MEDIALAB KATOWICE

DATA-DRIVEN METHODS FOR CITY RESEARCH AND EXPLORATION

KATOWICE 2015

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MEDIALAB KATOWICE

DATA-DRIVEN METHODS FOR CITY RESEARCH AND EXPLORATION

edited by Karol Piekarski

Institution of Culture *Katowice: City of Gardens*

KATOWICE 2015


Katowice
05.2014
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URBAN
DATA
STORIES

DATA-DRIVEN METHODS FOR CITY RESEARCH AND EXPLORATION. INTRODUCTION

This book discusses the basic rules for the implementation of data-driven projects, including stages of the design process, specific demands of working in an interdisciplinary team and methods for data acquisition, processing and visualisation.

While preparing our exhibition on the history of Katowice using maps and data visualisation, we had to deal with both negative and positive stereotypes about Silesia. Among them was an image of a busy Silesian who, instead of making plans and considering the details of possible projects, is eager to plunge into work as soon as possible to confront their ideas with reality.

We were driven by a similar motivation when we made the decision to start Medialab Katowice several years ago. Tired of futile considerations about the impact of technology on society, coupled with complaints of information overload and the Internet destroying our culture, and irritated by pretentious conferences on technological innovation with speakers teaching creativity through PowerPoint presentations, we were intent on creating a place where visions would immediately be field-tested as prototypes. Thus, a new workspace was established for people who are willing to "get their hands dirty".

As our intention was not to avoid reflection on technology altogether, we staged a number of festivals, seminars, lectures and discussions, however always with a view to concrete actions in accordance with the Medialab method of immediate prototyping of proposed solutions. The structure of this publication, consisting of theoretical texts accompanied by specific project documentations, best reflects our Medialab philosophy. Discussions on studying and discovering the city is interspersed with practical project implementations, even if they are just experiments and speculations about the future.

↘ **Seven Things You Need to Know Before You Take on a Data Visualisation Project** Karol Piekarski **p. 12**

The first article is an overview of the most important issues related to the implementation of data-driven projects. It contains a synthetic description of our reflections regarding projects delivered by Medialab. In most cases, these include universal problems which have long been bothering curators and designers, but are hardly ever addressed as part of popular data visualisation courses. The following articles discuss

research methods using large data set analysis, different ways of using data in city-related activities, and the *smart city* model together with its community-based alternatives. The second part consists of articles written specially for this publication and including considerations on data journalism, speculation in urban design, and urban typography. These, while not devoid of theoretical aspects of working with data, are based largely on experience gained from projects delivered in Katowice. The remaining pages of this book contain documentation of selected Medialab workshops and workgroup meetings, including several detailed project accounts as well as brief descriptions of Medialab's festivals, conferences and fringe events.

↘ **Civic Technologies: Tools or Therapy?**
Dietmar Offenhuber
p. 39

Is the *smart city* dead? By bringing up this rather provocative proposal by Dietmar Offenhuber, we continue the critical reflection on the *smart city* concept as initiated by Adam Greenfield's lecture at our Rediscovering the City conference. As other Polish urban centres are contemplating to join the prestigious club of *smart cities*, questions must inevitably be asked about the consequences of investment in urban data processing infrastructure. Can it really help solve the most important problems of Polish cities? Who will gain the most benefit? The residents, local administration, or, perhaps, some large technology companies which manage the infrastructure and software?

As more and more Polish cities, largely thanks to long-standing efforts of non-governmental organisations, make conscious and transparent attempts to implement policies of open access to data, solutions falling under the umbrella term of *smart cities* still await public debate, remaining largely in the sphere of influence of technology companies which try to sell their services to cities. The use of the term 'smart city' itself seems quite ambiguous, too. Depending on the context, it may refer to transport management systems, start-ups, municipal services cards, open data, mobile applications or sustainable development policies. Not only does this conceptual chaos compromise the quality of discussion about the sensible use of new technologies to improve the quality of life of residents, but mainly causes us to become overly excited with technological novelties and the associated newspeak which mindlessly abuses the term 'smart', suggesting that the proposed solutions are inherently sensible and therefore beneficial to the city.

Offenhuber does not mock *smart cities*, though. Indeed, he acknowledges the positive aspects of city management using data processing technologies. At the same time, however, he is not in raptures over grassroots civil technologies (*smart citizens*) as supposedly the best alternative to the technocratic vision of the intelligent city. The article provides a balanced view of different concepts for the use of urban data while addressing the dilemma of choosing between dynamism and creative energy of participatory projects and the expectation of longevity, reliability and responsibility that characterise initiatives adopted by public administration.

↘ **Owning the City: New Media and Citizen Engagement in Urban Design**
Michiel de Lange i Martijn de Waal
p. 46

The friction between different ways of managing the urban data infrastructure is also addressed by Michiel de Lange and Martijn de Waal, the authors of the subsequent article containing a synthetic review of participatory models of using data to promote active citizenship. Similarly to Offenhuber, criticism of the *smart city* concept is the starting point for a search to find more sustainable ways of creating digital public space. They see an alternative to the smart city in, among others, the use of open data, DIY urban schemes, as well as citizen science, i.e. volunteers collaborating with scientists to conduct research into urban centres.

Although Medialab is not involved in projects animating local communities, we find it important to present the context of using data acquisition and processing technologies and their applications in city management or research and civic projects. Such knowledge not only provides an understanding of the capabilities of available technologies, but above all helps avoid common mistakes, i.e. implementation in good faith of expensive technologies without taking into account the real needs of their consumers, in this case the residents. We addressed the topic of community-oriented applications of data processing methods as part of our CityLab festival (2013) and Rediscovering the City conference (2015).

↘ **The Science of Culture? Social Computing, Digital Humanities, and Cultural Analytics**
Lev Manovich
p. 23

The publication of Lev Manovich's article *The Science of Culture? Social Computing, Digital Humanities, and Cultural Analytics* summarises several Medialab activities during the festival art+bits in 2015, including: a lecture by Manovich, a lecture and seminar by Moritz Stefaner on cultural analytics, and the *Selfiecity* project delivered by the Software Studies Initiative. We find the lab's activities inspirational not only due to successfully combining cultural studies with science, but above all because of the practical dimension of its projects, starting with how to conduct the statistical analyses, through the use of large data sets acquired from the

web and ending with the exploratory nature of the visualisations presenting research results.

Of particular importance to us was a seminar conducted by Stefaner Moritz, who introduced the participants to the details of the *Selfiecity* project by giving a step-by-step account of the project stages as well as highlighting the biggest challenges and the inside scoop of work on data acquisition and processing. One of the topics discussed during the seminar was to what extent *On Broadway* or *Selfiecity* should be treated as classic research projects, i.e. those based on verifying hypotheses that will lead to solid conclusions.

Without giving any clear-cut answers, *On Broadway* and *Selfiecity* confine themselves to providing a kind of "information environment" to allow exploration of the issues presented and conduct their own research, whereby the recipient of the project can come to their own conclusion. This seems a common feature of projects based on the visualisation of large data sets. One might want to consider them, as proposed by Manovich, a newly emerging cultural form which, in contrast to forming strings of causal narratives, "represents the world as a list of items, and it refuses to order this list"[1]. Thus, research work does not consist in verifying hypotheses using data collected for this purpose, but rather relies on trying to "discover" certain phenomena, relationships or trends in large data sets by using various analytical methods, including those involving visualisation.

Manovich's article is a synthetic introduction to the relatively new field of research that uses the computational power of computers and databases in the area of humanities which are still rather reluctant, if not helpless, in relation to the technological revolution. The reader is given a synthetic view of the current possibilities of using different datasets – mainly content produced by users of social networking sites – to investigate cultural phenomena. Interest taken by the Software Studies Initiative in urban research projects *Selfiecity* and *On Broadway* raises the question of the extent to which software studies tools may be helpful in the study of cities?

1 Lev Manovich, *The Language of New Media*. Cambridge, MA: The MIT Press, 2001, p. 225.

↘ **An Introduction to Data Driven Investigations**
Nicolas Kayser-Bril
p. 67

Data journalism is no doubt an extremely helpful and promising method of exploring the city. This new concept combines the competence of journalists, data developers/analysts and graphic designers. Interdisciplinary editorial teams specialise in investigating the use of large data sets, trying to find important topics and relationships which could form the starting

point for stories presented using online tools: interactive charts, maps, timelines and visualisations. During the two projects carried out in conjunction with the Journalism++ agency, where we examined the issue of air quality in the region and the activity of the Katowice Special Economic Zone, we came to the conclusion that the widely available and user-friendly data journalism tools can be successfully used by NGOs, urban activists and other actors interested in the problems of the city. The specific character of a data journalist's work is presented by Journalism++'s Nicolas Kayser-Bril in his article *An Introduction to Data Driven Investigations*.

↘ **Simulation in Creating Cities**
Marek Kultys
p. 74

Another item included in this part of the publication is an article by Mark Kultys – a reflection of our interest in the benefits offered by the mechanism of speculation in managing the development of the city. Speculative design was a leading topic at the most recent edition of our art+bits festival, which hosted, among others, Anab Jain of the Superflux studio, Simone Rebaudengo, creator of speculative everyday objects, as well as Jakub Koźniewski of the panGenerator group. Noteworthily, Marek Kultys, along with Lina Aue Pogatschnigg, had already conducted a Katowice-based workshop *The Reversal of Roles: Visualization as a Method for Change* in 2013, the results of which were presented in Kultys's essay *Simulation in Creating Cities*.

↘ **Exploring Katowice Typography**
Verena Gerlach
p. 79

The results of a project implemented in Katowice are also described by Verena Gerlach, a Berlin-based book and typeface designer, who joined the Medialab team to lead a study of Katowice's typography. Although the project goes beyond the scope of Medialab activities discussed in this book, it is a good example of alternative ways of studying the city through an analysis of its lettering and iconography. A prominent outcome of the study is Pischinger, a multilayer typeface designed by the participants, wherein each subsequent layer expresses the nature of a different period in Katowice's history. The German times are invoked by the Fraktur style, while neon-styled letters are a symbolic reference to the 1960s and 1970s. The vinyl and three-dimensional typography, in turn, reflect the period of Poland's transition to market economy. All these styles can be freely mixed and matched and put on top of each other to create new configurations. Pischinger seems a fitting testament to Medialab's commitment to achieving practicable results, whereby a workshop-based research project yields a fully professional and openly licensed typeface that can be downloaded and incorporated by users into their projects.

The projects included in the latter part of the book represent only a brief selection of initiatives carried out by Medialab Katowice in 2013–2015. In keeping with the subject matter of the publication, we have selected only those projects that use data to investigate and explore the city. The choices we made were often influenced by our thoughts about the potential readers, as the book is not solely targeted at "classic" urban researchers, such as sociologists, urban planners, cultural theorists, or professional programmers, analysts and designers interested in data processing and visualisation. Instead of focusing on specific research topics or solving specific design problems, we go for a holistic representation of the design process and the potential of interdisciplinary projects involving experts from various fields to explore those uncharted aspects of the city and build an attractive narrative that goes beyond the rigid framework of academic milieus, professions and research disciplines, all in order to engage the most important urban actors i.e. the residents.

Soon, the ability to make decisions based on data analysis will become one of the core competencies of each resident. Whether we like it or not, we make more and more everyday life decisions based on the results of complex data processing and analysis operations. Software apps tell us how to get to our destinations, where to eat, how much jogging to do, what to buy and where to live. Their developers offer us a new vision of a better city based on hyper-rational decisions where every action is subject to the logic of efficiency. The coming years will show whether we will become just consumers of the digital city, or learn to consciously use the data for own purposes and projects that are meaningful to local communities. This volume was created for those people who, regardless of their profession and experience, are contemplating projects using data about the city. It contains a synthetic account of the basic principles for the implementation of such projects, including data acquisition, processing and visualisation methods, stages of the design process, as well as the nature of work in an interdisciplinary team.

With this book, we would like to share the knowledge and experience of experts and participants involved in our activities. It is extremely important to us the that authors have actually visited Katowice or participated in Medialab events and that several articles have been written specifically for this publication. A lot of the inspiration come from the guests

our conference Rediscovering the City, in particular, our partners from Prague's reSITE festival, who work with us on joint projects.

We have been involved in regular and long-term collaboration with the Academy of Fine Arts in Katowice and Netizens digital innovation house, our most important joint venture being art+bits, an urban-themed festival of art, design and technology. We are grateful to the Katowice History Museum and the Katowice City Archive for providing professional assistance and access to their resources and the Silesian Cultural Heritage Centre for the ongoing support in compiling data from the map of Katowice buildings.

We explored the topic of *smart cities* together with Magazyn Miasta and the Res Publica Foundation as part of the first edition of Warsaw's Res Publica Festival. We found it extremely inspirational to have the opportunity to present Medialab at the conference "Hacking the Social Operating System" during the WRO 2015 festival staged as part of City of the Future, a project delivered under the European Capital of Culture Wroclaw 2016. A lot of new experience and knowledge came from our collaboration with the Museum of Warsaw and participation in the Building Festival organised by the Centre for Architecture, as well as through our collaborative efforts with the Bęc Zmiana Foundation.

Thanks to the institution Workshops of Culture, we were able to complete a three-day project called *The Pulse of Lublin's Old Town*. Moreover, as part of the Coalition of Cities which competed for the title of European Capital of Culture, we were joined by the Wrocław Festival Office IMPART 2016 to prepare the second edition of the project *Cyberacademy,* held in Katowice under the banner of Digital City.

Working in conjunction with the Centrum Cyfrowe in Warsaw and the Arteria Association of Gdynia, we took part in RemiksLab, a project initiated by Lublin's "Grodzka Gate – NN Theatre". During a meeting of the group in Katowice, an online tutorial for NGOs and cultural institutions was created, entitled *A brief guide to sensible implementation of new technologies in cultural, social and educational projects*. The long list of our partners also includes Digital Cultural Institute Foundation of Lublin, the ePaństwo Foundation and its Koduj dla Polski [Code for Poland] project, and the Institute of Cultural and Interdisciplinary Studies at the University of Silesia.

Thanks to the knowledge and experience kindly shared by the above mentioned partners, we were able to organization such a wide range of projects and for this reason it seems only fair that they should be treated as co-authors of this book.

KAROL PIEKARSKI

SEVEN THINGS YOU NEED TO KNOW BEFORE YOU TAKE ON A DATA VISUALISATION PROJECT

Until recently, data visualisation was of interest merely to a small group of analysts, researchers and information design specialists. Their painstakingly developed and often hard-to-decipher diagrams filled the pages of specialist papers, reports and scientific publications. And althought, as early as two centuries ago, people were already aware that graphic images are a more powerful tool for effective and meaningful communication of ideas than numbers represented as rows of digits, it was not until the development of networks and data processing tools that data visualisation gained wider recognition. Since then, it has quickly made its way into the mainstream media, including journalism and advertising, while data visualisation designers have become overnight stars of fashionable conferences on the development of new technologies. Here is what you should know before you decide to start your own data-driven project.

1. How data visualisation found its way to the mainstream

When the pioneers of data journalism were making their first humble steps in the newsrooms of renowned international press titles a few years ago, no-one expected the outbreak of what was soon to be labelled the greatest media scandal since Watergate. It was upon the release by Wiki Leaks of documents from the wars in Afghanistan and Iran and the US embassy diplomatic cables, that the career of data journalism started to gain particular momentum. This was especially true in Britain, where, aided by web users, editors from the Guardian revealed the blatant misuse of public funds by British MPs. The relevant data visualisations rocked the UK public no less than the concurrent unmasking of the foul practices engaged in by tabloids from Rupert Murdoch's media conglomerate.[1]

While major scandals contributed to the development of data journalism, they did not play the decisive role in their rise to popularity. The critical factor was the ever-growing amounts of digital data stored on the Internet that was impossible to interpret and understand without the use of automated tools. One of the

1 Cf. *The Data Journalism Handbook,* ed. Jonathan Gray, Liliana Bounegru, Lucy Chambers. Sebastopol, CA: O'Reilly Media, 2012. Online version: http://datajournalismhandbook.org/1.0/en/.

tasks of data journalism is to search out stories in large collections of unstructured digital content. Interdisciplinary teams of editors, programmers and designers have the analytical and development tools to run new kinds of investigative journalism. One of these is *The Migrants Files*, an international project dedicated to immigrants who have died while attempting to escape to the Old Continent, which is carried out by reporters from several European countries[2]. Many major titles, such as The New York Times, The Guardian, and Poland's leading daily newspaper Gazeta Wyborcza, have data journalism departments focused on producing content in the form of pictograms, diagrams, maps and other visual messages that have been developed based on numerical data analysis. Noteworthy is also the emergence of alternative news services based entirely on the results of statistical analysis[3].

Data journalism is an attempt to deal with the information overload on the Internet and redefine the role that could be assumed in the world of digital media by journalism which is currently undergoing a deep crisis. Perhaps the essence of data journalism was most accurately defined by Simon Rogers, when he somewhat ironically noted that it is simply... journalism[4]. This way, he seems to have intended to suggest that automatic content processing and visualisation tools will become a mainstay in the bag of tricks of every competent journalist seeking information and stories in social media, reports and online databases. Similar trends can be observed in other fields that have not been associated with data analysis so far, e.g. humanities research, library studies and museum exhibitions.

2. What we can learn from data visualisation history

It may come as a shock to those who have not been to a library for years, and associate a visit to museum only with boredom and mandatory slippers, that cultural institutions such as the Rijksmuseum, the Metropolitan Museum of Art and the New York Public Library lead the way in digitisation and data sharing. Poland's large public institutions and especially libraries are also increasingly willing to have their collections digitised. And although still lacking in creative ideas on how to disseminate the digitised content, they are increasingly aware of the need to bring into the daylight all those items long hidden away in the archives. One way of presenting large collections is the long-standing methods of data visualisation. Good practices in that respect can be found in exhibition projects by Otto Neurath completed nearly a century ago in Vienna's Gesellschafts- und Wirtschaftsmuseum (socio-economic museum) as well as in his plans

2 *The Migrants Files*, http://www.themigrantsfiles.com/.

3 These include, inter alia: *Fact Tank | Pew Research Center*, http://www.pewresearch.org/fact-tank/; *Full Fact*, https://full-fact.org/; *Vox.com | Explain the news*, http://www.vox.com/; *FiveThirtyEight*, http://fivethirtyeight.com/.

4 Simon Rogers, *Facts Are Sacred: The Power of Data*. London: Faber and Faber, Guardian Books, 2013. Epub, Chapter *10 Things You Will Learn in This Book*.

sketched for the Mundaneum[5], an institution set up by Paul Otlet to collect and organise all the knowledge then available to humanity (associations with Google, whose mission is to" organize the world's information and make it universally accessible and useful"[6], are well justified).

So, why should we study the history of data visualisation today? Well, if only to be aware that most of the problems related to information design were resolved many years ago. If you think you have created a new type of diagram or an alternative method of presenting figures, it is likely that just failed to carefully read Michael Friendly's *Brief History of Data Visualization* or Edward Tufte's *The Visual Display of Quantitative Information*[7]. The rise of data visualisation in the most popular sense of the term, which refers to the statistical data on society, goes back to the end of the 18th century, although visualisation methods had been first used many years before by scholars in other fields, who sought effective ways to communicate their achievements. Moreover, those data visualisation pioneers fully realised that graphic images were far more persuasive than the same figures recorded only in the form of numbers. Even in the times of Congress Poland, which, to put it mildly, was not a leader of regular statistical research, emphasis was put on the way data was presented. In the introduction to the 1887 book *Ludność miasta Warszawy w obrazach graficznych* [*Warsaw Population in Graphic Images*], which presented the results of the 1882 one-day census using colour maps and graphs, the author explains the need for a visual language with which to present large numerical data sets.

> [...] Any intelligent resident of a given locality should know his surrounding circumstances, among which the people are undoubtedly the most important ones. [...] The first one-day census in Warsaw has provided material on the population structure of our city. However, since the numerical data as such is not easily comprehensible by everyone, because not everyone is capable of handling large numbers [...], we took on the laborious task to graphically present the state of affairs, considering it, for illustration purposes only, to be the most accessible and the least boring to read for the average person.[8]

Several visualisations from the same period, including the famed Charles Joseph Minard diagram showing Napoleon's invasion of Russia remains

5 *Isotype: design and contexts, 1925–1971*, ed. Christopher Burke, Eric Kindel, Sue Walker. London: Hyphen Press, 2013.

6 Google, *Company – Google*, https://www.google.com/about/company/.

7 Michael Friendly, *A brief history of data visualization*, in: *Handbook of data visualization*, ed. Chun-houh Chen, Wolfgang Karl Härdle, Antony Unwin. Springer Berlin Heidelberg, 2008. pp. 15–56; Edward R. Tufte, *The Visual Display of Quantitative Information*, Graphics Press, Cheshire, Connecticut 2001. Cf. also Michael Friendly, Daniel J. Denis, "Milestones in the history of thematic cartography, statistical graphics, and data visualization". *Seeing Science: Today American Association for the Advancement of Science* (2008).

8 Adam Bolesław Danielewicz, *Ludność miasta Warszawy w obrazach graficznych (według spisu jednodniowego z 1882 roku) [Warsaw Population in Graphic Images (According to the 1882 One-day Census)]*, Drukarnia Stanisława Niemiery, Warsaw 1887, p. 5.

unrivalled examples of the graphic presentation of content[9]. Although many researchers and designers have invested their time and effort to advance the discipline, the most interesting contributions were made by the aforementioned Isotype Institute. Rather than conveniently limit themselves to developing graphical methods of presenting content, its founders took on the daunting task of creating a universal visual language, which was to revolutionise the way we distribute knowledge and alleviate the undesirable consequences of information overload – an inherent feature of mass culture. A careful study of history helps understand the reasons for the current popularity of data visualisation, which is again seen by many as a remedy to the problem of information overload.

[9] Cf. Edward R. Tufte, *Beautiful Evidence*. Graphics Press LLC, Cheshire, Connecticut, 2013, pp. 122–139.

3. Why it is difficult to create a good visualisation alone

The visualisation craze can sometimes lead to problems arising from misunderstanding the specific nature of working with data. We often hear that it is possible to visualise any type of data as if visualisation was independent of the content at hand. Many assume – in good faith and not always wrongly – that visualisations are created single-handedly by designers who use data supplied by the client. However, in most cases the process involves several steps that require a variety of skills and many content-related decisions to be made by a professional who performs a function similar to the curator or publication editor.

Particularly instructive in this regard is the story of Maria Neurath, co-founder of the Isotype Institute. For a long time, this very creative person remained in the shadow of her famous husband Otto and graphic designer Gerd Arntz, creator of the graphic form of Isotype pictograms and visualisations. Several decades ago, it was difficult for a woman to compete with the acclaimed philosopher of the Vienna Circle that was Neurath, or Arntz, who still remains a true icon of graphic design. However, it was Maria who was largely responsible for the process of transforming data into graphic form, which is the most important stage in the creation of visualisations in Isotype. It seems that in the data-heavy cyberspace environment, where we are all competing for each other's attention, the role of a transformer who acts as an information dietician carefully tailoring a diet to the needs of users is becoming increasingly important

> It is the responsibility of the "transformer" to understand the data, to get all necessary information from the expert, to decide what is worth transmitting to the public, how to make it understandable, how to link it with general knowledge or with information already

given in other charts. In this sense, the transformer is the trustee of the public.[10]

Isotype researcher Christopher Burke acknowledged Maria Neurath's influential role, noting that the "transformer was an archetype of the modern information designer"[11]. Valuable projects are usually achieved by interdisciplinary teams or entities having extensive capabilities enabling them to apply due diligence at all stages of the design process. Transformers acts as curators who supervise the work of the team and the consistency of the final product.

4. Is data visualisation a good way to present facts objectively?

Following years of postmodernism's dominance on the intellectual scene, *Facts are Sacred*, the title of Simon Rogers's book on data journalism, was not much short of a provocation. While avoiding the naive belief in the absolute impartiality of media coverage, the author suggested that the presentation of facts by means of figures and visualisations is least vulnerable to bias[12]. In a way, Rogers's view fits in the debate on the objectivity of the visual language pioneered by Otto Neurath and his attempt to create a universal system of pictograms. This debate was continued many years later by Ellen Lupton, a respected designer and design critic, who challenged Neurath's universalist ambitions from a postmodernist perspective in her essay *Reading Isotype*[13].

Due to the polyphonic nature of social media, where everything is questioned as a matter of principle, the temptation to identify data with facts becomes very appealing. The problem seems to arise from the relaxed attitude to the meanings of these notions, which are often used interchangeably. However, in his article published as part of the evocatively titled collection "*Raw Data" Is an Oxymoron*, Daniel Rosenberg makes a useful distinction between data, evidence and facts. By referring to the etymology of these terms, he points out that facts are ontological in nature, while evidence is epistemological and data – rhetorical.

> The word "data" comes to English from Latin. It is the plural of the Latin word datum, which itself is the neuter past participle of the verb dare, to give. A "datum" in English, then, is something given in an argument, something taken for granted. This is in contrast to "fact", which derives from the neuter past participle of the Latin verb facere, to do, whence we have the English word "fact", for that which was

10 Marie Neurath, Robin Kinross. *The Transformer: Principles of Making Isotype Charts*. New York: Princeton Architectural Press, 2009.

11 *Isotype: design and contexts*, 1925–1971, ed. Christopher Burke, Eric Kindel, Sue Walker. London: Hyphen Press, 2013, p. 14.

12 Simon Rogers, *Facts Are Sacred: The Power of Data*. London: Faber and Faber, Guardian Books, 2013. Epub, Chapter *Introduction*.

13 Ellen Lupton, *Reading Isotype*, in: *Design Discourse: History, Theory, Criticism*, ed. Victor Margolin. Chicago: University of Chicago Press, 1989.

done, occurred, or exists. The etymology of "data" also contrasts with that of "evidence", from the Latin verb vidēre, to see. A datum may also be a fact, just as a fact may be evidence. But, from its first vernacular formulation, the existence of a datum has been independent of any consideration of corresponding ontological truth. When a fact is proven false, it ceases to be a fact. False data is data nonetheless[14].

Even if data visualisation is more effective in communicating the content, it is not a medium that is intrinsically more objective than other forms of communication. The use of figures does not guarantee objectivity and treating them automatically as identical with facts can be deceptive. Neither should we be misled by the nonchalant use of the expression "raw data", as pure, unprocessed, "uninterfered-with" data simply does not exist. Quite the contrary, it is, notably, always arbitrary and the result of someone's decision. Similarly, there cannot be a neutral and objective way to visualise data. The fact that it may communicate content more efficiently must not be taken to mean that it is intrinsically more objective than other forms. It should also be noted that there are different kinds of visualisation models, among which a large group includes works created to provide a clear presentation of common procedures conveying well-established knowledge, e.g. non-controversial scientific theories. Another group are visualisations to illustrate new research hypotheses and those leading to the discovery of new facts by juxtaposing data from different sources. There are also projects which set out to enable users to independently explore, compare and interpret large data sets. In the latter case, visualisation is a research tool, rather than a ready-made message aspiring to impartiality.

5. Why involve the community in the design process

When it comes to objectivity and authenticity in presenting data, we gained invaluable experience working on the map of Katowice buildings. In order to raise public awareness of the development of the city, we obtained relevant data from the Surveying Department of the City of Katowice, thanks to which we were able to create a map presenting the commissioning dates and architects of selected buildings[15]. A few days after its launch, we received dozens of comments, both from enthusiasts of the idea and users pointing out serious errors in the dating of the buildings. Here is an excerpt from an email we received:

14 Daniel Rosenberg, *Data before the Fact*, in: *"Raw Data" Is an Oxymoron*, ed. Lisa Gitelman. Cambridge, MA: The MIT Press, 2013, p. 18.

15 Cf. The *Map of Katowice Buildings* project herein.

> I welcomed the idea of a map of Katowice buildings with enthusiasm. Unfortunately, my excitement quickly waned as I saw that a 1935 house [...] is indicated on the map as commissioned in... 1950! Is the other data equally 'reliable'? Well, if so, this map is completely useless!...

This Katowice resident had a perfect right to expect the data obtained from the City Hall and published by the city's official cultural institution to be reliable. Of course, we discovered the inaccuracies upon receiving the data. We noticed, for example, that the commissioning dates for some of the buildings failed to match their completion dates. Facing a dilemma whether to take on the daunting task of verifying the data for tens of thousands of buildings in consultation with experts, or to publish the content in the current form and invite both experts and locals to share their knowledge and help us gradually complete and verify the data, we adopted the latter approach without much deliberation.

Although crowdsourcing is not an optimal or fully reliable way of obtaining data, community involvement – both local and network – in the verification process can bring great results. Methods of data collection by institutions established for that purpose, carry a lower risk of error, but are not without their shortcomings. Using official data sources does not relieve us of the obligation to verify their reliability and consistency. Methods for immediate prototyping and social project consulting at an early stage of production are conducive to detecting errors and inaccuracies, especially if they concern a subject close to residents' hearts.

6. Why activists work with data

Planting trees using mobile apps? Mapping vacant houses? These and other initiatives organised in cities across Poland go to show that crowdsourcing is not the only way to involve local communities in data-driven projects. Still, while going through writings on the advantages of visualisation, we constantly find ourselves reading about accessible forms of communication, effective methods of conveying content, leading the recipient by the hand or the effect to be achieved by a message communicated via a graphic image. It is quite amazing that ever so often we use the language of persuasion characteristic of mass communication studies, rather than resort to the classic web interactivity theories, which are sometimes guilty of overemphasising the active role of users. This attitude is much less surprising, however, when we talk about the history of data visualisation, because of the different social and cultural context. Today, we find the rather patronising attitude of Isotype creators to visualisation

recipients quite striking, though we hardly have reasons to accuse Neurath's project team of bad intentions.

When mass society was at its peak several decades ago, division into creators and consumers of content seemed natural and unquestionable. Currently, each web user independently produces massive amounts of data, but rarely has the opportunity and skills to use them it to achieve their own goals, which not necessarily match those of the largest technology companies such as Google, Amazon and Facebook. Being advocates of Enlightenment ideas, Isotype creators believed that social change can be made through the dissemination of knowledge among illiterate strata of society – a process to be aided by the universal visual language. Today data activists rely on making data public or use it in any other way to achieve objectives relevant to the community. The role of data is not just to inform, let alone instruct, but literally empower people to take action and bring about positive change[16].

The growth of the of open data movement and the controversies surrounding ACTA and Edward Snowden's leaks all go to show that the availability of data has in recent years become an important political issue worthy of public debate. The point is that most of the data-driven activist endeavours do not necessarily have to match WikiLeaks in terms of public attention or scope of impact. As data processing influences on the daily decisions of PC and smartphone users handling email and social networking sites, data processing skills must be put at the core of new media literacy that will become as widespread in society as literacy once did.

7. Why we should not be afraid of data overload

No more than a few years ago, we were told by information society theorists that atoms would soon be replaced by bits and that energy resources will give way to digital data as a fuel for economic development. Despite plummeting stock indexes, there is no sign of the age of oil and steel coming to an end. Nonetheless, digital data actually does bring a hefty income for many a technology company, even though mainly in the United States. The same seems true of data visualisation. Without appropriate resources in the form of databases, we will not be able to fulfil Poland's potential in this respect. In addition to analytical and design skills, we need access to open data that can be acquired, processed and disclosed without any legal or technological constraints. Although the Polish government and several major cities already took the first steps by creating the foundations of data repositories, the scale and pace of these actions lag far behind the standards in developed countries. For the time being, the future of coal remains a much more urgent issue than data extraction.

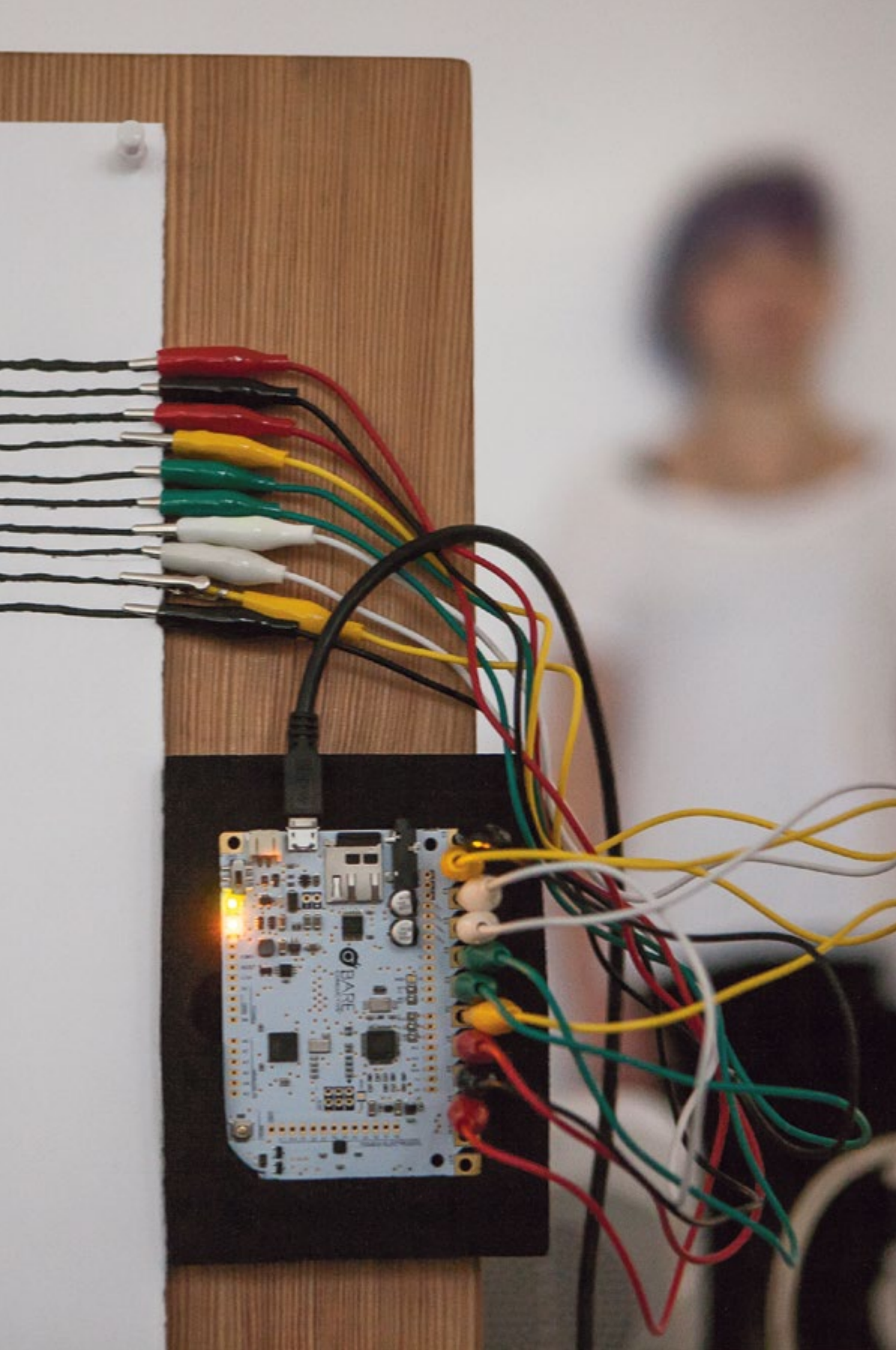
16 Cf. the activity of Tactical Technology Collective, https://tacticaltech.org/, and the research project DATACTIVE. The Politics of Data According to Civil Society, https://data-activism.net/.

The question whether the Polish aversion to openness is the result of our civilisational backwardness, or whether its causes lie deeper in Poles' mentality and result from a serious crisis of confidence and the weakness of our civil society, still remains unanswered. Although we know that open data does not equate to an automatic guarantee of government transparency[17], the continuing problems faced by non-governmental organisations trying to access public information seem to confirm that we are still suspicious and rather reluctant to share our knowledge. Arguments for the potential economic benefits of open data and its key role in creating new or improved tools and services in Poland also remain unheard.

The Central Statistical Office, which should be the main source of online data about Polish cities, hardly publishes content in formats allowing further processing. Most of the data available from public administration websites or public information bulletins is stored in pdf files, which are not suitable for further use without going through the tedious process of data extraction. Fortunately, there are initiatives which give hope for change. Although digital libraries provide only scans of their resources, the digitisation of yearbooks makes it easier to study the history of cities. The institutional gap is being bridged by non-governmental organisations and enthusiasts who carry out digitisation independently and willingly share the results of their work. Unfortunately, the lamentable lack of legal regulations to unlock the full potential of this digital cottage industry driven by Internet users.

Why is access to large data sets so important? Well, while the most widely used research model consists in putting forward a hypothesis, which is then verified using relevant source materials, database projects often complement and even reverse this logic. They employ calculating machines to find relationships and trends in data collections using analyses and summaries which would be too time-consuming or difficult to carry out manually. Thus, visualisation is not just a way of presenting research results, but a useful research tool that allows us to explore large data sets. This is the main, though not the only, reason why activists, urban planners and researchers should take interest in automatic data processing and visualisation methods. Rather than fear the information chaos, let us learn to take full advantage of the great abundance of available resources.

17 Harlan Yu, David G. Robinson, *The New Ambiguity of Open Government.* "SSRN Scholarly Paper". Rochester, NY: Social Science Research Network, 2012.



LEV MANOVICH

THE SCIENCE OF CULTURE? SOCIAL COMPUTING, DIGITAL HUMANITIES AND CULTURAL ANALYTICS

Studying Big Cultural Data: Social Computing and Digital Humanities

I define Cultural Analytics as "the analysis of massive cultural data sets and flows using computational and visualization techniques", I developed this concept in 2005, and in 2007 we established a research lab (Software Studies Initiative, softwarestudies.com) to start working on practical projects. The following are the examples of theoretical and practical questions that are driving our work:

What does it mean to represent "culture" by "data"? What are the unique possibilities offered by computational analysis of large cultural data in contrast to qualitative methods used in humanities and social science? How to use quantitative techniques to study the key cultural form of our era – interactive media? How can we combine computational analysis and visualization of large cultural data with qualitative methods, including "close reading"? (In other words, how to combine analysis of larger patterns with the analysis of individual artifacts and their details?) How can computational analysis do justice to the variability and diversity of cultural artifacts and processes, rather than focusing on the "typical" and "most popular"?

Eight years later, the work of our lab has become only a tiny portion of the very large body of research. Thousands of researchers have already published tens of thousands of papers analyzing patterns in massive cultural datasets. First of all, this is data describing the activity on most popular social networks (Flickr, Instagram, YouTube, Twitter, etc.), user created content shared on these networks (tweets, images, videos, etc.), and also users' interactions with this content (likes, favorites, reshares, comments). Second, researchers have also started to analyze particular professional cultural areas and historical periods, such as website design, fashion photography, 20th century popular music, 19th century literature, etc. This work is carried out in two newly developed fields – Social Computing and Digital Humanities.

Where does this leave Cultural Analytics? I think that it continues to be relevant as an intellectual program. As we will see, Digital Humanities and Social Computing carve their own domains in relation to the types of cultural data they study, but Cultural Analytics does not have these limitations. We are also not interested in choosing between humanistic vs. scientific goals and methodology, or subordinating one to the other. Instead, we are interested in combining both in the studies of cultures by adopting the focus on the particular, interpretation, and the past from the humanities and the focus on the general, formal models, and predicting the future from the sciences. In this article I will discuss these and other characteristics of both approaches to the study of large cultural datasets as they have developed until now, pointing out opportunities and ideas that have not yet been explored.

Digital Humanities scholars use computers to analyze mostly historical artifacts created by professionals. The examples are novels written by professional writers in the 19th century. Timewise, they stop at the historical boundaries defined by copyright laws in their countries. For example, according to the U.S. copyright law, the works published in the last 95 years are automatically copyrighted. (So, e.g. as of 2015, everything created after 1920 is copyrighted, unless it is recent digital content that uses Creative Commons licenses). I understand the respect for the copyright laws – but it also means that digital humanists shut themselves out from studying the present.

The field of Social Computing is thousands of times larger. Here, researchers with advanced degrees in computer science study online user-created content and interactions with this content. Note that this research is carried out not only by computer and information scientists who professionally identify themselves with the Social Computing field[1], but also researchers in a number of other computer science fields, such as Computer Multimedia, Computer Vision, Music Information Retrieval, Natural Language Processing, and Web Science. Therefore, social computing can also be used as an umbrella term for all computer science research that analyzes content and activity on social networks. The researchers deal with the data after 2004, when social networks and media sharing services started to become popular. (Since it takes 1–2 years to do research and publish a paper, typically a paper published in 2015 will use data collected in 2012–2014.) The datasets are usually much larger than the ones used in digital humanities. Tens or hundreds of millions of posts, photos, or other items are not uncommon. Since the great majority of user-generated content is created by regular people rather

1 See the programs of the conferences in these fields for the range of topics they cover, for example: http://cscw.acm.org/2016/submit/; http://www.www2015.it/accepted-papers/.

[2] *Google Scholar,* https://scholar.google.com.

[3] *Google Scholar.*

than professionals, Social Computing studies the non-professional, vernacular culture by default.

The scale of this research may be surprising to humanities and arts practitioners, who may not realise how many people are working in computer science and related fields. For example, the search on Google Scholar for "Twitter dataset algorithm" returned 102,000 papers, the search for "YouTube video dataset" returned 27,800 papers, and the search for "Flickr images algorithm" returned 17,400 papers[2]. Searching for "computational aesthetics dataset", I got 14,100 results[3]. Even if the actual numbers are much smaller, this is still impressive. Obviously not all these publications directly ask cultural questions, but many do.

The following table summarizes the differences between the two fields, as I see them

Fields	**Social Computing** and various fields of computer science where researchers study social networks and shared media	**Digital Humanities** (specifically researchers in DH who do quantitative analysis using computer science techniques)
Number of publications	Tens of thousands	Less than 100
Period and material studied	Websites and social media content and activity after 2004	Historical artifacts up to the early 20th century
Authors of artifacts studied	Regular people who share content on social networks	Professional writers, artists, composers, etc.
Size of datasets	From thousands to hundreds of millions of items and billions of relations	Typically hundreds or thousands of items

Why do computer scientists rarely work with large historical datasets of any kind? Typically, they justify their research by reference to already existing industrial applications – for example, search or recommendation systems for online content. The general assumption is that computer science will create better algorithms and other computer technologies useful to industry and government organizations. The analysis of

historical artifacts falls outside this goal, and consequently few computer scientists work on historical data (the field of Digital Heritage being one exception).

However, looking at many examples of computer science papers, it is clear that they are actually doing Humanities or Communication Studies (in relation to contemporary media) – but at a much larger scale. Consider, for example, these recent publications: *Quantifying Visual Preferences Around the World* and *What We Instagram: A First Analysis of Instagram Photo Content and User Types*[4]. The first study analyzes worldwide preferences for website design using 2.4 million ratings by 40,000 people from 179 countries. Obviously, the study of aesthetics and design traditionally was part of the humanities. The second study analyzed most frequent subjects of Instagram photos – a topic which can be compared to art historical studies of the genres in the 17th century Dutch art.

Another example is a paper called *What is Twitter, a Social Network or a News Media?*[5]. Published in 2010, it has since been cited 3,284 times in other computer science publications[6]. It was the first large-scale analysis of Twitter social network using 106 million tweets by 41.7 million users. The study looked in particular at trending topics, showing "what categories trending topics are classified into, how long they last, and how many users participate". This is a classic question of Communication Studies, going back to the pioneering work of Paul F. Lazarsfeld and his colleagues in the 1940s, who manually counted the topics of radio broadcasts. But, given that Twitter and other micro-blogging services represent a new form of media – like oil painting, printed books, and photography before – understanding the specificity of Twitter as a medium is also a topic for humanities.

A small number of publications lie at the intersection of Digital Humanities and Social Computing. They take computational methods and algorithms developed by computer scientists to study contemporary user-generated content and media and apply them to historical artifacts created by professionals (i.e., professional artists, writers, editors, musicians or filmmakers). The prominent examples are *Toward Automated Discovery of Artistic Influence*[7], *Infectious Texts: Modeling Text Reuse in Nineteenth-Century Newspapers* (David A. Smith, Ryan Cordell, and Elizabeth Maddock Dillon, 2013)[8], *Measuring the Evolution of Contemporary Western Popular Music* (Joan Serrà, Álvaro Corral,

4 Katharina Reinecke and Krzysztof Z. Gajos, "Quantifying Visual Preferences Around the World". *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '14, (New York: ACM, 2014): 11–20, http://www.eecs.harvard.edu/~kgajos/papers/2014/reinecke14visual.pdf; Yuheng Hu, Lydia Manikonda, Subbarao Kambhampati, "What We Instagram: A First Analysis of Instagram Photo Content and User Types," *Proceedings of the 8th International AAAI Conference on Weblogs and Social Media* (ICWSM, 2014), http://rakaposhi.eas.asu.edu/instagram-icwsm.pdf.

5 Haewoon Kwak, Changhyun Lee, Hosung Park, Sue Moon, "What is Twitter, a Social Network or a News Media?" *Proceedings of the 19th International World Wide Web (WWW) Conference* (ACM, 2014): 591-600, http://www.eecs.wsu.edu/~assefaw/CptS580-06/papers/2010-www-twitter.pdf.

6 *Haewoon Kwak – Google Scholar Citations,* https://scholar.google.com/citations?user=M6i3Be0AAAAJ&hl=en.

7 Babak Saleh, Kanako Abe, Ravneet Singh, Arora Ahmed Elgammal, "Toward Automated Discovery of Artistic Influence," *Multimedia Tools and Applications* (Springler, 8/19/2014): 1–27, http://arxiv.org/abs/1408.3218.

8 David A. Smith, Ryan Cordell, and Elizabeth Maddock Dillon, "Infectious texts: Modeling text reuse in nineteenth-century newspapers," *Proceedings of 2013 IEEE Conference on Big Data* (IEEE, 2013): 84–94, http://www.ccs.neu.edu/home/dasmith/infect-bighum-2013.pdf.

Marián Boguñá, Martín Haro & Josep Ll. Arcos, 2012)[9], and *Quicker, faster, darker: Changes in Hollywood film over 75 years.* (James E Cutting, Kaitlin L Brunick, Jordan DeLong, Catalina Iricinschi, Ayse Candan, 2011)[10].

Until a few years ago, the only project that analyzed cultural history on a really large scale of millions of texts was carried out by scientists rather than by humanists. I am referring to N-Gram Viewer, created in 2010 by Google scientists Jon Orwant and Will Brockman, following the prototype by two Ph.D. students from Harvard in Biology and Applied Math. However, more recently, we have seen people in Digital Humanities scaling up the size of data they study. For example, in *Mapping Mutable Genres in Structurally Complex Volumes,* literary scholar Ted Underwood and his collaborators analyzed 469,200 volumes from Trust Digital Library[11]. Art historian Maximilian Schich and his colleagues analyzed the life trajectories of 120,000 notable historical individuals (*A network framework of cultural history*)[12]. And even larger historical datasets are becoming available in the areas of literature, photography, film, and TV – although they remain to be analyzed. In 2012, The New York City Municipal Archives released 870,000 digitized historic photos of NYC[13]. In 2015, HathiTrust made available for research data extracted from 4,801,237 volumes (containing 1.8 billion pages)[14]. In the same year, The Associated Press and British Movietone uploaded to YouTube 550,000 digitized news stories covering the period from 1895 to today[15].

What is the importance of having such large cultural datasets? Can't we simply use smaller samples? I believe that there are reasons. Firstly, to have a representative sample, we first need to have a much larger set of actual items from which to sample, or at least a good understanding of what this larger set includes. So, for example, if we want to create a representative sample of 20th century films, we can use IMDb, which contains information on 3.4 million films and TV shows (including separate episodes)[16]. Similarly, we can create a good sample of historical U.S. newspaper pages using Historical American Newspaper collection of millions of digitized

9 Joan Serrà, Álvaro Corral, Marián Boguñá, Martín Haro, Josep Ll. Arcos, "Measuring the Evolution of Contemporary Western Popular Music," *Nature Scientific Reports* 2, article number: 521 (2012), http://www.nature.com/articles/srep00521.

10 James E Cutting, Kaitlin L Brunick, Jordan DeLong, Catalina Iricinschi, Ayse Candan, "Quicker, faster, darker: Changes in Hollywood film over 75 years," *i-Perception* (2011), vol. 2: 569–576, http://people.psych.cornell.edu/~jec7/pubs/iperception.pdf.

11 Ted Underwood, Michael L. Black, Loretta Auvil, Boris Capitanu, "Mapping Mutable Genres in Structurally Complex Volumes," *Proceedings of the 2013 IEEE Conference on Big Data* (IEEE, 2013), http://arxiv.org/abs/1309.3323.

12 Maximilian Schich, Chaoming Song, Yong-Yeol Ahn, Alexander Mirsky, Mauro Martino, Albert-László Barabási, Dirk Helbing, "A network framework of cultural history," *Science* 1 August 2014: 345 (6196): 558–562, http://www.uvm.edu/~cdanfort/csc-reading-group/schich-science-2014.pdf.

13 *Historic Photos From the NYC Municipal Archives – In Focus – The Atlantic,* http://www.theatlantic.com/photo/2012/04/historic-photos-from-the-nyc-municipal-archives/100286/.

14 *HTRC Portal – Extracted Features Dataset,* https://sharc.hathitrust.org/features.

15 *AP makes one million minutes of historical footage available on YouTube,* http://www.ap.org/content/press-release/2015/ap-makes-one-million-minutes-of-history-available-on-youtube.

16 *Database Statistics,* http://www.imdb.com/stats.

pages from The Library of Congress[17]. But in many other cultural fields, such larger datasets do not exist, and without them, it may be impossible to construct representative samples.

Here is another reason. Assuming that we can construct a representative sample of a cultural field, we can use it to find general trends and patterns. For example, in the already mentioned paper *What We Instagram: A First Analysis of Instagram Photo Content and User Types*[18], three computer scientists analyzed 1,000 Instagram photos and came up with eight most frequent categories (selfie, friends, fashion, food, gadget, activity, pet, captioned photos). The sample of 1,000 photos was randomly selected from a larger set of photos shared by 95,343 unique users. It is possible that these eight categories are also most popular among all Instagram photos shared worldwide at the time when the scientists did their study. However, as we saw from our projects where we analyzed Instagram photos in different cities and their parts (for example, the center of Kyiv during 2014 Ukrainian Revolution in *The Exceptional and the Everyday*[19]), people also share many other types of images. Depending on the geographic area and time period, some of these types may replace the top eight in popularity. In other words, while a small sample allows finding the "typical" or "most popular", it does not reveal what I call "content islands" – types of coherent content with particular semantic and/or aesthetic characteristics shared in moderate numbers.

Can We Study Everything?

When I first started to think about Cultural Analytics in 2005, both Digital Humanities and Social Computing were just getting started as research fields. I felt the need to introduce this new term to signal that our lab's work would not be simply a part of digital humanities or social computing, but would cover subject matter studied in both fields. Like digital humanists, we are interested in analyzing historical artifacts – but we are also equally interested in contemporary digital visual culture (e.g. Instagram). Likewise, we are similarly interested in professional culture, artifacts created by dedicated non-professionals and artists outside of the art world (e.g. deviantart.com, "the largest online social network for artists and art enthusiasts"[20]) and accidental creators (e.g. people who once in a while upload their photos to social media networks).

Like computational social scientists and computer scientists, we are also attracted to the study of society using social media and social phenomena specific to social networks. An example of the former is finding

17 *About Chronicling America, Library of Congress*, http://chroniclingamerica.loc.gov/about/.

18 Yuheng Hu, Lydia Manikonda, Subbarao Kambhampati, "What We Instagram..."

19 Lev Manovich, Mehrdad Yazdani, Alise Tifentale, Jay Chow, *The Exceptional and the Everyday: 144 hours in Kyiv* (2014), http://www.the-everyday.net/.

20 *About DeviantArt, DeviantArt,* http://about.deviantart.com/.

similar neighborhoods in the city using social media activity, as in *The Livehoods Project: Utilizing Social Media to Understand the Dynamics of a City*[21]. An example of the latter is analyzing patterns of information diffusion online, as in *Delayed information cascades in Flickr: Measurement, analysis, and modeling*[22]. However, if Social Computing focuses on the social in social networks, Cultural Analytics focuses on the cultural. (Therefore, the most relevant part of social sciences for Cultural Analytics is sociology of culture, and only after that sociology and economics.)

We believe that the web and social networks content and user activities give us the unprecedented opportunity to describe, model, and simulate global cultural universe while questioning and rethinking basic concepts and tools of humanities that were developed to analyze "small cultural data" (i.e., highly selective and non-representative cultural samples). In the very influential definition by British cultural critic Matthew Arnold (1869), culture is "the best that has been thought and said in the world"[23]. Academic humanities have largely followed this definition. And when they started to revolt against their canons and include the works of previously excluded people (women, non-whites, non-Western authors, queer, etc.), they often included only "the best" created by those who were previously excluded.

Cultural Analytics is interested in everything created by everybody. In this, we are approaching culture the way linguists study languages or biologists who study life on Earth. Ideally, we want to look at every cultural manifestation, rather than selective samples. (This more systematic perspective is not dissimilar to that of cultural anthropology.) The larger inclusive scope combining professional and vernacular, historical and contemporary content is exemplified by the range of projects we have worked in our lab on since 2008. We have analyzed historical, professionally created cultural content in all Time magazine covers (1923–2009); paintings by Vincent van Gogh, Piet Mondrian, and Mark Rothko; 20,000 photographs from the collection of Museum of Modern Art in New York (MoMA); one million manga pages from 883 manga series published in the last 30 years. Our analysis of contemporary vernacular content includes *Phototrails* (the comparison of visual signatures of 13 global cities using 2.3 million Instagram photos)[24], *The Exceptional and the Everyday: 144 Hours in Kyiv* (the analysis of Instagram images shared in Kyiv during the 2014 Ukrainian Revolution)[25] and *On Broadway* (the interactive installation exploring the Broadway in NYC using 40 million user-generated

21 Justin Cranshaw, Raz Schwartz, Jason I. Hong, Norman Sadeh, "The Livehoods Project: Utilizing Social Media to Understand the Dynamics of a City," *The 6th International AAAI Conference on Weblogs and Social Media* (Dublin, 2012), https://s3.amazonaws.com/livehoods/livehoods_icwsm12.pdf.

22 Meeyoung Cha, Fabrício Benevenuto, Yong-Yeol Ahn, Krishna P. Gummadi, "Delayed information cascades in Flickr: Measurement, analysis, and modeling," *Computer Networks* 56 (2012): 1066–1076, http://200.131.208.43/bitstream/123456789/2022/1/ARTIGO_DelayedInformationCascades.pdf.

23 Matthew Arnold. *Culture and Anarchy* (London: 1869), http://www.library.utoronto.ca/utel/nonfiction_u/arnoldm_ca/ca_all.html.

24 Nadav Hochman, Lev Manovich, Jay Chow, *Phototrails* (2013), http://phototrails.net/.

25 Lev Manovich, Mehrdad Yazdani, Alise Tifentale, Jay Chow, *The Exceptional and the Everyday: 144 hours in Kyiv* (2014), http://www.the-everyday.net/.

images and data points)[26]. We also have looked at contemporary amateur or semi-professional content (one million artworks shared by 30,000 semi-professional artists on www.deviantart.com.) Currently, we are exploring a dataset of 265 million images tweeted worldwide during 2011–2014. In summary, in our work we don't draw a boundary between (smaller) historical professional artifacts and (bigger) online digital content created by non-professionals. Instead, we freely take from both.

Obviously, social networks today do not include every human being, and the content shared is sometimes specific to these networks (e.g. Instagram selfies), as opposed to something which existed beforehand. This content is also shaped by the tools and interfaces of the technologies used for its creation, capturing, editing, and sharing (e.g. Instagram filters, or its collage layouts offered by third party apps such as InstaCollage). The kind of cultural actions available are also defined by these technologies. For example, in social networks you can "like", share, or comment on a piece of content. In other words, like in quantum physics, here the instrument can influence the phenomena we want to study. All this needs to be carefully considered when we study user-generated content and user activities. While social networks APIs make it easy to access massive amounts of contents, it is not "everything" by "everybody". (API stands for Application User Interface. It's a mechanism that allows anybody to download massive amounts of user content from all major social networks. All computer science publications use APIs to download the data they analyze).

The General and the Particular

When humanities were concerned with "small data" (content created by single authors or small groups), the sociological perspective was only one of many options for interpretation – unless you were a Marxist. But once we start studying online content and activities of millions of people, this perspective becomes almost inevitable. In the case of "big cultural data", the cultural and the social closely overlap. Large groups of people from different countries and socio-economic backgrounds (sociological perspective) share images, videos, texts, and make particular aesthetic choices in doing this (humanities perspective). Because of this overlap, the kinds of questions investigated in the sociology of culture of the 20th century (exemplified by its most influential researcher Pierre Bourdieu[27]) are directly relevant for Cultural Analytics.

Given that certain demographic categories have become taken for granted in our thinking about society, it appears natural today to group

[26] Daniel Goddemeyer, Moritz Stefaner, Dominikus Baur, Lev Manovich, *On Broadway* (2014), http://on-broadway.net/.

[27] Pierre Bourdieu, *Distinctions. A Social Critique of the Judgment of Taste*. Harvard University Press 1984.

people into these categories and compare them in relation to social, economic, or cultural indicators. For example, the Pew Research Center regularly reports the statistics of popular social platform use, breaking their user sample by demographics such as gender, ethnicity, age, education, income, and place of living (urban, suburban, and rural)[28]. So if we are interested in various details of social media activities, such as types of images shared and liked, filters used, or selfie poses, it is logical to study the differences between people from different countries, ethnicities, socio-economic backgrounds, or levels of technical expertise. The earlier research in social computing did not, and most of the current work still does not consider such differences, treating all users as one undifferentiated pool of "humanity" – but more recently we have started seeing publications that break users into demographic groups. While this is a very good move, we also want to be careful in how far we want to go. Humanistic analysis of cultural phenomena and processes using quantitative methods should not simply be reduced to sociology, i.e. considering common characteristics and behaviors of human groups only.

Sociological tradition is concerned with finding and describing general patterns in human behavior, rather than with analyzing or predicting the behaviors of particular individuals. Cultural Analytics is also interested in patterns that can be derived from the analysis of large cultural datasets. Ideally, however, the analysis of the larger patterns will also lead us to particular individual cases, i.e. individual creators, their particular creations, or cultural behaviors. For instance, the computational analysis of all photos taken by a photographer during her long career may lead us to the outliers – the photos that are most different from all the rest. Similarly, we may analyze millions of Instagram images shared in multiple cities to discover the types of images unique to each city (this example comes from current research in our lab).

In other words, we may combine the concern of social science, and sciences in general, with the general and the regular, and the concern of humanities with the individual and the particular. (After all, all great artists in the history of art were outliers in comparison to their contemporaries). The just described examples of analyzing massive datasets to zoom in on the unique items illustrate one way of doing this, but it is not the only way.

28 Pew Research Center, "Demographics of Key Social Networking Platforms," January 9, 2015, http://www.pewinternet.org/2015/01/09/demographics-of-key-social-networking-platforms-2/.

The Science of Culture?

The goal of science is to explain the phenomena and come up with compact mathematical models that describe how these phenomena work. The three laws of Newton's physics are a perfect example of how classical science was approaching this goal. Since the middle of the 19th century, a number of new scientific fields adopted a new probabilistic approach. The first example was the statistical distribution describing likely speeds of gas particles presented by Maxwell in 1860 (now it is called the Maxwell–Boltzmann distribution). And what about social science? Throughout the 18th and 19th centuries, many thinkers were expecting that, similarly to physics, the quantitative laws governing societies will eventually also be found[29]. This never happened. (The closest 19th century social thought came to postulating objective laws was in the works of Karl Marx). Instead, when positivist social science started to develop in the late 19th and early 20th century, it adopted a probabilistic approach. So instead of looking for deterministic laws of society, social scientists study correlations between measurable characteristics and model the relations between "dependent" and "independent" variables using various statistical techniques.

After deterministic and probabilistic paradigms in science, the next paradigm was computational simulation – running models on computers to simulate the behavior of systems. The first large-scale computer simulation was created in the 1940s by the Manhattan Project to model a nuclear explosion. Subsequently, simulation was adapted in many hard sciences, and in the 1990s it was also taken up in the social sciences.

In the early 21st century, the volume of digital online content and user interactions allows us to think of a possible "science of culture". For example, by the summer of 2015, Facebook users were sharing 400 million photos and sending 45 billion messages daily[30]. This scale is still much smaller than that of atoms and molecules – for example, 1cm^3 of water contains 3.33 *10^22 molecules. However, it is already bigger than the number of neurons in the whole nervous system of an average adult estimated at 86 billion. But since the science now includes a few fundamental approaches to studying and understanding the phenomena – deterministic laws, statistical models, and simulation – which of them should a hypothetical science of culture adopt?

Looking at papers by computer scientists who are studying social media datasets, it is clear that their default approach is statistics[31]. They describe social media data and user behavior in terms of probabilities. This includes the creation of statistical models – mathematical

29 Philip Ball, *Critical Mass*. London: Arrow Books 2004, pp. 69–71.

30 *200 Amazing Facebook Statistics*, http://expandedramblings.com/index.php/by-the-numbers-17-amazing-facebook-stats/15/.

31 Computer scientists also use many recently developed methods including techniques of data mining and machine learning that were not part of 20th century statistics. I am discussing these differences in "Data Science and Digital Art History," *International Journal for Digital Art History*, issue 1 (2015), https://journals.ub.uni-heidelberg.de/index.php/dah/article/view/21631.

equations that specify the relations between variables that may be described using probability distributions rather than specific values. The majority of papers today also use supervised machine learning – an automatic creation of models that can classify or predict the values of new data using already existing examples. In both cases, a model can only account for part of the data, and this is typical of the statistical approach.

Computer scientists studying social media use statistics differently than social scientists. The latter want to explain social, economic or political phenomena (for example, the effect of family background on children's educational performance). Computer scientists are generally not concerned with explaining patterns in social media they discover by referencing some external social, economic or technological factors. Instead, they typically either analyze social media phenomena internally, or try to predict outside phenomena using information extracted from social media datasets. The example of the former is a statistical description of how many favorites a photo on Flickr may receive on average after a certain period of time[32]. The example of the latter is the Google Flu Trends service that predicts flu activity using a combination of Google search data and CDC (U.S. Centers for Disease Control and Prevention) official flu data[33].

The difference between deterministic laws and non-deterministic models is that the latter only describe probabilities and not certainties. The laws of classical mechanics apply to any macroscopic objects. In contrast, a probabilistic model for predicting number of favorites for a Flickr photo as a function of time since it was uploaded cannot tell us exactly the numbers of favorites for any particular photo. It only describes the overall trend. This seems to be the appropriate method for a "science of culture". If, instead, we start postulating deterministic laws of human cultural activity, what happens to the idea of free will? Even in the case of seemingly automatic cultural behavior (people favoring photos on social networks with certain characteristics, such as pretty landscapes, cute pets, or posing young females), we don't want to reduce humans to mechanical automata for passing on memes.

The current focus on probabilistic models in studying online activity leaves out the third scientific paradigm – simulation. As far as I know, simulation has not yet been explored in either Social Computing or Digital Humanities as a tool to study user-generated content, its topics, types of images, etc. If in 2009 scientists at IBM's Almaden research center simulated human visual cortex using 1.6 billion virtual neurons with 9 trillion synapses[34], why can't we think of simulating, for instance,

32 See Meeyoung Cha, Fabrício Benevenuto, Yong-Yeol Ahn, Krishna P. Gummadi, "Delayed information cascades in Flickr."

33 *Research Blog: Google Flu Trends gets a brand new engine,* http://googleresearch.blogspot.com/2014/10/google-flu-trends-gets-brand-new-engine.html, 10/31/2014.

34 *IBM Reveals the Biggest Artificial Brain of All Time,* http://www.popularmechanics.com/technology/a4948/4337190/.

all content produced yearly by Instagram users? Or all content shared by all users of major social networks? Or the categories of images people share? The point of such simulations will be not to get everything right or to precisely predict what people will be sharing next year. Instead, we can follow the authors of the influential textbook *Simulation for the Social Scientist* when they state that one of the purposes of simulation is "to obtain a better understanding of some features of the social world" and that simulation can be used as "a method of theory development"[35]. (Emphasis mine – LM.) Since computer simulation requires developing an explicit and precise model of the phenomena, thinking of how cultural processes can be simulated can help us to develop more explicit and detailed theories than we use normally. (For the example of how agent-based simulation can be used to study the evolution of human societies, see *War, space, and the evolution of Old World complex societies*[36]).

And what about "big data"? Does it not represent a new paradigm in science with its own new research methods? This is a complex question that deserves its own article. (If we are talking about research methods and techniques, the developments in computer hardware in the 2000s, including the increasing CPU speed and RAM size, and the use of GPUs and computing clusters, were probably more important than the availability of larger data sets. And while the use of machine learning with large training datasets achieved remarkable successes, in most cases it does not provide explanations of the phenomena). However, as a way of conclusion, I do want to mention one concept interesting for humanities that we can borrow from big data analytics and then push in a new direction.

The 20th century social science was working on what we can call "long data"[37]. That is, the number of cases was typically many times bigger than the number of variables being analyzed. For example, imagine that we surveyed 2000 people asking them about their income, family educational achievement and their years of education. As a result, we have 2000 cases and three variables. We can then examine correlations between these variables, or look for clusters in the data, or perform other types of statistical analysis.

The beginnings of social sciences are characterized by the most extreme asymmetries of this kind. The first positivist sociologist – Karl Marx – divides all humanity into just two classes: people who own the means of production and people who do not, i.e. capitalists and the proletariat. Later sociologists have added other divisions. Today these

35 Nigel Gilbert and Klaus G. Troitzsch, *Simulation for the Social Scientist*, 2 nd edition (2005): pp. 3–4.

36 Peter Turchina, Thomas E. Currieb, Edward A. L. Turnerc, Sergey Gavriletsd, "War, space, and the evolution of Old World complex societies," *PNAS* October 8, 2013, vol. 110, no. 41: pp. 16384–16389.

37 I am using this term in different way than Samuel Abresman in his "Stop Hyping Big Data and Start Paying Attention to 'Long Data'," *wired.com*, 1/29/2013, http://www.wired.com/2013/01/forget-big-data-think-long-data/.

divisions are present in numerous surveys, studies and reports in popular media and academic publications – typically, gender, race, ethnicity, age, educational background, income, place of living, religion, and a few others (the list of additional variables varies from study to study). But regardless of the details, the data collected, analyzed and interpreted is still very "long". The full populations or their samples are described using much smaller number of variables.

But why should this be the case? In the fields of computer media analysis and computer vision, computer scientists use algorithms to extract thousands of features from every image, video, tweet, email, and so on[38]. So while, for example, Vincent van Gogh only created about 900 paintings, these paintings can be described on thousands of separate dimensions. Similarly, we can describe everybody living in a city on millions of separate dimensions by extracting all kinds of characteristics from their social media activity. For another example, consider our own project *On Broadway* where we represent Broadway in Manhattan with 40 million data points and images using messages, images and check-ins shared along this street on Twitter, Instagram, and Foursquare, as well as taxi rides data and the U.S. Census indicators for the surrounding areas[39].

In other words, instead of "long data", we can have "wide data" – a very large and potentially endless number of variables describing a set of cases. Note that if we have more variables than cases, such representation would go against the common sense of both social science and data science. The latter refers to the process of making a large number of variables more manageable as dimension reduction. But for us "wide data" offers an opportunity to rethink fundamental assumptions about what society is and how to study it; and, similarly, what is culture, an artistic career, a body of images, a group of people with similar aesthetic taste, and so on. Rather than dividing cultural history using one dimension (time), or two (time and geographic location) or a few more (e.g. media, genre), endless dimensions can be put into play. The goal of such "wide data analysis" will not only be to find new similarities, affinities, and clusters in the universe of cultural artifacts, but, first of all, help us question our common-sense view of things, where certain dimensions are taken for granted. And this is one example of the general Cultural Analytics method: estrangement (ostranenie)[40], making strange our basic cultural concepts and ways or organizing and understanding cultural datasets. Using data and techniques for manipulating it to question how we think, see, and ultimately act on our knowledge.

38 I explain the reason for using large number of features in "Data Science and Digital Art History."

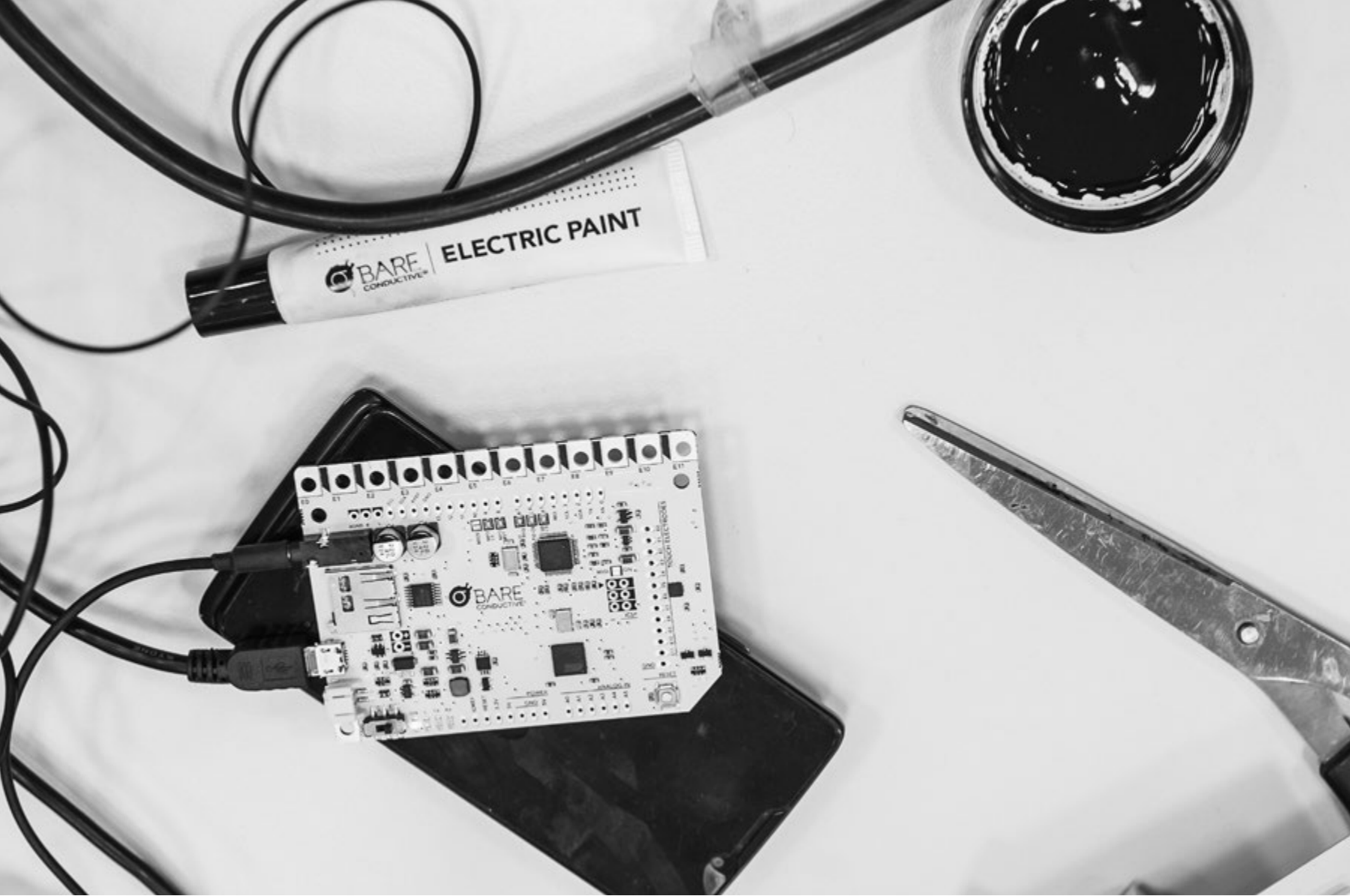
39 *On Broadway*, http://www.on-broadway.nyc/.

40 The term "ostranenie " was introduced by Russian literary theorist Viktor Shklovsky in his essay "Art as a Technique" in 1917. http://www.vahidnab.com/defam.htm.

Acknowledgments

I am grateful to my colleagues from computer science and digital humanities fields for many discussions over the years. My gratitude also extends to the students, and post-docs and research scientists who have worked in our lab since 2007 and taught me so much. Our work was generously supported by The Andrew Mellon Foundation, The National Endowment for the Humanities, The National Science Foundation, National Energy Research Scientific Computing Center (NERSC), The Graduate Center, City University of New York (CUNY), California Institute for Telecommunications and Information Technology (Calit2), University of California – San Diego (UCSD), California Humanities Research Institute, Singapore Ministry of Education, and Museum of Modern Art (NYC).

The Science of Culture? Social Computing, Digital Humanities and Cultural Analytics is taken from http://manovich.net/index.php/projects/cultural-analytics-social-computing. Published courtesy of the author.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CIVIC TECHNOLOGIES: TOOLS OR THERAPY?

The *smart city* is dead. This sentence is not a provocation or a personal opinion, but merely an observation, since even its strongest promoters seem to have given up on the idea. To be precise, I am talking about the narrow meaning of the *smart city* brand, focused on the idea of making cities more efficient by sensing, analyzing and managing all infrastructure services – water, electricity, mobility. A comprehensive solution that is delivered, invisible to the user, by a single company.

Jean Luc Godard's Alphaville was perhaps the first film about a *smart city*: a city where are all infrastructure is controlled by a central computer according to principles of reason and efficiency. That is until the cartoon detective Lemmy Caution takes it down. Even when Alphaville was released in 1965, the idea of the city as an intelligent machine was not new, it was already a familiar science fiction trope. One could, however, object that although the city of Alphaville is intelligent (after all, it engages in a philosophical dialogue with Lemmy), it is not very smart. Smartness does not require human-like intelligence, it requires recognizing patterns, anticipating what needs to be done, and doing it without making a big fuss – keeping things invisible.

Jean Luc Godard initially wanted to call his film "Tarzan versus IBM", which is an interesting coincidence because, during the past 5 years, IBM has been the main driving force behind the *smart city* solution, focused on the idea of making the city more efficient by sensing, analyzing and managing all infrastructure services – water, electricity, mobility, invisible to the user. Now in 2015, this comprehensive approach to the *smart city* is pretty much a closed chapter. The *smart city* is dead. I don't say this as a provocation or because I don't believe in it, but because apparently even IBM has given up on this project; perhaps having realized that cash-strapped cities are not an ideal target .

The messiness of urban infrastructure with its historical legacies, institutional idiosyncrasies, the brittleness of sensor networks in the harsh outdoor environment, or the contractual constraints of public employees, and most importantly, the failed anticipation of a large federal

infrastructure initiative after the 2008 recession – all these factors make the *smart city* unattractive. Instead, IT companies such as IBM focus on what they can do best and what is more profitable: offering analytical services for the huge amounts of data that cities already have, instead of directly dealing with the complexities of the cities' physical hardware and organizational structures.

There is no shortage of criticisms of the *smart city*,[1] from privacy concerns, to gloating over the fact that even a waste bin can nowadays experience a computer crash. Today, the *smart city* clearly has a reputation problem. In the light of such ridicule, one has to ask: is trying to improve the infrastructure and making it more efficient really such a bad thing?

The criticisms can be summarized in two points. The first one is the observation that the *smart city* concept is unduly reductive. In its techno-centric approach, the *smart city* resembles the 1960s model of the cybernetic city, which failed to account for the complexities of the actual society. An often-cited example in this context is the failure of New York's fire response system reorganization in the 1970s, based on a simulation model by the Rand Corporation. The project ended with an unprecedented series of fires in the poorer neighborhoods of the city, because the model did not consider the political power structures that ultimately determined the distribution of fire stations[2]. The cybernetic legacy of the *smart city* is often illustrated with the aesthetics of "total control", signaled by the IBM Intelligent Operations Center in Rio de Janeiro, bringing live data streams from citywide systems into a single control room equipped with large wall displays. However, such criticisms can also be reductive. The main advantage of the Operations Center is not a capacity for total surveillance, but the simple fact that it brings city employees from different departments together in the same room, as an IBM engineer from Rio de Janeiro noted. Even the Rand Fire Project for New York was path breaking, despite its initial failure, and influential for contemporary emergency response systems[3].

The second criticism is not about the shortcomings of the *smart city*, but about lost opportunities. The argument goes as this: why should we attach sensors to every light pole, when each citizen already owns an array of intricate sensors? I am not referring to sensors in smartphones and gadgets, but to the eyes, ears, and the local knowledge of each individual, for which the smartphone is just a conduit. This argument has gained traction during the recent years. Initiatives such as *Code for America* and its various global spin-offs[4] connect young coders with city departments,

1 Adam Greenfield and Nurri Kim, *Against the Smart City (The City Is Here for You to Use)*. New York, NY: Do projects, 2013; Anthony M Townsend, *Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia.* New York, NY: W.W. Norton & Company, 2013; Rob Kitchin, "Big Data, New Epistemologies and Paradigm Shifts," Big Data & Society 1, no. 1 (April 1, 2014): 2053951714528481, doi:10.1177/2053951714528481.

2 Joe Flood, *The Fires: How a Computer Formula, Big Ideas, and the Best of Intentions Burned Down New York City and Determined the Future of Cities*. Penguin 2010.

3 Carl E. Gianino, "The Rand Fire Project Revisited," *Fire Technology* 24, no. 1 (1988): 65–67.

4 *Code for America,* https://www.codeforamerica.org; *Code for All,* http://codeforall.org.

where they collaborate on the nuts-and-bolts of participatory governance. The notion of *government as a platform*[5] recasts urban governance as an informal and problem-focused collaboration between the city and citizens. The supporters of *civic technologies* emphasize the advantages of this arrangement for both constituents and institutions. For the city, citizens make the city legible by contributing data about the urban environment, create new services that make use of these public data, and directly participate in solving problems. The constituents, on the other hand, gain direct influence in governance decisions and benefit from a more responsive city. In summary, *civic technologies* are hoped to introduce a new appreciation for the public good. This is the proposed alternative – the *smart citizen*.

What will the aspirations of civic tech mean for the future of the city, its physical appearance, and its governance? It could mean that cities gain more freedom to experiment. Since all their interactions with citizens become open data, the public will judge the decisions of officials based on their outcomes, not by whether they strictly followed administrative guidelines.[6] In everyday urban environments, this freedom would mean less standardization, more informality, improvisation, and creative hacking – a motley utopia of "popup anything" – hackspaces, fablabs, knitbombed potholes[7].

But it should also be mentioned that the shift from process-oriented to outcome-oriented accountability is rooted in the 1980s doctrine of New Public Management (NPM) and Margaret Thatcher's ideas for reforming government. NPM introduced business management practices into public administration, modeling the relationship between citizen and city on the relationship between customer and company. The ambition of civic technologies to involve private citizens in solving urban problems and enlist them as stewards of their own neighborhood can also entail a push towards individualization of responsibility and the privatization of public services. Prime Minister David Cameron's policy initiative of the "Big Society," publicly showcased during the 2012 London Olympics, embraced local activism, volunteerism, and private initiatives, while at the same time cutting back funds for public services.

Civic hackers and neoliberal reformers make strange bedfellows. This can be illustrated by emerging concepts of decentralized algorithmic governance using *Bitcoin* technology, which, in a sense, is also a civic, commons-oriented technology. In 2013, developer Mike Hearn presented his vision for the future of infrastructure, governed by a hypothetical, blockchain operated and distributed entity he called TradeNet:

5 Daniel Lathrop and Laurel Ruma, *Open Government*. O'Reilly Media, Inc. 2010.

6 Stephen Goldsmith and Susan Crawford, *The Responsive City: Engaging Communities Through Data-Smart Governance,* 1 edition. Jossey-Bass 2014.

7 These are projects that combine art and social activism, during which artists fill potholes with coloured knitting wool (Ed).

> "In this future scenario, the roads on which Jen is driving will have also become autonomous actors, doing trades with the car on TradeNet. They can submit bids to the car about how much they are going to charge to use them. If she is in a hurry, Jen can choose a road that is a bit more expensive but which will allow her to get into the city faster. Awesome, right?"[8]

While civic technologies emphasize ideas of the public good and infrastructure as a commons, TradeNet completely abandons the idea of public infrastructure. In a scenario where even miniscule consumptions of infrastructure services can be measured and billed, infrastructure becomes an entirely private good. In the face of these seeming contradictions, one has to ask: what is the politics of civic technologies, are they neo-liberal or neo-weberian, service-oriented or activist? I argue that the answer to this question depends on what is entailed by the elusive term "participation".

What do we mean when we talk about participation?

Participation is almost universally accepted as a positive value, so much that Sherry Arnstein commented somewhat sarcastically in 1969, "the idea of citizen participation is a little like eating spinach: no one is against it in principle because it is good for you."[9]. But only, as she argues, until participation is understood as a re-distribution of power and control, in which case enthusiasm quickly wanes. To disambiguate the different meanings of the term, Arnstein introduced her famous "ladder of citizen participation" as a conceptual continuum of different levels of control bestowed upon the participants – from pseudo-participation as an empty ritual on the one end, to complete citizen-control on the other. We can apply a similar lens – a ladder of participation in civic technologies – to differentiate the modes of participation of the *smart citizen*.

Often, participation is not much more than compliance. This is the case for contemporary forms of behavior engineering under the terms "gamification" or "nudging", i.e. using game mechanics to motivate and reward people for behaviors that are, like eating spinach, considered good for us: taking the bike instead of the car, recycling, and generally being a nice citizen. Here, participation is about succeeding at the rules, not questioning the rules. What does it mean if an aluminium company releases an app for encouraging people to recycle beverage cans by rewarding them with points for recycling? It is a way of saying that it is the individual consumer who is responsible for a healthy environment, and not the beverage companies, which have designed their supply chains around

8 Mike Hearn, "Future of Money," 2013, http://www.slideshare.net/mikehearn/future-of-money-26663148.

9 Sherry R. Arnstein, "A Ladder of Citizen Participation," *Journal of the American Institute of Planners* 35, no. 4 (1969): pp. 216–24.

disposable packaging made from problematic materials. In this sense, "saving the world one step at a time" is a great way of staying in place – maintaining the status quo[10].

Another step is participation as feedback. Citizen issue trackers, the classic civic technology app, are a good example of this category: smartphone apps that allow citizens to report problems in the environment, from potholes to graffiti, from litter to streetlight outages. Pioneered by systems for non-emergency community requests, many large cities around the world have implemented citizen-reporting apps. The value of the information collected through this means is huge, giving the city access to accurate data from street level. Noting that majority of reports are submitted by a small number of individuals, cities encourage individuals to become stewards of their own street.

But citizens are not just passive sources of information for the city which might or might not use this information. The next step is therefore participation as monitoring. Through data collection, citizens can also create pressure on the city and to some extent challenge its authority and expertise. They become what Kuznetsov and Paulos call the "expert amateur"[11]. In the Japanese *Safecast* project, a collective of activists built and deployed mobile radiation monitoring units after all Geiger counters in the country were sold out following the nuclear disaster at Fukushima Daiichi. The volunteers not only documented radioactive pollution, but also uncovered flaws in the official radiation measurement methodology[12].

A further step is participation as co-production: involving citizens in planning, implementing, and managing public services. The theorist of governance of commons, Eleanor Ostrom, observed that if people are involved in planning and implementing infrastructure or housing projects, they are more satisfied with service provision and have more sense of ownership[13]. The city benefits from the local knowledge of participants and can better react to their needs and the individual gains by having more influence in the design of services which they will eventually be the primary beneficiaries.

On the other end of the spectrum is participation as self-organization: systems that are entirely created and managed by their users, or "Inverse Infrastructures"[14]. Truly self-organized, or even crowdsourced infrastructures that are sustained over a long period are rare, Wikipedia being the obvious and overused example. The inverse infrastructures of the open source and citizen science communities show us the potential, but also

10 Samantha MacBride, *Recycling Reconsidered the Present Failure and Future Promise of Environmental Action in the United States*. Cambridge, Mass.: MIT Press 2012.

11 Stacey Kuznetsov and Eric Paulos, "Rise of the Expert Amateur: DIY Projects, Communities, and Cultures," *Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries* 2010, pp. 295–304, http://dl.acm.org/citation.cfm?id=1868950.

12 Stacey Kuznetsov, Eric Paulos, "Rise of the Expert Amateur: DIY Projects, Communities, and Cultures", *Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries*, 2010, pp. 295–304, http://dl.acm.org/citation.cfm?id=1868950.

13 Elinor Ostrom, "Crossing the Great Divide: Coproduction, Synergy, and Development," *World Development* 24, no. 6 (June 1996): pp. 1073–87, doi:10.1016/0305-750X(96)00023-X.

14 Tineke M. Egyedi and Donna C. Mehos, *Inverse Infrastructures: Disrupting Networks from Below*. Cheltenham, UK: Edward Elgar Publishing 2012.

the limitations of sustained participation. Some inspirational examples exist. Founded by the media artist Usman Haque, Pachube was a community platform for sharing live data feeds from sensors deployed by a community of citizen scientists and enthusiasts. In many ways, Pachube delivered what the Smart City concept promised to do, surpassing most official sensor networks in scope and completeness. Ed Borden from Pachube posted in June 2011:

> BigGov has become irrelevant in the public sector, eclipsed by someone with a supercomputer in their pocket, open source hardware and software at their fingertips, and a global community of like-minded geniuses at their beck and call: YOU. YOU are the Smart City.

The urbanist Adam Greenfield gently objected:

> there are some things that can only be accomplished at scale – I think, particularly, of the kind of heavy infrastructural investments that underwrite robust, equal, society-wide access to connectivity. And for better or worse, governments are among the few actors capable of operating at the necessary scale to accomplish things like that; they're certainly the only ones that are, even in principle, fully democratically accountable.[15]

Greenfield appears to have gained the upper hand here – just a few weeks after this exchange, Pachube was sold, renamed, and turned into a closed service. Its groundbreaking idea, the enthusiasm of its community, and its short life as a community project illustrate a central dilemma of infrastructure and participation: the dilemma between the creative energy of participatory projects and the expectation of longevity, reliability, and accountability. Any concept of a future city will have to come to grips with these two opposing forces. This is not necessarily a limitation or a problem, just an indication that cities are too complex to be "fixed" by a single group, whether they are Silicon Valley entrepreneurs, *smart city* engineers, civic hackers, or governmental institutions. The tradeoffs of participatory governance can be generative and open up a rich space for experimentation between technology and policy, once we understand that no simple solutions exist, and that none of the involved actors can claim a neutral, objective position. The involved protocols and algorithms should not be seen merely as the technical substrate on which democratic discourse unfolds, but as an object of this discourse. Collectively defining protocols and standards is a democratic concern in the 21st century city. In this

15 Ed Borden and Adam Greenfield, "YOU Are the 'Smart City,'" *Pachube :: Blog,* June 30, 2011, http://blog.pachube.com/2011/06/you-are-smart-city.html.

respect, the designers and coders of civic technologies find themselves in an unfamiliar role: not only as mediators of experience, but also as policy makers, who design the technical frameworks that not only facilitate, but also shape urban governance.

Published courtesy of Ars Electronica Linz GmbH. The article first appeared in *POST CITY. Habitats for the 21st Century. Ars Electronica 2015*. Festival for Art, Technology and Society, ed. Gerfried Stocker, Christine Schöpf, Hannes Leopoldseder. Ostfildern: Hatje Cantz 2015, pp. 150–153.

MICHIEL DE LANGE | MARTIJN DE WAAL

OWNING THE CITY: NEW MEDIA AND CITIZEN ENGAGEMENT IN URBAN DESIGN

Over the last few years, the term "smart cities" has gained traction in academic, industry, and policy debates about the deployment of new media technologies in urban settings. It is mostly used to describe and market technologies that make city infrastructures more efficient, and personalize the experience of the city. Here, we want to propose the notion of "ownership" as a lens to take an alternative look at the role of urban new media in the city. With the notion of ownership, we seek to investigate how digital media and culture allow citizens to engage with, organize around and act upon collective issues to engage in co-creating the social fabric and built form of the city. Taking ownership as the point of departure, we wish to broaden the debate about the role of new media technologies in urban design from an infrastructural to a social point of view, or from "city management" to "city making".

1. Introduction

In today's cities, our everyday lives are shaped by digital media technologies such as smart cards, surveillance cameras, quasi-intelligent systems, smartphones, social media, location-based services, wireless networks, and so on. These technologies are inextricably bound up with the city's material form, social patterns and mental experiences. As a consequence, the city has become a hybrid of the physical and the digital. This is perhaps most evident in the global north, although in emerging countries, like Indonesia and China mobile phones, wireless networks and CCTV cameras have also become a dominant feature of urban life (Castells, *et al*., 2004; Qiu, 2007, 2009; de Lange, 2010). What does this mean for urban life and culture? And what are the implications for urban design, a discipline that has hitherto largely been concerned with the city's built form?

In this contribution we do three things. First, we take a closer look at the notion of "smart cities" often invoked in policy and design discourses about the role of new media in the city. In this vision, the city is mainly understood as a series of infrastructures that must be managed as efficiently as possible. However, critics note that these technological imaginaries of a personalized, efficient and friction-free urbanism ignore some of the basic tenets of what it means to live in cities (Crang and Graham, 2007).

Second, we want to fertilize the debates and controversies about smart cities by forwarding the notion of "ownership" as a lens to zoom in on what we believe is the key question largely ignored in smart city visions: how to engage and empower citizens to act on complex collective urban problems? As is explained in more detail below, we use "ownership" not to refer to an exclusive proprietorship, but to an inclusive form of engagement, responsibility and stewardship. At stake is the issue of how digital technologies shape the ways in which people in cities manage coexistence with strangers who are different and who often have conflicting interests and, at the same time, form new collectives or publics around shared issues of concern (see, for instance, Jacobs, 1992; Graham and Marvin, 2001; Latour, 2005). "Ownership" teases out a number of shifts that take place in the urban public domain characterized by tensions between individuals and collectives, between differences and similarities, and between conflict and collaboration.

Third, we discuss a number of ways in which the rise of urban media technologies affects the city's built form. Much has been said and written about changing spatial patterns and social behaviors in the media city. Yet, less attention has been paid to the question of how urban new media shape the built form. The notion of ownership allows us to figure the connection between technology and the city as more intricate than direct links of causality or correlation. Therefore, ownership in our view provides a starting point for urban design professionals and citizens to reconsider their own role in city making.

Questions about the role of digital media technologies in shaping the social fabric and built form of urban life are all the more urgent in the context of challenges posed by rapid urbanization, the worldwide financial crisis that hits particularly hard on the architectural sector, socio-cultural shifts in the relationship between the professional and the amateur, the status of expert knowledge, societies that face increasingly complex "wicked" problems, and governments retreating from public services. When grounds are shifting, urban design professionals as well as citizens need to reconsider their own role in city making.

2. Recounting the role of urban tech: From smart city to social city

2.1. The personalized and efficient city

Urban media technologies stimulate a profound personalization of city life on spatial, social, and mental levels (Ling, 2008; Paulos, et al., 2008; de Lange, 2010, pp. 179–183; Dourish and Bell, 2011; de Waal, 2012a). For example, on the spatial level GPS-enabled devices and navigation software enable quick familiarization with unknown terrain. On location-based platforms users check-in at particular locales, quickly grasp what is there and build up personal relationships with places (like becoming "mayor"). Developments of what is known as the *Internet of Things*, or *Ambient Intelligence*, allow the automation of physical environments to respond to individual preferences[1]. On the social level, mobile communications allow people to continually keep in touch with their in-group (Licoppe, 2004; Ito, 2005), imagine a sense of nearness and intimacy (de Gournay, 2002: pp. 201–204; Fox, 2006, p. 13), and solidify established relationships with friends and family at the expense of weak ties and strangers (Ling, 2008, pp. 159, 182). On the mental level, mobile devices with their multimedia capabilities allow people to create highly idiosyncratic images of the city (Bull, 2005; de Lange, 2009, p. 66). Listening to music on one's mobile device, for example, generates – in the words of one of Michael Bull's respondents – the "illusion of omnipotence" (Bull, 2005, p. 175). These media thus foster an individualized "sense of place", a feeling of being part and in control of a situation (Meyrowitz, 1985).

The push towards an efficient and personalized city is institutionalized on a much larger scale in smart city policies (Mitchell, 1999; Mitchell, 2006; Hollands, 2008; Allwinkle and Cruickshank, 2011; Ratti and Townsend, 2011; Chourabi, *et al.*, 2012)[2]. Municipalities form alliances with technology companies and knowledge institutions with the aim to organize urban processes efficiently (for a recent research/policy agenda see Batty, *et al.*, 2012). Sensor and network technologies gauge and optimize energy and water supplies, transport and logistics, air and environmental quality. The hope is that this improves the quality of life and that it helps to tackle some of the big future challenges that cities face. Companies that work on smart city strategies include IBM, CISCO, General Electric, AT&T, Microsoft and Philips.

Examples of actual "smart cities" include towns built from scratch like New Songdo in South Korea and Masdar in the United Arab Emirates, but

[1] In the words of a company that sells Near Field Communication solutions, this will produce an "effective personalization of the physical world". Source: http://www.nearfieldcommunication.com/business/overview/, accessed 23 September 2012.

[2] See also numerous special journal issues about smart cities, like Journal of Urban Technology (volume 18, number 2, 2011); Urbanist (number 517, 2012); Journal of the Knowledge Economy (volume 4, number 2, 2013); Economist (27 October 2012).

more often existing cities that are made "smarter", like the Amsterdam Smart City project in the Netherlands.

2.2. Critique

As we note elsewhere (de Lange and de Waal, 2012a), the omnipresence of new media in an urban context has come under criticism along three broad lines. First, observers note that wayfinding devices, location-based services, digital signage, and customer loyalty cards transform our cities into consumer-optimized zones, while simultaneously producing exclusionary practices of "social sorting" (Crang and Graham, 2007; Shepard, 2011; de Waal, 2012a, 2013). Second, omnipresent cameras with face and gait recognition software, RFID-based access cards, smart meters, connected databases, and mobile network positioning, push cities toward revived "big brother" scenarios of pervasive institutional control and surveillance (Crang and Graham, 2007; Greenfield and Shepard, 2007; Lyon, 2009). Third, mobile screens, portable audio devices and untethered online access to one's familiar inner circle enable people to retreat from public life into privatized tele-cocoons, bubbles or capsules (Cauter, 2004; Habuchi, 2005; Bull, 2005; Ito, *et al*., 2009). In these scenarios, city dwellers no longer engage with strangers around them. There is a lack of space for spontaneous encounters and public life, and a general lack of involvement with the immediate environment.

Additionally, "smart city" developments take the technology lab as the starting point. The actual city is seen as the last and most difficult hurdle in successive phases of "deployment" or "roll-out", rather than the sole place where experiment truly proves its value. Smart city projects typically consist of a "triple helix" of government, knowledge production (*e.g.* universities) and industry. Such consortia often ignore the role of citizens as equally important agents. At best, citizens in smart city policies are allowed to provide feedback somewhere in the design process, although oftentimes they figure as "end-users" instead of being engaged in the early stages of co-creation.

Artists and media activists have used these same media technologies to question and subvert the logic of the three Cs of consumption, control, and capsularization (de Lange and de Waal, 2012b) and approach urbanites as citizens rather than as consumers or end-users. This often happens through ludic interventions that hark back to Situationist legacies of *dérive* and *detournement* (Debord, 1958; Chang and Goodman, 2006; Charitos, *et al*., 2008; de Waal, 2012b). While we believe such criticisms are valuable, many remain highly temporary and stick to an oppositional politics. How can we use the potential strengths of urban technologies to help

forge more durable "project identities"[3]? We argue that an alternative take on urban design with digital technologies is needed that focuses on the active role of citizens and uses the city itself as the test bed for experiments.

2.3. "Social cities"

Another tale – still under construction – has recently risen to the fore. In this vision, urban technologies engage and empower people to become active in shaping their urban environment, to forge relationships with their city and other people, and to collaboratively address shared urban issues (Paulos, *et al.*, 2008; Foth, *et al.*, 2011; de Lange and de Waal, 2012b). The focus in these discussions is on "social cities", rather than on "smart cities"[4]. It explores how digital media technologies can enable people to act as co-creators of livable and lively cities. This narrative is inspired by the body of literature that describes profound shifts in the balance between production and consumption: from the professional amateur to wisdom of the crowd, from do-it-yourself culture to the hacker ethic (Himanen, 2001; Leadbeater and Miller, 2004; Benkler and Nissenbaum, 2006; Shirky, 2008; Rheingold, 2012). Central is the question of how collaborative principles and participatory ethics from online culture can be ported to the urban realm in order to coordinate collective action and help solve some of the urgent complex issues that cities are facing.

What are these issues, then? They exist on multiple scales. Some have a global scope, like social equity and environmental sustainability, or adequate water, food and energy supplies. Others are specific to particular cities, like shrinking cities, aging populations and empty spaces. On an intermediary level, many cities in the world face challenges such as the perceived decline of publicness, safety, social inclusion and cohesion, and the gap between citizens and policy. Typically, such issues are not "owned" by a single party. They are collective issues that involve multiple stakeholders and require forms of collaborative governance to tackle them. What is common for these issues is that short and long term interests of different stakeholders diverge. As a result, it is hard to establish a common definition of the problem itself, let alone find a solution everyone agrees on. Moreover, a single intervention may catalyze unforeseen events that alter the initial state. Because of this complexity, such issues have been called "wicked problems" (Rittel and Webber, 1973).

[3] Manuel Castells distinguishes between the dominant "legitimizing identity", the counter-active "resistance identity", and the affirmative "project identity" (Castells, 1997, pp. 7–8).

[4] See the documentation on the international workshop and conference "Social Cities of Tomorrow", organized by The Mobile City, Virtueel Platform and ARCAM, 14–17 February 2012 in Amsterdam, www.socialcitiesoftomorrow.nl.

3. Ownership: Engaging citizens with new media

We want to contribute to the social city discourse by advancing the notion of "ownership" as a lens to look at how cities are made and remade with the help of digital media. "Ownership" acts as a heuristic device to make sense of the variety of developments that can be grouped under the social city label. We use ownership to refer to the degree to which city dwellers feel a sense of responsibility for shared issues and are taking action on these matters. As such, it is a "hack" of ownership in everyday parlance as being the proprietor of something, which gives the possessor the right to exclude someone else. When understanding ownership in more inclusive terms it means that one has the right to act upon an issue. It is this sense of ownership that we are after: not a contractual, proprietary ownership, but a sense of belonging to a collective place, commitment to a collective issue, and willingness to share a private resource with the collective in order to allow other citizens to act without infringing on other people's right of ownership. In Lefebvre's terms this is the right to appropriation, which is clearly distinct from the right to property (Lefebvre, 1996, p. 174; Mitchell, 2003, p. 18; Pugalis and Giddings, 2011, p. 282).

What is the advantage of looking at urban issues as ownership questions? It highlights how in cities there often is a discrepancy between formal juridical rights on individual or institutional levels and a collective sense of responsibility for the lived environment. As said, ownership can have an exclusive meaning as proprietorship ("mine not thine") with passively conferred rights. This is the case with purely private matters and purely public matters for which the state is the sole responsible body. Ownership can also have an inclusive meaning that involves stewardship of what belongs to all of us. It then demands a stance of collective engagement and action. This inclusive and active notion of ownership underlines that city life is not just a matter of avoiding friction but also requires the willingness to affect, that is to touch upon things and other people and to set something or someone in motion (Thrift, 2004; de Lange, 2013).

Another advantage is that ownership offers a fresh take on existing models for citizen engagement. The idea of engaging citizens in shaping their living circumstances is of course not new. In many western countries it has been around since the 1970s. Among town planners, for example, "place making" has been a popular concept, whereby local people have their say within a community-driven process (Beyea, *et al.*, 2009). Policy-makers, housing corporations, politicians and knowledge institutes have also taken up the subject of citizen engagement. We can identify two extremes: a top-down participation model and a bottom-up community model. Policy institutions use participation models to initiate projects in which

citizens are invited to have a say, like in a town hall meeting. Some critics dismiss this as "pseudo-participation" (Miessen, 2010), which is reminiscent of what Arnstein has called "tokenism" (Arnstein, 1969). Politicians and government authorities give participation a nostalgic sugarcoating of inclusivity, democratic decision-making and solidarity. In doing so, they are "offloading" their own responsibilities (Institute for the Future, 2010). This is especially urgent in the context of the "Big Society" policy concept devised by the U.K. Conservative party, which seeks to shift from big government to "a political system where people have more power and control over their lives" (Conservative Party, 2010, p. ix).

The community model attempts to foster a sense of togetherness that has roots in physical proximity or virtual presence of homogenous groups of people who share key aspects of their lives. It upholds ideals of neighboring, localness, small-scale, similarity and simplicity. However, Jane Jacobs, among others, pointed out that city dwellers typically reject small-town parochialism. Or as she outspokenly put it:

> "Togetherness" is a fittingly nauseating name for an old ideal in planning theory. This ideal is that if anything is shared among people, much should be shared. "Togetherness", apparently a spiritual resource of the new suburbs, works destructively in cities. The requirement that much shall be shared drives city people apart. (Jacobs, 1992, p. 62)

In her view, cities offer citizens the advantage to escape narrow social control of the small village, and obtain the freedom to choose their own lifestyles.

With the notion of ownership, we position ourselves in response to earlier investigations of using ICTs for urban issues in what has been called "community informatics" (Gurstein, 2000, 2003; Keeble and Loader, 2001; Foth, 2009: p. XXIX; Shin and Shin, 2012). While we continue in the line of thought that ICTs can be used to help solve shared issues, we disagree on the centrality of the notion of community. Shin and Shin, for example, note that the notion of community is morally charged and problematic, yet argue for community as an ideal to keep striving for: "[P]ursuing community is not merely an idealistic, utopian project; rather, it is a realistic requirement for life" (Shin and Shin, 2012, p. 28). Community, we believe, need not be the sole or even necessary precondition to act on collective issues. In our view community is too reminiscent of small-scale and local ways of life rather than of contemporary urban life. Instead, we prefer the use of "networked publics" (Varnelis, 2008), groups of people who

convene around a shared "matter of concern" in entities that may be more fleeting, composed of differences, rather than being based on sameness, and organized in distributed networks rather than in "natural" social bonds of locality, class, ethnicity, cultural identity, and so on[5].

Importantly, complex urban issues often transcend purely local interests. Tenacious urban issues involve a complex of stakeholders, composed of citizens themselves, but also authorities and policy-makers on multiple levels, housing corporations, a wide array of social organizations and knowledge institutes involved in urban affairs, as well as local and global businesses. Ownership provides a horizon for action in which each stakeholder reciprocally contributes to the whole on a different but equal base.

Thus, with ownership we seek to overcome the parochialism inherent in bottom-up community models and the paternalism of top-down institutional participation policies. How can new media enable a more participatory kind of city making, without falling in the trap of either those participation models in which nothing essentially changes, or the anti-urban ideals of localism and "small-is-beautiful" implied by community models? The advent of digital media technologies in the urban sphere offers opportunities to organize citizen engagement neither in a local bottom-up nor an institutionalized top-down fashion, but in networked peer-to-peer ways. Instead of seeking consensus, these tools allow room for managing differences. We have seen how urban new media are often perceived to alleviate and eliminate moments of uncertainty and tension inherent to urban life. It is easy to understand how that threatens what, according to prominent urban theorists, is the city's fragile quintessence, namely living among strangers and dealing with differences and serendipitous situations (Simmel, 1997; Wirth, 1938; Jacobs, 1992; Milgram, 1970; Sennett, 1976). We should note, however, that there is nothing inherently new (or wrong *per se*) with personalizing and smoothing out the city. Since the rise of the early modern metropolis, urbanites in one way or another have tailored the city to their individual preferences. People orient to familiar physical elements to feel more secure (Lynch, 1960). They play intricate social avoidance games of disengagement, distraction and deceit (Goffman, 1959; Lofland, 1973). They adopt blasé attitudes as a way to cope with sensory overload (Simmel, 1997; Milgram, 1970). The challenge in our view, therefore, is to balance these stories of personalization and efficiency on the one hand and to build collectives based on differences and mutualism on the other hand. Individuals must not only devise avoidance strategies, but also cooperate in order to address the more complex issues that are part of city life.

[5] See also Latour, 2005, p. 114.

4. Promising developments for strengthening citizen ownership

As mentioned, "ownership" is related to social policies that have been around since the 1970s. Nonetheless, we argue that new media afford several promising qualitative shifts with regard to the way people engage, empower, and act, and in addition how they manage shared issues and resources. First, on the level of resources and issues, "big data" and urban media allow for collective issues to be named and made visible in new ways. Second, on the level of engagement, media art projects contribute to a "sense of place", allowing people to see themselves as part of the urban fabric. Third, media technologies empower new "networked publics": groups of people who organize themselves around collective issues. Fourth, in what can be called "DIY urbanism", media technologies allow citizens to act in new ways, for instance design their own city and collectively govern urban affairs.

4.1. Resources and issues: The rise of a data commons

A current development is considering the city as an information-generating system. A variety of technologies collect an enormous amount and range of data. Consciously or unconsciously, citizens contribute to the accumulation of data through their uses of all kinds of products and services. As these data are being aggregated, they may become a "data commons": a new resource containing valuable information for urban designers. Datasets can be used to bring out, visualize and manage collective issues. Preconditions for the establishment of a data commons include the availability of and access to open data, and the skills citizens have to use the data in a meaningful way. With the notion of ownership in mind one issue at stake is who has possession rights over these data. Are these a limited number of players (mostly governmental authorities and private companies) or can citizens, too, have access to these data in order to create interesting new applications and services. Examples include a number of app contests that have been organized by various municipalities in the Netherlands based on open data sets[6]. Not only is it possible to use aggregated data about urban practices to visualize collective issues, but it is also possible to bring out individual contributions and usage of resources.

4.2. Engagement: Sense of place

To engage people with communally shared issues, it is essential that people envision themselves as part of the urban fabric, and understand that their individual actions make a difference to the common good. They also need to trust other urbanites to act accordingly. Digital media can play an

6 See, for instance, Apps for Amsterdam (www.appsforamsterdam.nl/en).

important part in this, and engage citizens in new ways. Various experiments have been done with this. Art projects, like *Urban Tapestries* or the Dutch *Het geheugen van Oost* (*The Memory of Amsterdam East*), collect stories from various citizens and function as an exchange platform for these. Other projects such as Christian Nold's *Biomapping* act as provocative conversation pieces. Nold's installation collected biometric data from citizens while walking across town. The results – sudden spikes in heart rate or galvanic skin response – were used to engage locals in discussions about these places and the sensations they produced in them. Placeblogs have started to play a role in mapping diverse local initiatives in a particular area and by doing so produce a site where some of the stories of different people may start to overlap (Lindgren, 2005).

4.3. Publics: Networked publics

"Networked publics" are groups of people that use social media and other digital technologies to organize themselves around collective goals or issues (Varnelis, 2008). In online culture, networks of "professional amateurs" create "user generated content" or take part in "citizen science" projects. Think of open source software or Wikipedia as successful examples. In cities we have seen a growing interest in organizing publics in such a way, either to collectively map issues as part of activism, or to organize themselves around common pool resources. The Dutch Geluidsnet is an example of the former, where citizens who live near Schiphol airport in the Netherlands started a campaign against excessive airport noise pollution. Participants set up a mesh network by installing sound sensors in or around their houses. This data was collected and aggregated to produce a body of facts that could be used as counter-evidence in their case against the airport. Lately, we have seen a great interest in the organization of publics around so-called "common pool resources" (Ostrom, 1990). These vary from car sharing and tool lending to urban gardening. What is new, is that digital media make it easier to register individual contributions and usage of collective resources, and the reputation systems that emerge from these patterns may prevent the proverbial "tragedy of the commons" (Hardin, 1968). What both these new interfaces have in common, is that they make it easier to take a collective ownership into an issue or a common resource.

4.4. Act: DIY urban design

Digital media have enabled mechanisms for managing collective action. Traditionally, collectives suffer from a lack of information leading to less than optimal decision-making, which hampers action. With mobile and

location-based media, people can share more information more quickly and base adaptive decisions on it. Examples are the real-time exchange of information about air quality using portable sensors and mobile networks, or aggregated location-based information that allows predicting and providing information about traffic congestion. The terms "co-creation" and "crowdsourcing" are used for collective issues being tackled and managed collaboratively, with new participants having an active role. An interesting project is *Face Your World* by artist Jeanne van Heeswijk and architect Dennis Kaspori. Young people and other people living in an Amsterdam neighborhood collaborated in designing a city park using a 3D simulation environment in which they could upload their own images and ideas to debate amongst each other. With this crowdsourced plan, they managed to persuade the local government to abandon the initial plans for the park and execute theirs instead. Like online counterparts that successfully manage collective action (from Wikipedia to the Linux kernel), it would be an illusion to view these phenomena as exclusively bottom-up processes. They require curatorship and sets of rules. These rules are oftentimes enforced not by singular top-down institutions, but through distributed forms of supervision and sanctions organized by users themselves.

4.5. Limitations of "ownership"

The lens of ownership also brings out a number of problematic issues with regard to the social organization of urban life with the help of new media. Many of the examples above are still anecdotal. Others have their origins in the domain of art. Both show that urban media do have the affordance to promote "ownership". However, the examples provided also raise pertinent and interrelated questions: What is the effectiveness or social merit of these interventions and how do we institutionalize these new forms? Once new urban issues have been visualized, and an initial interest or sense of engagement is aroused, how can publics organize in a productive way around them? What legal and regulatory frameworks do we need, for instance, to allow citizens to produce their own energy in a collaborative structure and deliver their surplus to the grid? What new types of institutions are needed and how can the pitfalls of new utopian society-making be avoided? By taking these questions as points of departure, "ownership" can also be used as a design and policy approach that offers an alternative to the urban imaginary of "smart cities".

5. Implications for urban design: New media and the built form

The relationship between (digital) media technologies and the physical city has often been thought of in a straightforward, even simplistic manner. The relation has long been theorized in terms of a substitution effect, whereby ICTs eventually would make the physical urban form obsolete[7]. In this view, voiced by, for instance, McLuhan, Virilio, and Mitchell, ICTs would lead the city to become increasingly dematerialized, decentralized and ephemeral (McLuhan, 1994, p. 366, pp. 378–379; Mitchell, 1995; Virilio, 1997, p. 25). ICTs would cause the disappearance of concentrated functions from the city centers in realms such as commerce (Dodge, 2004), public institutions (Mitchell, 1995), and housing (de Sola Pool, 1977, pp. 141, 302). To be fair it should be added that de Sola Pool takes a more nuanced approach, rather than depicting technology's impact on the city as merely one-way. Despite its title, de Sola Pool and his colleagues make it consistently clear in *The social impact of the telephone* (1977) that the telephone is "a facilitating device" and that it "often contributed to quite opposite developments" (de Sola Pool, 1977, p. 302). The city and the telephone "mutually shape" or modify each other. The telephone (and the car) "were jointly responsible for the vast growth of American suburbia and exurbia, and for the phenomenon of urban sprawl. There is some truth to that, even though everything we have said so far seems to point to the reverse proposition that the telephone made the skyscraper possible and increased the congestion downtown" (Pool, 1983, pp. 43–44). Since the early 1990s onwards, a growing number of authors have pointed out that ICTs actually concentrate functions and people in cities. Cities are hubs for information networks, skills and knowledge in "global cities" and "technopoles" (Sassen, 1991; Castells and Hall, 1994) and for cultural industries in "creative cities" (Florida, 2004).

At the level of design practice, crude translations from observation to intervention frequently result in slavishly catering to some of the technological affordances discussed in the first section. For instance, in reaction to people working ubiquitously with their portable wireless devices, a host of spaces are adapted to nomadic labor by being equipped with Wi-Fi, power sockets and cocooning zones. Convenient as this may be for individuals, such a reactive, or even servile, attitude of urban design to the demands of "technological progress" avoids a more critical engagement that interrogates the desirability of such developments (de Lange and de Waal, 2009).

We believe it is necessary to explore alternatives to direct connections of causality or correlation between technology and the city. Ownership allows us to venture beyond relationships of amplification, substitution,

7 For critical discussions, see Downey and McGuigan, 1999; Graham, 2004, pp. 3–24; Picon, 2008, pp. 32–34; de Lange, 2010, pp. 160–166; Tuters and Lange, 2013.

or modification, and take a more culturally sensitive detour that highlights new ways of co-creating the city.

For one, the data generated by the city can be used as variables in (parametric) design approaches. Architects and other professionals can and are already using these data to gain insight in spatial patterns of citizens, about their mental maps and emotional sense of well-being tied to particular places, or to learn about the presence or absence of particular subcultures to which designs can be tailored. Dutch architecture and research office Space&Matter harvested social network data to research a transformation plan for an old energy plant in Eindhoven. Through these searches, they found two subcultures of skaters and BMX bikers, and climbers. By investigating and comparing their respective spatial needs, they proposed to strike a balance in the reuse of the building by retrofitting it with perforations in the floor that would benefit both subcultures.

The data produced by the city and its inhabitants e can be used to visualize collective issues in new ways that appeal to people's emotional attachment. For instance, there have been quite a few projects trying to visualize environmental issues, from MIT's Senseable City Lab's *Trash Track*, which follows the route of discarded objects, to the Medialab Prado's *In the Air,* which measures and displays air pollution. Most data visualization projects stay in the digital realm of "information architecture", turning data in beautiful visualizations. Some of them, however, jump over to urban architecture by experimenting with physical and tangible installations, rather than online maps or projections on museum walls. For *In the Air,* a prototype was developed for a fountain with colors and light intensity that reflect air quality. In the Dutch city of Doetichem artist Q.S. Serafijn and architect Lars Spuybroek created the D-Tower, an interactive light sculpture that reflects the mood of the city and which can be seen as an early exploration of an "architecture of affect" (see de Lange, 2013). The colors of the light installation (yellow for fear, green for hatred, red for love and blue for happiness) are determined by the outcomes of a daily online questionnaire amongst residents about their mood. As the project was finalized in 2004, it did not yet make use of any real-time information. It can be expected that in the near future many interactive installations, light sculptures and other objects will appear in the city to reflect, in concrete or more abstract ways, the real-time rhythms and emotions of the city or address particular issues (such as air pollution) that may arise from the data commons.

At the same time, we witness the emergence of new spatio-temporal types. For some time now, many cities have seen so-called "pop-up" events (pop-up bars, pop-up clubs, pop-up shops), often in vacant buildings and

underused sites (Schwarz and Rugare, 2009). Additionally, crowdfunded neighborhood buildings and infrastructures emerge that are sometimes literally built with second hand or discarded materials (an example in Amsterdam is http://noorderparkbar.nl). Often organized with a collaborative DIY attitude and with the aid of social media, these interventions shift focus from place making to creating temporary events. Their sudden appearance and impermanence underline the transient nature of urban places in an age of new media developments that occur on a completely different timescale from traditional architecture (de Lange and de Waal, 2009). Thus, the balance of architectural practice appears to shift from manipulating space to manipulating space in time. A case taken to the extreme is DUS Architect's Bubble Building made entirely out of soap bubbles. It is meant to stimulate playful interactions since visitors must collaborate to build the soap structure.

In these examples, we see how some of the tensions mentioned in the introduction – individual and collective, difference and similarity, conflict and collaboration – become materialized and reconfigured in architecture. The rise of urban data means it is much easier to find, build and live among people based on perceived similarities. This is partly true in the case of collective private commissioning (CPC), an official Dutch housing policy measure in place since 2000, which aims to stimulate end-users to collectively design and build their own homes, as they did prior to World War II, after which public housing became the task of national government, local authorities and semi-public housing corporations. CPC aims to fit the mobility and DIY attitude of the present network society, and "the need for a renewed collective self-esteem" (Boelens and Visser, 2011, pp. 105–106). While on the scale of the housing project, this may lead to homogenization, as likeminded people tend to cluster and choose similar designs, it may lead to a mosaic-like heterogeneity at the wider scale of neighborhoods. Nonetheless, it raises questions about who owns the city, as an evaluative study into ten years of CPC and variants finds: "[A]ccording to the residents questioned, there are some cases where (C)PC projects seem to be perceived as 'different' and 'gated'. Although openness is often guaranteed, some are still regarded as outsiders". (Boelens and Visser, 2011, p. 124).

In the above cases, traditional institutions are often bypassed. Architects adopt the roles of commissioner and executor at once. Rather than being demand-driven and waiting for a commission or entering competitions, they actively seek out an issue like the redevelopment or temporary use of a particular place and try to organize publics that take ownership. Instead of pitching, they campaign and mobilize networked

publics to realize their plans. This movement away from a demand-driven work ethic appears to have striking parallels with the intrinsically motivated playful hacker spirit of doing something just because it is fun (Himanen, 2001, pp. 3–7).

6. Conclusion

We have forwarded "ownership" as a lens to look at the role of new media technologies in the city, chiefly as an alternative to the smart city paradigm. We have shown how digital media have created a number of qualitative shifts in the way publics can be engaged with, organized around and act upon collective issues. These shifts mean that it has become easier for many citizens to organize themselves and take ownership of particular issues. In turn this may lead not only to new ways in which social life is organized, but also to new ways of shaping the built environment. We also argued that a culturally sensitive approach to the relation between city and technology is much needed. While many of these developments spring from grassroots initiatives and are organized around decentralized networks, they certainly are not without structure, rules and institutions. Of course we have to keep in mind that not everyone has access to these digital technologies, let alone is "net smart" enough to use them beneficially (Rheingold, 2012). Another issue for further debate is the ongoing struggle over control of infrastructures and data. Perhaps, this is a contribution architects and other urban designers can make to the world of new media design: to design truly accessible and inclusive urban interfaces that engage citizens with particular issues and allow to them to organize themselves and act.

Owning the city: New media and citizen engagement in urban design by Michiel de Lange and Martijn de Waal was published by First Monday, Volume 18, Number 11–4 November 2013 http://firstmonday.org/ojs/index.php/fm/article/view/4954/3786doi: 10.5210/fm.v18i11.4954.

BIBLIOGRAPHY

Sam Allwinkle and Peter Cruickshank, 2011. "Creating smart–er cities: An overview," *Journal of Urban Technology*, volume 18, number 2, pp. 1–16. doi: http://dx.doi.org/10.1080/10630732.2011.601103, accessed 5 November 2013.

Sherry R. Arnstein, 1969. "A ladder of citizen participation," *Journal of the American Planning Association*, volume 35, number 4, pp. 216–224.

Michael Batty, Kay Axhausen, Fosca Giannotti, Alexei Pozdnoukhov, Armando Bazzani, Monica Wachowicz, Georgios Ouzounis, and Yuval Portugali. 2012. "Smart cities of the future," *European Physical Journal Special Topics*, volume 214, number 1, pp. 481–518. doi: http://dx.doi.org/10.1140/epjst/e2012-01703-3, accessed 5 November 2013.

Yochai Benkler and Helen Nissenbaum. 2006. "Commons–based peer production and virtue," *Journal of Political Philosophy,* volume 14, number 4, pp. 394–419. doi: http://dx.doi.org/10.1111/j.1467-9760.2006.00235.x, accessed 5 November 2013.

Wayne Beyea, Christine Geith, and Charles McKeown. 2009. "Place making through participatory planning," In: Marcus Foth (editor). *Handbook of research on urban informatics: The practice and promise of the real–time city*. Hershey, Pa.: Information Science Reference, pp. 55–57. doi: http://dx.doi.org/10.4018/978-1-60566-152-0.ch004, accessed 5 November 2013.

Luuk Boelens and Anne–Jo Visser. 2011. "Possible futures of self–construction: Post–structural reflections on ten years of experimentation with (C)PC," In: Lei Qu and Evert Hasselaar (editors). *Making room for people: Choice, voice and liveability in residential places*. Amsterdam: Techne Press, pp. 103–128.

Michael Bull, 2005. "The intimate sounds of urban experience: An auditory epistemology of everyday mobility," In: János Kristóf Nyíri (editor). *A sense of place: The global and the local in mobile communication.* Vienna: Passagen Verlag, pp. 169–178.

Manuel Castells. 1997. *The power of identity*. Malden, Mass.: Blackwell.

Manuel Castells and Peter Hall. 1994. *Technopoles of the world: The making of twenty–first–century industrial complexes*. London: Routledge.

Manuel Castells, Mireia Fernandez–Ardevol, Jack Linchuan Qiu, and Araba Sey. 2004. "The mobile communication society: A cross–cultural analysis of available evidence on the social uses of wireless communication technology," *Annenberg Research Network on International Communication, University of Southern California*, at http://arnic.info/workshop04/MCS.pdf, accessed 5 November 2013.

Lieven de Cauter, 2004. *The capsular civilization: On the city in the age of fear.* Rotterdam: NAi Publishers.

Michele Chang and Elizabeth Goodman, 2006. "Asphalt games: Enacting place through locative media," *Leonardo*, volume 14, number 3, at http://www.leoalmanac.org/wp-content/uploads/2012/07/Asphalt-Games-Enacting-Place-Through-Locative-Media-Vol-14-No-3-July-2006-Leonardo-Electronic-Almanac.pdf, accessed 5 November 2013.

Dimitris Charitos, Olga Paraskevopoulou, and Charalampos Rizopoulos. 2008. "Location–specific art practices that challenge the traditional conception of mapping," *Artnodes*, number 8, athttp://www.uoc.edu/artnodes/8/dt/eng/paraskevopoulou_charitos_rizopoulos.html, accessed 5 November 2013.

Hafedh Chourabi, Taewoo Nam, Shawn Walker, J. Ramon Gil–Garcia, Sehl Mellouli, Karine Nahon, Theresa A. Pardo, and Hans Jochen Scholl, 2012. "Understanding smart cities: An integrative framework," *HICSS '12: Proceedings of the 2012 45th Hawaii International Conference on System Sciences*, pp. 2289–2297. doi: http://dx.doi.org/10.1109/HICSS.2012.615, accessed 5 November 2013.

Conservative Party (Great Britain), 2010. "Invitation to join the government of Britain: The Conservative Manifesto 2010," [London: Conservative Party], at http://media.conservatives.s3.amazonaws.com/manifesto/cpmanifesto2010_lowres.pdf, accessed 5 November 2013.

Mike Crang and Stephen Graham, 2007. "Sentient cities: Ambient intelligence and the politics of urban space," *Information, Communication & Society*, volume 10, number 6, pp. 789–817. doi: http://dx.doi.org/10.1080/13691180701750991, accessed 5 November 2013.

Chantal de Gournay, 2002. “Pretense of intimacy in France,” In: James E. Katz and Mark A. Aakhus (editors). *Perpetual contact: Mobile communication, private talk, public performance.* Cambridge: Cambridge University Press, pp. 193–205.

Guy Debord, 1958. “Theory of the Dérive,” *Internationale Situationiste*, number 2, athttp://www.cddc.vt.edu/sionline/si/theory.html, accessed 5 November 2013.

Martin Dodge, 2004. “Geographies of e–commerce: The case of Amazon.com,” In: Stephen Graham (editor). *The cybercities reader.* London: Routledge, pp. 221–225.

Paul Dourish and Genevieve Bell. 2011. *Divining a digital future: Mess and mythology in ubiquitous computing.* Cambridge, Mass.: MIT Press.

John Downey and Jim McGuigan (editors), 1999. *Technocities.* London: SAGE.

Richard L. Florida, 2004. *The rise of the creative class: And how it’s transforming work, leisure, community and everyday life.* New York: Basic Books.

Marcus Foth (editor), 2009. *Handbook of research on urban informatics: The practice and promise of the real–time city.* Hershey, Pa.: Information Science Reference.

Marcus Foth, Laura Forlano, Christine Satchell, and Martin Gibbs (editors), 2011. *From social butterfly to engaged citizen: Urban informatics, social media, ubiquitous computing, and mobile technology to support citizen engagement.* Cambridge, Mass.: MIT Press.

Kate Fox, 2006. “Society: The new garden fence,” In: *The mobile life report 2006: How mobile phones change the way we live*, at http://www.yougov.co.uk/extranets/ygarchives/content/pdf/CPW060101004_1.pdf, accessed 5 November 2013.

Erving Goffman, 1959. *The presentation of self in everyday life.* Garden City, N.Y.,: Doubleday.

Stephen Graham (editor), 2004. *The cybercities reader.* London: Routledge.

Stephen Graham and Simon Marvin, 2001. *Splintering urbanism: Networked infrastructures, technological mobilities and the urban condition.* London: Routledge.

Adam Greenfield and Mark Shepard. 2007. “Urban computing and its discontents,” *Situated Technologies Pamphlet Series*, at http://www.situatedtechnologies.net/files/ST1-Urban_Computing.pdf, accessed 12 December 2007.

Michael Gurstein (editor), 2000. *Community informatics: Enabling communities with information and communications technologies.* Hershey, Pa.: Idea Group Pub.

Michael Gurstein, 2003. “Effective use: A community informatics strategy beyond the Digital Divide,” *First Monday*, volume 8, number 12, at http://firstmonday.org/article/view/1107/1027, accessed 5 November 2013.

Ichiyo Habuchi, 2005. “Accelerating reflexivity,” In: Mizuko Ito, Misa Matsuda, and Daisuke Okabe (editors). *Personal, portable, pedestrian: Mobile phones in Japanese life.* Cambridge, Mass.: MIT Press, pp. 165–182.

Garrett Hardin, 1968. “The tragedy of the commons,” *Science*, volume 162, number 3859 (13 December), pp. 1,243–1,248, and at http://www.sciencemag.org/content/162/3859/1243.full, accessed 5 November 2013.
doi: http://dx.doi.org/10.1126/science.162.3859.1243, accessed 5 November 2013.

Pekka Himanen, 2001. *The hacker ethic, and the spirit of the information age*. New York: Random House.

Robert G. Hollands, 2008. “Will the real smart city please stand up? Intelligent, progressive or entrepreneurial?” *City*, volume 12, number 3, pp. 303–320.
doi: http://dx.doi.org/10.1080/13604810802479126, accessed 5 November 2013.

Institute for the Future, 2010. “A planet of civic laboratories: The future of cities, information, and inclusion,” at http://iftf.me/public/SR-1352_Rockefeller_Map_reader.pdf, accessed 5 November 2013.

Mizuko Ito, 2005. “Intimate visual co–presence,” *2005 Ubiquitous Computing Conference* (Tokyo), athttp://www.itofisher.com/mito/archives/ito.ubicomp05.pdf, accessed 5 November 2013.

Mizuko Ito, Daisuke Okabe, and Ken Anderson. 2009. “Portable objects in three global cities: The

personalization of urban places," In: Rich Ling and Scott W. Campbell (editors). *The reconstruction of space and time: Mobile communication practices*. New Brunswick, N.J.: Transaction Publishers, pp. 67–87.

Jane Jacobs, 1992. *The death and life of great American cities*. New York: Vintage Books.

Leigh Keeble and Brian Loader (editors), 2001. *Community informatics: Shaping computer–mediated social relations*. London: Routledge.

Michiel de Lange, 2013. "The smart city you love to hate: Exploring the role of affect in hybrid urbanism," In: Dimitris Charitos, Iouliani Theona, Daphne Dragona, and Haris Rizopoulos (editors).*The hybrid city II: Subtle rEvolutions,* at http://www.bijt.org/wordpress/wp-content/uploads/2013/06/130524_HC2-Athens.pdf, accessed 5 November 2013.

Michiel de Lange, 2010. *Moving circles: Mobile media and playful identities.* Faculty of Philosophy, Erasmus University Rotterdam, Rotterdam, at http://www.cs.vu.nl/~eliens/download/read/moving-circles.pdf, accessed 5 November 2013.

Michiel de Lange, 2009. "From always on to always there: Locative media as playful technologies," In: Adriana de Souza e Silva and Daniel M. Sutko (editors). *Digital cityscapes: Merging digital and urban playspaces*. New York: Peter Lang, pp. 55–70, and at http://www.bijt.org/wordpress/wp-content/uploads/2009/12/fromalwaysontoalwaysthere_def02.pdf, accessed 5 November 2013.

Michiel de Lange and Martijn de Waal. 2012a. "Ownership in the hybrid city", at http://virtueelplatform.nl/english/news/ownership-in-the-hybrid-city/, accessed 5 November 2013.

Michiel de Lange and Martijn de Waal. 2012b. "Social cities of tomorrow: Conference text," athttp://www.socialcitiesoftomorrow.nl/background, accessed 5 November 2013.

Michiel de Lange and Martijn de Waal, 2009. "How can architects relate to digital media? The Mobile City keynote at the 'Day of the Young Architect'," at http://www.themobilecity.nl/2009/12/06/how-can-architects-relate-to-digital-media-tmc-keynote-at-the-%E2%80%98day-of-the-young-architect%E2%80%99//, accessed 5 November 2013.

Bruno Latour, 2005. *Reassembling the social: An introduction to actor–network–theory.* Oxford: Oxford University Press.

Charles Leadbeater and Paul Miller. 2004. *The pro–am revolution: How enthusiasts are changing our economy and society.* London: Demos.

Henri Lefebvre, 1996. *Writings on cities*. Selected, translated, and introduced by Eleonore Kofman and Elizabeth Lebas. Cambridge, Mass.: Blackwell.

Christian Licoppe, 2004. "'Connected' presence: The emergence of a new repertoire for managing social relationships in a changing communication technoscape," *Environment and Planning D: Society and Space*, volume 22, number 1, pp. 135–156. doi: http://dx.doi.org/10.1068/d323t, accessed 5 November 2013.

Tim Lindgren, 2005. "Blogging places: Locating pedagogy in the whereness of Weblogs," *Kairosvolume* 10, number 1, at http://www.technorhetoric.net/10.1/binder2.html?coverweb/lindgren/, accessed 5 November 2013.

Rich Ling, 2008. *New tech, new ties: How mobile communication is reshaping social cohesion*. Cambridge, Mass.: MIT Press.

Lyn H. Lofland, 1973. *A world of strangers: Order and action in urban public space.* New York: Basic Books.

Kevin Lynch, 1960. *The image of the city.* Cambridge, Mass.: Technology Press.

David Lyon, 2009. *Identifying citizens: ID cards as surveillance.* Cambridge: Polity.

Marshall McLuhan, 1994. *Understanding media: The extensions of man.* Cambridge, Mass.: MIT Press.

Joshua Meyrowitz, 1985. *No sense of place: The impact of electronic media on social behavior.* New York: Oxford University Press.

Markus Miessen, 2010. *The nightmare of participation.* New York: Sternberg Press.

Stanley Milgram, 1970. "The experience of living in cities," *Science*, volume 167, number 3924 (13 March), pp. 1461–1468. doi: http://dx.doi.org/10.1126/science.167.3924.1461, accessed 5 November 2013.

Don Mitchell, 2003. *The right to the city: Social justice and the fight for public space.* New York: Guilford Press.

William J. Mitchell, 1999. *E–topia: "Urban life, Jim – but not as we know it".* Cambridge, Mass.: MIT Press.

William J. Mitchell, 1995. *City of bits: Space, place, and the infobahn.* Cambridge, Mass.: MIT Press.

William J. Mitchell, 2006. "Smart City 2020," *Metropolis* (April),http://www.metropolismag.com/April-2006/Smart-City-2020/, accessed 5 November 2013.

Elinor Ostrom, 1990. *Governing the commons: The evolution of institutions for collective action*. Cambridge: Cambridge University Press.

Eric Paulos, R.J. Honicky, and Ben Hooker, 2008. "Citizen science: Enabling participatory urbanism," In: Marcus Foth (editor), 2009. *Handbook of research on urban informatics: The practice and promise of the real–time city.* Hershey, Pa.: Information Science Reference. doi: http://dx.doi.org/10.4018/978-1-60566-152-0.ch028, accessed 5 November 2013.

Antoine Picon, 2008. "Toward a city of events: Digital media and urbanity," In: Stephen Ramos and Neyran Turan (editors). *New Geographies,* volume 0, pp. 32–43.

Ithiel de Sola Pool, 1983. *Forecasting the telephone: A retrospective technology assessment*. Norwood, N.J.: ABLEX.

Ithiel de Sola Pool (editor), 1977. *The social impact of the telephone.* Cambridge, Mass.: MIT Press.

Lee Pugalis and Bob Giddings, 2011. "A renewed right to urban life: A twenty–first century engagement with Lefebvre's initial 'cry'," *Architectural Theory Review*, volume 16, number 3, pp. 278–295. doi: http://dx.doi.org/10.1080/13264826.2011.623785, accessed 5 November 2013.

Jack Linchuan Qiu, 2009. *Working–class network society: Communication technology and the information have–less in urban China.* Cambridge, Mass.: MIT Press.

Jack Linchuan Qiu, 2007. "The wireless leash: Mobile messaging service as a means of control," *International Journal of Communication*, volume 1, number 1, at http://ijoc.org/index.php/ijoc/article/view/15, accessed 5 November 2013.

Carlo Ratti and Anthony Townsend. 2011. "The social nexus," *Scientific American*, volume 305 (September), pp. 42–48. doi: http://dx.doi.org/10.1038/scientificamerican0911-42, accessed 5 November 2013.

Howard Rheingold, 2012. *Net smart: How to thrive online.* Cambridge, Mass.: MIT Press.

Horst W.J. Rittel and Melvin M. Webber, 1973. "Dilemmas in a general theory of planning," *Policy Sciences*, volume 4, number 2, pp. 155–169. doi: http://dx.doi.org/10.1007/BF01405730, accessed 5 November 2013.

Saskia Sassen, 1991. *The global city: New York, London, Tokyo.* Princeton, N.J.: Princeton University Press.

Terry Schwarz and Steve Rugare (editors), 2009. *Pop up city.* Cleveland, Ohio: Cleveland Urban Design Collaborative, College of Architecture and Environmental Design, Kent State University.

Richard Sennett, 1976. *The fall of public man*. New York: W.W. Norton.

Mark Shepard (editor), 2011. *Sentient city: Ubiquitous computing, architecture, and the future of urban space*. Cambridge, Mass.: MIT Press.

Yongjun Shin and Dong–Hee Shin, 2012. "Community informatics and the new urbanism: Incorporating information and communication technologies into planning integrated urban communities," *Journal of Urban Technology*, volume 19, number 1, pp. 23–42. doi: http://dx.doi.org/10.1080/10630732.2012.626698, accessed 5 November 2013.

Clay Shirky, 2008. *Here comes everybody: The power of organizing without organizations*. New York: Penguin Press.

Georg Simmel, 1997. "The metropolis and mental life," In: David Frisby and Mike Featherstone (editors). *Simmel on culture: Selected writings*. Thousand Oaks, Calif.: Sage, pp. 174–186.

Nigel Thrift, 2004. "Intensities of feeling: Towards a spatial politics of affect," *Geografiska Annaler: Series B, Human Geography*, volume 86, number 1, pp. 57–78. doi: http://dx.doi.org/10.1111/j.0435-3684.2004.00154.x, accessed 5 November 2013.

Marc Tuters and Michiel de Lange. 2013. "Executable urbanisms: Messing with Ubicomp's singular future," In: Regine Buschauer and Katharine S. Willis (editors). *Medialität und räumlichkeit – Multidisziplinäre perspektiven zur verortung der medien (Multidisciplinary perspectives on media and locality)*. Bielefeld: Transcript, pp. 49–70.

Kazys Varnelis (editor), 2008. *Networked publics*. Cambridge, Mass.: MIT Press.

Paul Virilio, 1997. *Open sky*. Translated by Julie Rose. London: Verso.

Martijn de Waal, 2013. *The city as interface: How new media are changing the city.* Rotterdam: NAI Uitgevers/Publishers Stichting.

Martijn de Waal, 2012a. "De stad als interface: Digitale media en stedelijke openbaarheid," Proefschrift Rijksuniversiteit Groningen.

Martijn de Waal, 2012b. "The ideas and ideals in urban media," In: Marcus Foth, Laura Forlano, Christine Satchell, and Martin Gibbs (editors). *From social butterfly to engaged citizen: Urban informatics, social media, ubiquitous computing, and mobile technology to support citizen engagement.* Cambridge, Mass.: MIT Press, pp. 5–20.

Louis Wirth, 1938. "Urbanism as a way of life," *American Journal of Sociology*, volume 44, number 1, pp. 1–24.

NICOLAS KAYSER-BRIL

AN INTRODUCTION TO DATA-DRIVEN INVESTIGATIONS

On a summer day of 2009, Arnold Schwarzenegger, then governor of California, erupted in his office with the Los Angeles Times in his hand and yelled "I want this fixed today!" in typical Terminator style. What had provoked the action-hero-turned-politician was not a corruption scandal or a sudden disaster. Actually, all the information published in the newspaper was public already. Journalists from ProPublica, a newsroom in New York, collected data on the Nursing Boards of several US states. Such boards regulate the accreditation of nurses in the United States and are supposed to warn hospitals of inadequate candidates, such as nurses with a history of abuse. They showed that in California, as opposed to other states, nurses who had repeatedly mishandled patients and been fired could easily find a position in another hospital, among other findings[1]. The investigation was subsequently published in the Los Angeles Times, where Schwarzenegger read it. A few days later, the majority of the Nursing Board was fired and the situation improved.

Collect & structure

To achieve such an outcome, the journalists patiently aggregated data concerning the complaints filed to the Nursing Boards, checked for patterns, worst cases and compared the results across the states, before they could be sure that there was a problem in California. By transforming a series of anecdotes into statistics, they had definite proof of what they were arguing.

The process of using information that is already public, structuring it in a database and analyzing it, is called *open source intelligence*. It has been used for years by several intelligence agencies and is slowly coming to journalism. The premise is fairly simple. A huge amount of information is published each day, in the form of news articles, tweets, public Facebook posts, automated data exhausts, such as logs from web servers, documents from the "deep web" (what is

[1] Pro Publica, *When Caregivers Harm*, http://www.propublica.org/series/nurses.

not indexed in search engines) and so on. Taken individually, each of these has almost no value for a journalist. A tweet mentioning a car crash, for instance, is not usable. But a news outlet can keep track of such tweets and turn them into worthy data. Consider this tweet[2]:

The information it contains can be stored in a table, such as:

incident	Car crash
location	Elephant & Castle, London
date	Sep 7, 2012
time	11:00

2 Twitter, https://twitter.com/BossRy_TG/status/244323199632941056.

By doing so at a large scale on car crashes in London, a newsroom would eventually end up with a database and could run analyses to know the number of accidents in each neighborhood, the trends, the worst time of the day or the names of the victims. A public radio in New York, WNYC, is doing just that. Starting in January 2014, they collected information on fatal car crashes in the city as part of the project *Mean Streets*[3]. They have been able to show in particular that official statistics undercounted the death toll from car crashes.

Automate as much as you can

Some information is most efficiently collected by hand. Extracting data from a tweet or a news article is best done by humans. But computers can help, too. You can, for instance, create a robot that will crawl through documents to find only the ones of interest to your investigation (e.g. documents containing certain keywords). Alternatively, you can set up a Google Alert[4] on specific searches to get the latest content on a topic.

Large amounts of structured data are already available online. Business and property registries, lists of public tenders, job vacancies, declaration of interests or lists of lobbyists are all easily accessible. Obtaining this data in a format that lets you run analyses, such as a spreadsheet, is much harder. In the absence of computer skills, you are forced to search by hand for the information that interests you most, copy it into your document and stop there. However, these steps can be fully automated. A computer, geared with the right program, can go to every single web page of a website, extract the information you need and give you a perfect spreadsheet in the end. The action of automatically collecting data from web pages is called *scraping*. While it is most efficient to do it using high-level programming languages, such as Python, alternatives exists with point-and-click interfaces, such as OutwitHub, Import.io or Kimono Labs.

Some corpuses of documents are too complex even for the best computers to analyze and too large for a single journalist to convert from messy to structured information. It was the case, for instance, when the French High Authority for Transparency released the declarations of interests of the French MPs. In all, hundreds of pdf files were available, all filled out by hand. The whole collection could not be used in such a format. An NGO, Regards Citoyens, devised an online tool to distribute the work among many different people. Anyone could take part of a document and type in the text they saw (see illustration below[5]). A result was validated after three unrelated users has typed in the same text. 8,000 people structured over 11,000 elements in a couple of days. No newsroom in

3 *Mean Streets*, http://project.wnyc.org/traffic-deaths.

4 *Google Alerts – Monitor the Web for interesting new content*, https://www.google.com/alerts.

5 *Numérisons les déclarations d'intérêts des parlementaires*, http://regardscitoyens.org/interets-des-elus/#crowdsource.

France could have done that by itself. Such outsourcing of a task to a crowd (*crowdsourcing*) has been used in many investigations, such as ProPublica's Free The Files[6], where users had to type in the declarations regarding political TV advertising in the US in 2012, so that the journalists could investigate on campaign financing.

Don't dismiss anecdotes

Looking at an issue through the data you gather can bring other problems. By looking at what is available, a journalist obviously misses the data they cannot access. Not knowing how much data is missing will distort your analysis. Homicide Watch[7], a project by Laura Amico, a journalist in Washington, DC, collects and structures public information on homicides in the US capital. How can she know if the absence of information represents an absence of murder or an absence of reports about a murder? She cannot. This bias is inherent to any data project. No organization, not even the police or the hospitals, is omniscient – some data will always be missing. A lot of time has to be invested in order to know what

Declarations of interests of the French MPs

Numérisons les déclarations d'intérêts des parlementaires, http://regardscitoyens.org/interets-des-elus/#crowdsource.

6 Pro Publica, *Free the Files*, http://www.propublica.org/series/free-the-files.

7 *Homicide Watch D.C. | Mark every death. Remember every victim. Follow every case*, http://homicidewatch.org/.

data is missing. This implies talking to experts about a topic, to know if your data matches her experience on the ground, and going on location yourself to assess the situation. Datajournalism is about turning anecdotes into statistics and knowledge, not about dismissing anecdotes out of hand.

The other challenge of open source intelligence is validation. It is impossible to spend days checking every single piece of information in a database. On the other hand, a database has no value if it contains erroneous facts. You have to find the right balance between your goals and your resources. Doing an investigation on car crashes? Then reports from Twitter accounts, provided they are not robots and use true pictures, can probably suffice[8]. Investigating the corruption links between politicians? You will need ironclad facts. Most importantly, you have to assess the proportion of errors in your database with the help of a statistician. You might find out that the errors you have are sometimes above the actual value (say, a report says an accident happened at 5pm, when it happened at 4pm) and sometimes below (4pm instead of 5pm). In the end, the errors might average themselves out and you analysis will still be strong, without the need to comb through every single data point.

Communicating the results

While data journalism can be used for research, it is equally powerful to communicate a story. Some stories are best told with words. In June 2014, the Sunday Times published the results of an investigation in millions of documents they obtained through a source (this was not open source intelligence). The force of their investigation, where they showed that Qatar had not been given the 2022 World Cup on the basis of its merit but because of corruption[9], was such that words were all that was needed. The Migrants Files[10], a project that keeps the count on migrants who died trying to come or stay in Europe, made use of a black map where red dots proportional to the number of migrants who died at a given location to show the breadth of the issue. Given the large amount of deaths and the little familiarity of the audience with the subject, a traditional article would not have sufficed.

Most of the time, simple visualizations are enough. A line chart will make a clear point when talking about an evolution. Comparing two or more values? Use a bar chart. More visualizations types are rarely needed. They are cumbersome to prepare and might not be understood clearly by the reader. Always remember that a datavisualization should make a message faster to digest, not the other way around.

8 Use Fotoforensics (http://fotoforensics.com/) to validate images and some common sense to find Twitter bots. State of Digital, *How to recognize Twitter bots: 7 signals to look out for*, http://www.stateofdigital.com/how-to-recognize-twitter-bots-6-signals-to-look-out-for.

9 The Sunday Times, *Secret deals turn heat on World Cup*, http://www.thesundaytimes.co.uk/sto/news/uk_news/fifa/article1420147.ece.

10 *The Migrants Files*, http://themigrantsfiles.com.

11 *Zone Silesia. An in-depth report on the Katowice Special Economic Zone*, http://ksse.medialabkatowice.eu/.

12 *Iraq Body Count*, https://www.iraqbodycount.org/.

13 *Bullet Points | Tracking intentional homicides in Trinidad and Tobago*, http://bulletpoints.org.tt/.

14 *Global Terrorism Database*, http://www.start.umd.edu/gtd/.

Recoup your investment

Investigations that make use of datajournalism are time consuming. Not necessarily more so than traditional investigations, but they still represent an investment that carries risks. As part of the Urban Data Stories workshop on the topic, we set out to investigate the details of the Katowice Special Economic Zone (KSSE). Halfway through the 3-day endeavor, we realized that the methodology we chose – gathering information from public company records – would not let us come up with the hoped-for results. We had to change the way we collected data and the focus of the investigation, from the companies proper to the general environment of the KSSE[11].

This example illustrates how such investigations cannot be ordered in a short time frame. The nursing project at ProPublica took almost two years to complete. More commonly, similar projects are created for the long run. *Homicide Watch* had to wait more than a year before it could boast interesting data. The Migrants Files keeps storing new information as it comes in, making the database more and more valuable. *Iraq Body Count*[12], another example of open source intelligence, became one of the best resources for information on casualties as the war dragged on in the 2000's.

The most difficult part is to sustain the investment until the point when your database becomes the best on the topic you are investigating. Once there, it will provide you with exclusive information that will add value to each article or news report you publish on the topic, on top of being used in the leading articles of the investigation. *The Migrants Files*, for instance, garnered a lot of attention on its release date in March 2014 and keeps being mentioned since then.

To capitalize on this long-lasting popularity and make sure that you recoup your investment, make sure to publish your data to the public. Sometimes, a shared spreadsheet might suffice. This is what The Guardian of Trinidad and Tobago does with its *Bullet Points*[13] project, an investigation using open source intelligence on killings on the Caribbean island. Other projects go to great lengths to provide ad-hoc front-ends, such as the *Global Terrorism Database*[14], an open source intelligence project by the university of Maryland on all terrorist acts reported since 1970. Some tools let you create databases from scratch, especially Poderopedia or Detective.io, which were done specifically for journalists.

You might not change the mind of the governor of California by structuring information from open sources into a database. But you

will certainly discover that there is a lot to be gained from having a data-driven approach to information that will make you a more efficient journalist – and let you find exclusive stories, too.

Disclosure:
Nicolas Kayser-Bril coordinated The Migrants Files project and Detective.io

MAREK KULTYS

SIMULATION IN CREATING CITIES

Simulation – Model – Platform

Simulation is one of the most sophisticated ways to achieve a human desire to understand the surrounding world and a no less ambitious goal to control it. Through simulations, we are able to anticipate changes in weather, experience weightlessness, explore the structure and properties of matter at molecular level or, last but not least, learn to fly a passenger jet. It is hard to say how many scientific discoveries and technologies would remain unknown today had it not been for simulation and its role in underpinning all these achievements.

Simulation can be defined as an attempt to mimic some of the features and behaviour of the simulated system within a simulating system. Any simulation is based on a model providing definitions of certain rules of operation to apply within its system. In simple terms, it can be concluded that simulation makes it possible to observe a model over time. Simulated models may have very different complexity levels: from relatively simple ones (e.g. a model describing the game of pool billiards), to the extremely complex systems (e.g. a model to simulate the dynamics of the Earth's hydrosphere, i.e. the circulation of water between the land masses, oceans and the atmosphere). Moreover, the model may be set up to consider more or less important factors that potentially impact on the behaviour of the simulation. For example, no respectable pool model can do without the rule requiring the balls to bounce off the cushion at the same angle at which the impact came. A factor of less importance may be the height above sea level at which the game is played, which in a very detailed model of pool would have an effect on the density of the air and, consequently, aerodynamic drag on the balls.

Simulations themselves may also be carried out in a variety of ways. This depends mainly on the platform on which the model is to be run. Quantum model simulations of are executed on supercomputers as part of projects involving huge amounts of computing power, funding and time. Simpler simulations can be run on ordinary laptops or smartphones, as evidenced by the multitude of games available on diverse themes and with varying degrees of complexity. Simulations may also take place outside computing machines, e.g. at a military training field, where exercises

cover a wide range of conflict and mission scenarios. Combat field simulations can target different levels of realism of the combat environment, such as emulating specific weather conditions, introducing the factor of time, or even using live ammunition.

Going back to computer simulations, advances in digital technologies, and especially in creating virtual environments, have allowed the development of interactive simulations where the simulated elements of the system can be actively influenced and relevant feedback received in the form of system responses to such actions. The most popular form of such simulations are, for example, computer games offering more diversity in terms of the player's perspective. Flight simulators, car racing and "first-person shooter" games (shooting games in which the player takes on the role of one of the characters[1]) are simulations controlled from the user perspective. The scope and degree of impact of the player on the simulated environment of the game is usually limited spatially and temporally. This localised point of view stands in opposition to another type of simulation which offers the opportunity of seeing and acting from a global perspective. Simulators which allow users to create planetary systems[2], study the spread of pandemics[3] or manage a cold war military conflict[4] give them the ability to manage the entire simulation environment which is subject to modification, reacts to the player's actions, while trying to achieve its inherent equilibrium state. The scope of the user's observation, knowledge and interference offered in this type of simulation is close to godlike omnipotence.

The multitude and richness of simulations have led to the blurring of boundaries between their various types. In some cases, simulations designed for entertainment have turned out to be effective educational aids, or even serious corporate management tools. Others, due to the versatility of the models employed, are used not only in science, but also as intelligent entertainment.

SimCity – Foldit – Simulation on Paper

SimCity 2000 is one of the most acclaimed city construction and management simulations. The game, created by Will Wright in 1993, has already found a permanent place in modern entertainment tradition, as confirmed by its inclusion in the permanent collection of New York's MoMA[5]. In the game, the player takes on the role of an omnipotent mayor whose job is to provide favourable conditions for the construction and development of the city. The mayor has a range of tools with which to indirectly impact on the status of the city. The aspects under the mayor's control

1 *Wolfenstein 3D*, http://en.wikipedia.org/wiki/Wolfenstein_3D.

2 *Planet Families*, http://www.scigames.org/game.php?id=2.

3 *Plague Inc*, http://www.ndemiccreations.com/en/22-plague-inc.

4 *Harpoon*, http://www.mobygames.com/game/harpoon.

5 *SimCity 2000*, http://www.moma.org/collection/browse_results.php?object_id=152406.collection/browse_results.php?object_id=152406.

include: tax and safety regulations, educational standards and urban planning.

SimCity 2000 has become a model for complex simulations in which the player discovers the complex operating rules of the urban system through practical experiment. While exploring the subtle correlations between taxation and emigration to neighbouring cities, the mayor of SimCity will first inadvertently cause a few waves of mass emigration before getting a feel for the level of fiscal burden that must not be exceeded. This is the educational value of SimCity, as only in simulated conditions is one allowed to get away with testing different options and learning from each failure incurred.

This exemption from punishment while experimenting has been taken advantage of by the creators of GlassLab educational simulations. The SimCityEDU: Pollution Challenge![6] is an adaptation of the SimCity series devised for use in schools as part of environmental education classes. Students are given the task of completing specially designed missions which relate to the issues of environmental pollution and the sustainable development of local communities. During the game, students discover the complicated relationships between environmental protection and other aspects of life and economy, as well as learn to take responsibility for any decisions made in the simulation environment.

The value of simulation as an effective mechanism for learning about complex systems has found recognition among the business community as well. SimCity creator Will Wright also made SimRefinery, a prototype simulation for Chevron Corporation[7]. The game was created for internal use at the company and its purpose was to acquaint those technologically disinclined Chevron employees with the operation of refineries and petrochemical plants. Simulation again proved an effective method of teaching and learning through experimentation, play and fun.

Having played a few games, most SimCity 2000 players become versed in the sequence of moves that should be taken at a given place and time. Players quickly learn from their mistakes and thanks to the repeatability of simulations within SimCity, methods leading to optimum results can be effectively improved upon. Repeatability is also the reason behind the success of another simulation game called Foldit. Foldit is an unusual project that has turned super-complex simulations of protein structures into a three-dimensional puzzle enjoyed by players all over the world[8]. Determining the optimum protein conformation (i.e. the shape which determines its function in living organisms) is a very tedious and computationally intensive process. In Foldit, players are encouraged to find

6 *SimCityEDU: Pollution Challenge!*, http://www.glasslabgames.org/games/SC?scrollTo=top.

7 *SimRefinery*, http://archive.wired.com/wired/archive/2.01/wright.html.

8 *Foldit*, http://centerforgamescience.org/portfolio/foldit/.

the optimum spatial structure of the protein by repeatedly manipulating its shape. The process is similar to solving the Rubik's cube, the difference being proteins can be many times more diverse and complicated. The benefit for science comes from the vast number of solutions proposed and pre-tested by more than half a million players. Foldit players took only ten days to decipher the crystal structure of the Mason-Pfizer monkey virus, a problem which scientists had not been able to work out for fifteen years. Interestingly, the final determination of the structure of this protein was contributed to by crystallographers from Poznań's Adam Mickiewicz University and Academy of Sciences[9].

The above discussed simulations have one thing in common, namely that they bear no (or hardly any) relevance to *your* everyday life, dear Reader. The rules governing the city in SimCity 2000 fail to take into account the local conditions in youre home city. The situation regarding environmental pollution in your city is probably different from the model used in SimCity EDU: Pollution Challenge!, for which the inspiration came from the environmental situation in California. Problems solved in Foldit are global, so they can have an impact on the creation of a new anti-cancer therapy, but there is no way half a million players will pull together to solve problems in your community. Nevertheless, simulation can be helpful in answering questions asked by local communities and the process can be a lot less complicated than most of the discussed examples. Let us call this method *simulation on paper*.

The "Role Reversal" Workshop

In February 2014, Medialab Katowice conducted "The reversal of Roles: Visualisation as a Method for Change", a three-day workshop attended by local designers, urban and social activists, artists and architects. The workshop participants were given a challenging task of designing a change in urban space. Working in four thematic teams, the participants focused on several issues, including promoting environmentally responsible behaviours among residents of Zakopane, communication between local authorities and residents, social atomisation of Katowice agglomeration as well as the social and economic mobilisation in Silesia. The workshop was divided into three stages.

As part of the first stage, each group was to develop a visual model of the situation in which the selected change was to be designed. In some cases, the model took the form of a detailed map of all stakeholders, policy makers and institutions, having an interest, voice or effect on decisions made in the community, as well as their interrelationships. Other

9 *Crystal structure of a monomeric retroviral protease solved by protein folding game players*, http://doi.org/10.1038/nsmb.2119.

groups found inspiration in the general data models defining given phenomena, or, on the contrary, models of specific cases which were used to propose specific changes in the lives of real people. All the models were given a visual form and were drawn on paper, allowing ideas to be handled, amended and tested in an easy and unrestricted manner.

In the second stage, the teams focused on generating speculative scenarios that could occur in the developed models and ultimately lead to the intended changes. Each group focused on their issue of choice and the unrestricted speculation formula allowed the creation of a wide spectrum of scenarios (ranging from very conservative to completely outlandish ideas).

The third stage was to select one scenario and test it in a simulated environment. The teams' simulations were based on models developed during the first stage of the workshop. The simulation process itself took place on paper and in the imagination of the participants according to the scenario planned during the second stage. Critical discussions that followed and the lessons learned from the simulation were the main sources of information for evaluating the accuracy of the adopted models. The participants' task was then to consider the positive and negative effects of the simulated scenarios while identifying their strengths and weaknesses as well as possible risk areas.

The Katowice "Role Reversal" workshop was an experiment in combining information design and speculative design in the context of broader thinking about the city. The participants undertook the daunting task of analysing the conditions and ways in which their proposed change could have become a reality. What they found helpful in this task was the process of building a simple simulation, i.e. creating a model and the rules governing it, and then running a simulation, or, in other words, testing different scenarios in the constructed model environment. The results of all four groups, enabled the participants to explore and understand the multi-threaded processes and complex factors affecting the current status of their city and, more importantly, what it can become in the future.

VERENA GERLACH

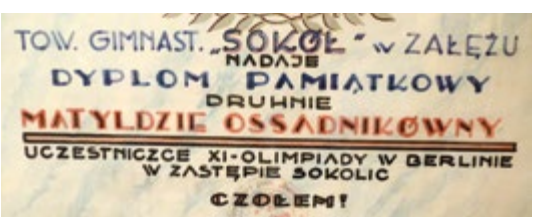
EXPLORING KATOWICE TYPOGRAPHY

When you come to an unfamiliar place (or as a local, you step beyond the known and try to get a fresh, unbiased, stranger's eye view), there are different ways to approach its personality and spirit. One possibility is to just stay on the surface and experience what is obvious and visible. But when you start to develop an emotional response to what you see, you might like to delve a little deeper and find out more about this place.

For the typography workshop initiated by Medialab Katowice, we used exactly this emotional response of the young professional participants to get close to the core of the city (literally by even visiting a historic coalmine 320m underground in nearby Zabrze).

Working on type-design projects, scrutinising what they found all over the city, the workshop participants set out on a treasure hunt for the most hidden, most spectacular, and sometimes most hilarious and not spectacular-at-all type relics. From the many design disciplines, type design and typography might be some of the most emotional ones, since they are related to a range of dogmas. They thus lend themselves perfectly to providing just the right energy to discover the city of Katowice from a different perspective.

The group started their hunt in the Katowice History Museum, where they were provided generous access to all kinds of historical documents, inscribed items, and even entire metal plates and signs. They learned all about the history of Upper Silesia, which had belonged to Poland, the Czech state (Czechia), Austria, Prussia and Germany. After Poland had regained independence in 1918, the region's future was shaped by the three Silesian Uprisings and the Versailles plebiscite (1919–1921).



There was the famous architectural modernism movement in the interwar period, but also the communist time with its stunningly complex neon installations, up to the recent "TypoPolo" phenomenon that created some quite unique lettering shapes. Using some still existing pre-WWI shop letterings and signs, which had survived the passage


KATOWICE
RESTAURACJA

of time, could also be one method. But what would distinguish them from the letterings of the same period in Germany, which Katowice was part of for a long time? Would they still reflect the city's identity if taken out of their context?

A layer cake

The city of Katowice may be perceived as a huge Pischinger, a layer cake that was first created in 1881 by the Vienna confectioner Oscar Pischinger, and which still enjoys widespread popularity across Austria, Poland, Serbia and Ukraine. Each country even sees this cake as its own specialty. Like the cake, Katowice seems to be made up of a number of layers.

There are several layers to be found in Katowice: from the bottom ones (e.g. the famous old coal mines) to the top ones (e.g. staircase landings of the high-rise residential buildings – a wonderful habitat for DIY letterings and industrial signs boasting a wide variety of stencilled typography).

The colours of Katowice

Even the most prominent colours in the cityscape are harking back to their first use in the mines. Wherever you go, among the grey-to-charcoal toned brick facades of the tenements, you can still find bright spots of light turquoise, lemon yellow and blood red. These are the sides of outside window cavities, painted by the inhabitants to brighten up their view by giving it a colourful frame.

The story has it that in the old mining days, the machines and tools belonging to a certain mine were colour-coded, each mine having its own colour. The paint was used not only to protect the valuable machines and tools from corrosion, but even more so from getting stolen.

The same paint (colour) was also used to honour the most productive workers, who would get some of the paint to brighten up their homes by decorating their window masonry. Even with most of the coalmines shut down, painting window cavities is still a playful custom in Silesia. Outside central Katowice, one can still find a lot of examples of this in the old miners districts of Nikiszowiec and Szopienice.

Other layers

There are also the vertical layers, including dozens of tacky bright signs and plates – often quite badly designed, but luckily mostly using quite pure upper case sans serifs – part of the battle to draw the potential customer's attention and lure them to one of those hidden shops crammed into the shabby courtyards. This army of signs and letterings, sometimes still boasting "TypoPolo" styled designs, often conveying the same message for

the same shop in totally different ways, makes for a truly dazzling concoction of colours and shapes. Finding the shop, or noticing the beauty of a facade or forgotten courtyard is like unveiling a shy young bride or unwrapping a present. Only the "attire" is a little weird.

Unveiling the city

So, do these layers of adverts and signs try to hide something? Or is their size and glitter supposed to cover up the dull reality of some shops? In fact, they are sometimes so massive that they cover the entire facades of some of the most beautiful modernist or brutalist buildings. The lack of clear information may even lead to a smug feeling of being a privileged local: "I'm one of the few chosen ones who knows what's underneath".

The Silesians' fascination with veils and the big illusion can even be seen in the widespread use of lace curtains – an obvious implication that there is something very special and valuable hidden inside. Also, are the huge banners just hung up for the money? Do the owners just rent out their houses as advertising space, especially that the inhabitants sometimes unable to look out of their windows anymore.

The ~~errors~~ arrows

One side effect of all the layers of signs and letterings is an epidemic of all kinds of arrows, trying to help the pedestrians navigate their way through the city's information jungle. Available in all kinds of sizes, shapes and forms, these arrows pop up just everywhere. Since a lot of the shops are located in some of Katowice's many hidden courtyards, guiding arrows would actually be quite useful if it was not for the fact that the arrow also seems to convey another message: "Our shop is in a shitty location". Worse yet, a lot of these arrows are actually used as decorations or to draw attention to shops looking out directly onto busy shopping streets. In this case the arrow might actually be taken to mean "Our shop actually IS shitty". Is the arrow supposed to be a Katowice trademark or maybe just an embarrassing error?

Conclusion

A lot of the ingredients, used for Katowice's street typography and public space design are already solid and useful. (Noteworthily, the arrow was already widely used in for example Bauhaus graphics to reflect the rather three dimensional industrial idea of visual information shown in printed works.) They even show a local identity and could be very promising. There are just way too many visual noises all over the place screaming to get notices. Eventually, you just want to run away from this cacophony.


RECTUM
STUDIO TATUAŻU
I KOLCZYKOWANIA
PAPIEROSY
TYTONIE
KAWA
Ratujemy Twoje Włosy !!!
• Badanie włosów i skóry głowy
• Włoskie preparaty Vivipharma
• Akcesoria do przedłużania
• Sprzedaż włosów
Dotyk Anioła
Salon Urody
Fryzjer
• warkoczyki
• stylizacja paznokci
• przedłużanie włosów i rzęs
NOWY SKATESHOP KATOWICE
SZMATRIX
MARKOWA ODZIEŻ UŻYWANA I NOWA
FILA


OBUWIE


UWAGA
PRZED WEJŚCIEM
DO DŹWIGU
SPRAWDŹ
CZY KABINA
ZNAJDUJE SIĘ
ZA DRZWIAMI

Considering the short period of the very special Silesian modernism, maybe the answer could be sought in Mies van der Rohe's concept of "less is more" (even though he was not Silesian)? But please, not too little! Used here and there, some of the playful typographic messiness of Katowice's contemporary streets could actually be the key to the city keeping its very local typographic identity.

One wonderful outcome of the workshop was the Pischinger font, an indigenous multi-layer typeface, designed by Maciej Kodzis, Grzegorz Owczarek, Marta Moskwa, Ewa Sadowska and Michał Pawłowski, to tell you the entire typographic history of Katowice.

Pischinger

Fraktura

Neonline

Inner Glow

Neon Outline

Outline Neon

Grotesk

Fontex

Neonline

Neon Outline

Neon Outline Glow

Rurpol

Shadow

Inner Glow

PISCHINGER FONT

Pischinger is a multi-layer font drawing on Katowice's history and iconography. The font has two basic varieties: Fraktur and Grotesque (sans serif Antiqua). It also contains many variants drawing from, among others, neon signs, vinyl three-dimensional letters and vernacular typography. The individual layers are inspired by different periods in Katowice's typographic history. While the German times are reflected by Fraktur, the neon sign lettering is a reminiscence of the 60s and 70s, and the vinyl and three-dimensional typography are a symbol of the transition period and transition to democracy and market economy in the late 1980s. All varieties can be freely mixed by putting them on top of each other and creating new configurations. Thanks to its friendly appeal, Pischinger can be used in visual identity projects to promote the city as well as in promotional merchandise. Users are free to install it on their own computers and use it to enhance their own design projects.

Project development and final typeface version: Maciej Kodzis, Grzegorz Owczarek
and workshop group: Marta Moskwa, Michał Pawłowski, Ewa Sadowska

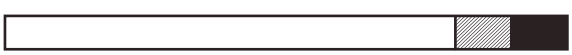
download font
j.mp/mlab_49

DATA ACQUISITION, PROCESSING AND VISUALISATION

What is the recipe for a good visualisation? People with no experience in working with data may think that all you need is a competent designer who will transform the supplied content into an attractive image without much difficulty. Yet building valuable visual communication using numerical data usually requires many hours of tedious work associated with the acquisition and processing of data. Content visualisation is generally just the culmination of the entire design process. As noted by Simon Rogers, creator of the data journalism department in the Guardian, it is only to a limited extent the result of great ideas for a topic and visualisation – up to 80 percent of the process is hard work involving data acquisition and "cleaning".

Simon Rogers, *Facts are Sacred: The Power of Data*

1 80% perspiration 2 10% great idea 3 10% output



As part of Medialab workshops and workgroup meetings, we focused on various aspects of working with data. In brief, the process can be divided into three stages: acquisition, processing and visualisation. What we mean by data acquisition is both using official sources, e.g. content published by public administration and/or research institutes, as well as our own data acquisition using standard methods, such as surveys or cordon studies, and also by placing low-cost sensors and microcontrollers, such as Arduino, in key spots around the city.

Data processing involves a series of design activities to be carried out using the acquired content, before moving on to create a visualisation. This constitutes the critical part of the 80 percent of hard work to be done by the workgroup. This stage includes both the cleaning of unstructured data and analysis of its content as well as curatorial decisions on the final shape of the message, i.e. what kind statement we intend to convey with our communication. Data processing and visualisation usually follows the principles of the design process, which helps define the purpose of the task at hand and determine the recipients of our actions.

Visualisations, in turn, are not limited to choosing a suitable graphic format, e.g. pie or bar chart, or to the otherwise important decision of what kind of media presentation – a diagram, a table or a map – will best meet

the objectives. We devoted much attention to the core design principles and competencies related to the use of tools for data processing and presentation, but at the same time often looked for alternative ways to visualise data, such as using poetry and the visual language of street art or interactive kinetic sculptures placed in public spaces around the city.

The following pages contain presentations of our Medialab Katowice projects. Their descriptions are not always consistent, as in each case we try to present in detail those aspects of particular projects which seem most valuable and useful for readers interested in the subject. Sometimes we focus on the results of workshops, while other times we detail the adopted methodology and subsequent stages of the design work. In all cases, however, we mention the tools used and provide links to online sources: pages with full documentation, photographs, videos or downloads.

This book is not a guide or tutorial, nor does it provide a step-by-step instruction on how to implement your own project. What it does, however, is try to answer some practical questions. First and foremost, we discuss the potential benefits of this kind of activity, as well as potential difficulties and challenges to tackle while using the above methods to pursue one's own projects. We also try to provide the general principles of working with data and show how to use it in interdisciplinary (and often experimental) projects that go beyond the domain of specialists and the traditionally defined boundaries of research disciplines involved in the city.

List of projects including activities undertaken

	acquisition	processing	visualisation
Apetite for Radical Change. Katowice 1865–2015	30%	40%	30%
Katowice, Open City	30%	50%	20%
SensLab	60%	30%	10%
Kinetic Street Art	10%	40%	50%
The Pulse of Lublin's Old Town	70%	10%	20%
Data-Driven Investigation	30%	40%	30%
Connecting with Your Urban Environment	30%	40%	30%
Wild Style. Data Visualisation in Public Space	10%	30%	60%
Analogue Algorithms: a Data Drawing Workshop	0%	20%	80%
Modern City in the Making. Katowice 1865–2015	40%	30%	30%
The Reversal of Roles	20%	40%	40%
MapLab: Analysis and Visualisation of Spatial Data	30%	50%	20%
Katowice Buildings	30%	10%	60%

APPETITE FOR RADICAL CHANGE. KATOWICE 1865–2015

2015	exhibition
methods & tools	animation, diagrams, online map, pictograms, spatial data visualisation

30% 40% 30%

Is it possible to present the history of a city in such a way that it can be viewed and understood in fifteen minutes?

Or, can one describe the most important events and processes that moulded a city using data visualisations, maps and pictograms? These are the questions we asked ourselves while working on the exhibition to mark the 150th anniversary of Katowice receiving its civic rights. A much more ambitious challenge was once taken up by Otto Neurath, co-founder of the Isotype visual language and author of *Modern Man in the Making*, presenting the history of modern society by visualising numerical data. Neurath believed in the possibility of creating a universal visual language that will be understood regardless of the viewer's age, origin and level of education.

Although this utopian vision did not materialise, the pre-WWII-invented rules for content organisation found their way into the canon of design. Now as the Internet offers access to vast amounts of data, we are witnessing an ever-growing popularity of infographics and visual language, which help present complex issues in a clear and consistent way. Just as the creators of Isotype once did, data journalists along with so-called info-activists argue that adequately presented information may lead to social change.

While preparing *Appetite for Radical Change. Katowice 1865–2015* we tried to avoid the traditional historical narrative, which usually puts the focus on important historical figures, political events or wars. Instead, we used diagrams, maps and data visualisations to illustrate the rapid transformations of Katowice. The city's architecture also plays an important role, showing the momentum and optimism of its creators, regardless of the period and political context.

see video documentation
j.mp/mlab_18

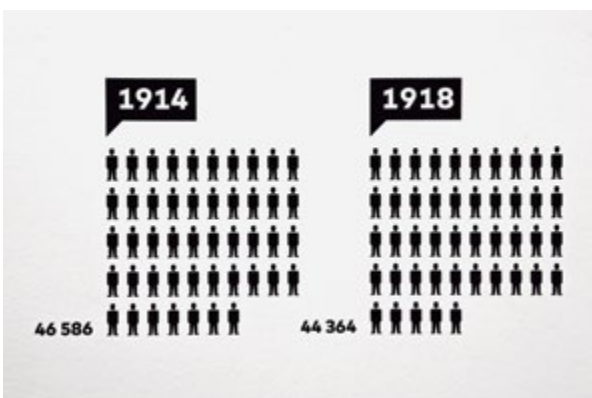
The exhibition is the result of a Medialab Katowice educational and research project which consisted of several lectures and workshops conducted under the guidance of experienced designers. The project included an interdisciplinary team, inter alia, cultural researchers, designers, architects and spatial planners. Their task was not to create a universal and objective story about the city's history, but to look at Katowice from a new perspective through the use of tools for data processing and visualisation.

The studies presented by Medialab help tackle stereotypes and understand the current challenges facing Katowice, including the development of public spaces and quality of life in the city centre. In fact, the city's history is just an excuse to consider the current status and future of Katowice.

A LUCKY CHANCE MAKES HISTORY

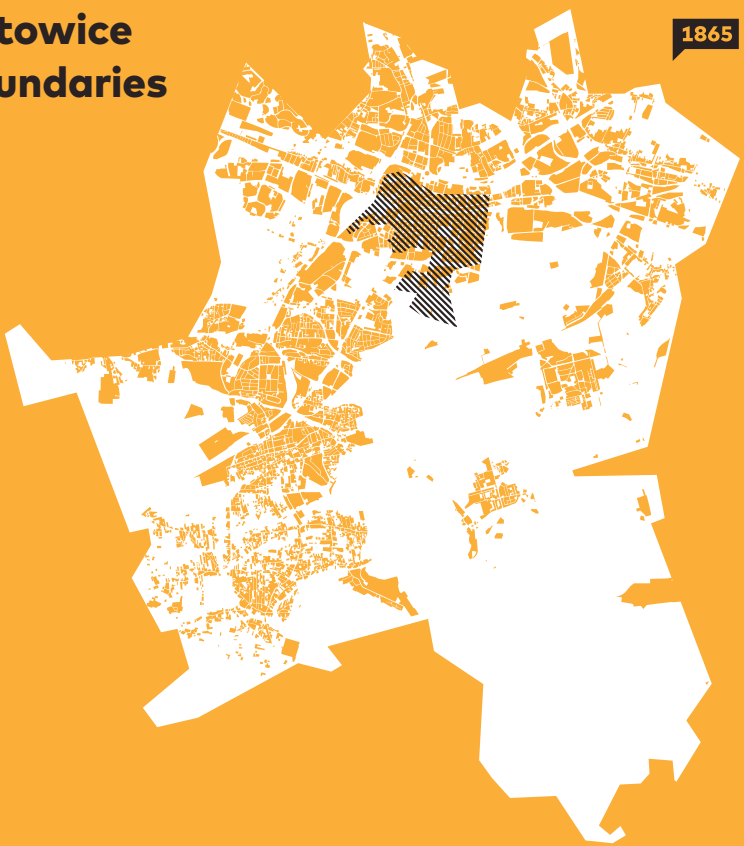
Katowice is perceived as an industrial city whose development cycle has been determined by the boom and decline of heavy industry. However, while the prosperous local steelworks and coalmines had attracted thousands of people to Katowice for long decades before, a direct factor leading to the founding of the city was the rail, which came here by chance in the mid 19th century, when Franz Winckler, owner of the village in the east of Prussia, convinced investors that the new line to connect Wrocław to the Russian border should run through his land. Many of the later unexpected turns in the history of Katowice were also a product of top-down policy decisions, rather than of any logical industrial development process. The shaky lot of the city is well demonstrated by the fact that its name changed five times in just 35 years.

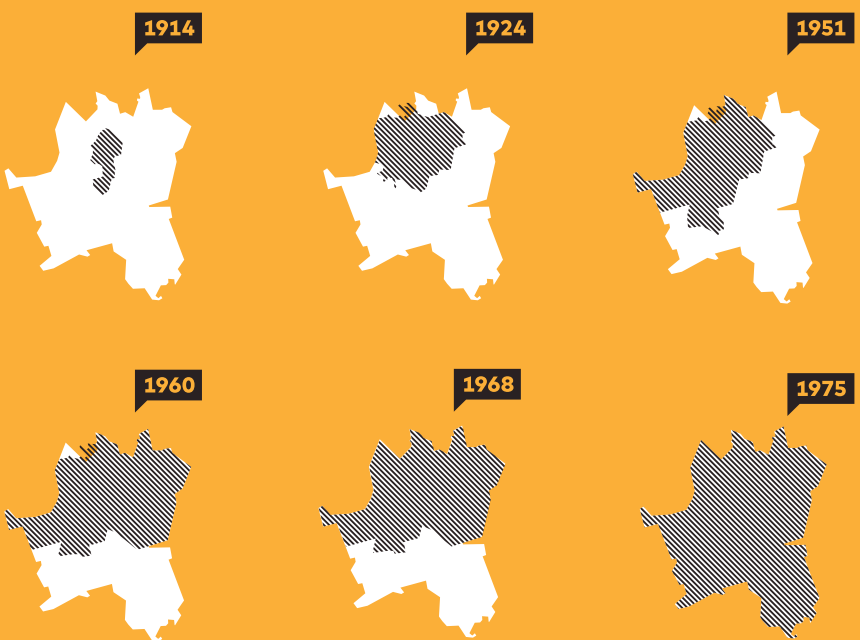

Katowice
1903
Kattowitz
1939
Katowice
1945
Stalinogród
1953
Katowice
1956
1914
1926
1951
1914
1918
1926
1939
1945
1950


1914
1918
46 586
44 364


2015

Katowice Boundaries



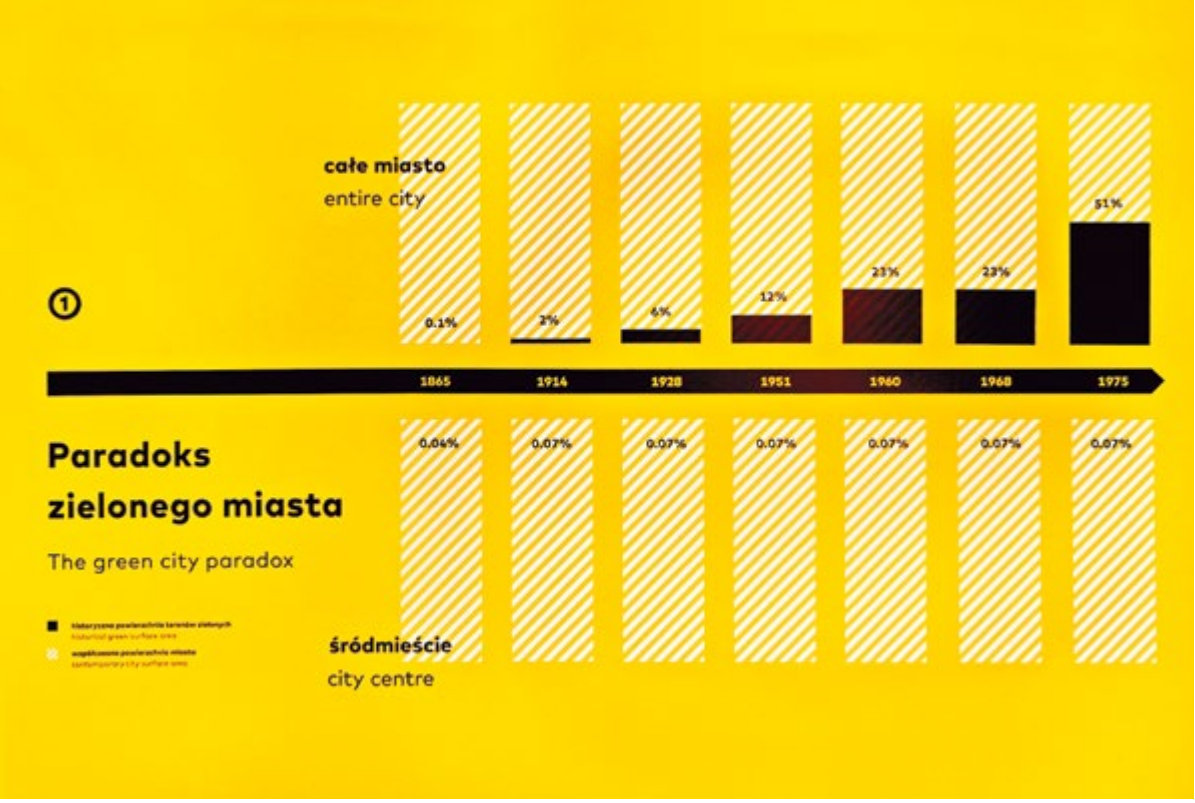


changes in city boundaries

contemporary city area

DEVELOPMENT ENHANCES DISPERSION

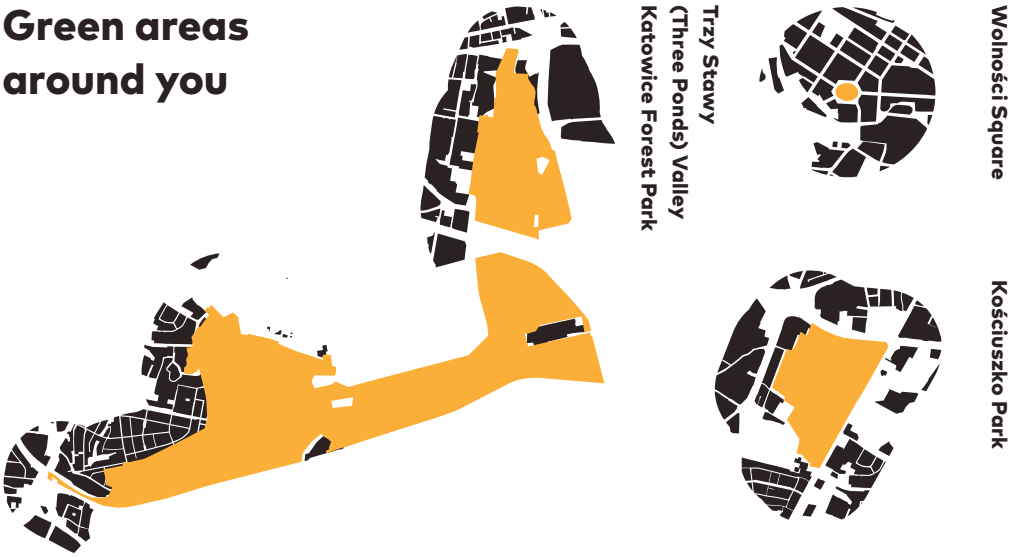
Contemporary Katowice is an agglomeration of cities, towns and villages which, as a result of the political decisions of the last hundred years, have fallen within one administrative area. Each of these areas had a different origin, impacting on its urban pattern. For a long time, these patterns were determined by agricultural activity and the distribution of farmland. Later, the decisive factor was the location and availability of mineral reserves as well as the technological process relationships and transport links within the local large-scale industrial conglomerates. An important factor for the city centre was the proximity to the railway station, which is why tenement houses and villas were tightly packed into clusters separated only by the streets. Although the buildings have survived, we are no longer able to see the logic behind their origins or development.



CONTRAST PROVOKES STEREOTYPE

Half of Katowice's surface area is covered by green vegetation such as woods, parks, lawns, river valleys and former industrial wasteland undergoing rehabilitation. Not all residents, however, enjoy unrestricted pedestrian access to these areas due to their specific location resulting from the history of local spatial development. The largest green complexes found themselves within Katowice's city limits due to the incorporation of subsequent districts and rehabilitation of degraded land. The city centre, on the other hand, was provided with small lawns and green squares to complement the dense building systems. As this situation heavily affects perceptions of contemporary Katowice, statistical and urban studies based on official databases and documents along with social map services remain the only method to address the stereotypes of "Black Silesia" and the "City of Gardens".

Green areas around you

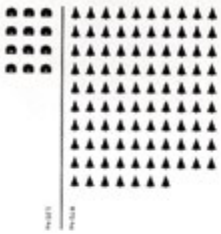


Accessibility Of Green Areas

The quality of residential areas is not determined solely by the availability of green spaces, but also by their character. The key parameter in this respect is the size and type of development – the effects of large and dense wood complexes, architect-designed parks or small lawns at the crossroads are all different due to their diverse functions and times of use. To assess whether the size of these sites is sufficient, one needs to consider the size of the community they are designed to serve. Since accurate demographic data associated with particular addresses are not easily accessible, the balancing process includes a total area of all above-ground floors of residential buildings located within the 10-minute walk zone.

Katowice: Black Silesia Or The City Of Gardens?

As a starting point while preparing the exhibition, we asked a simple question, often raised by the residents themselves: why can't we see green spaces in the city centre, though, paradoxically, they account for half of the total surface area of the city. A non-obvious answer was found by studying spatial data sets. The map shows public areas of recreational use: parks and squares, green public spaces, wooded wasteland, river valleys and woodland. We compared the data, obtained from official databases and documents as well as social Internet map services, with aerial photographs.



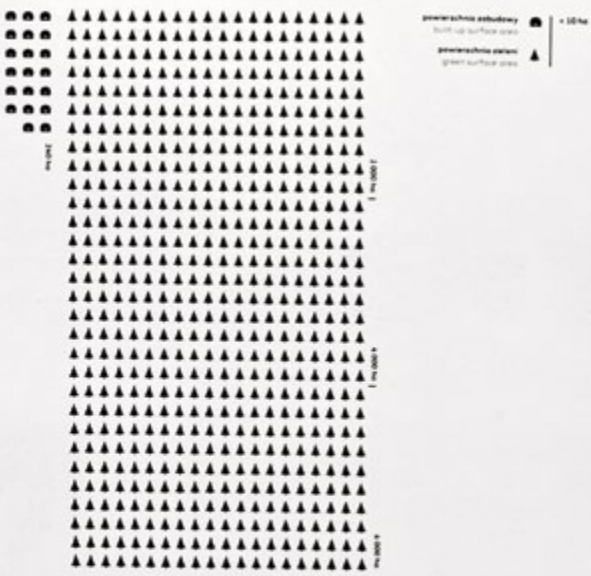
③

Jak zielono jest wokół ciebie

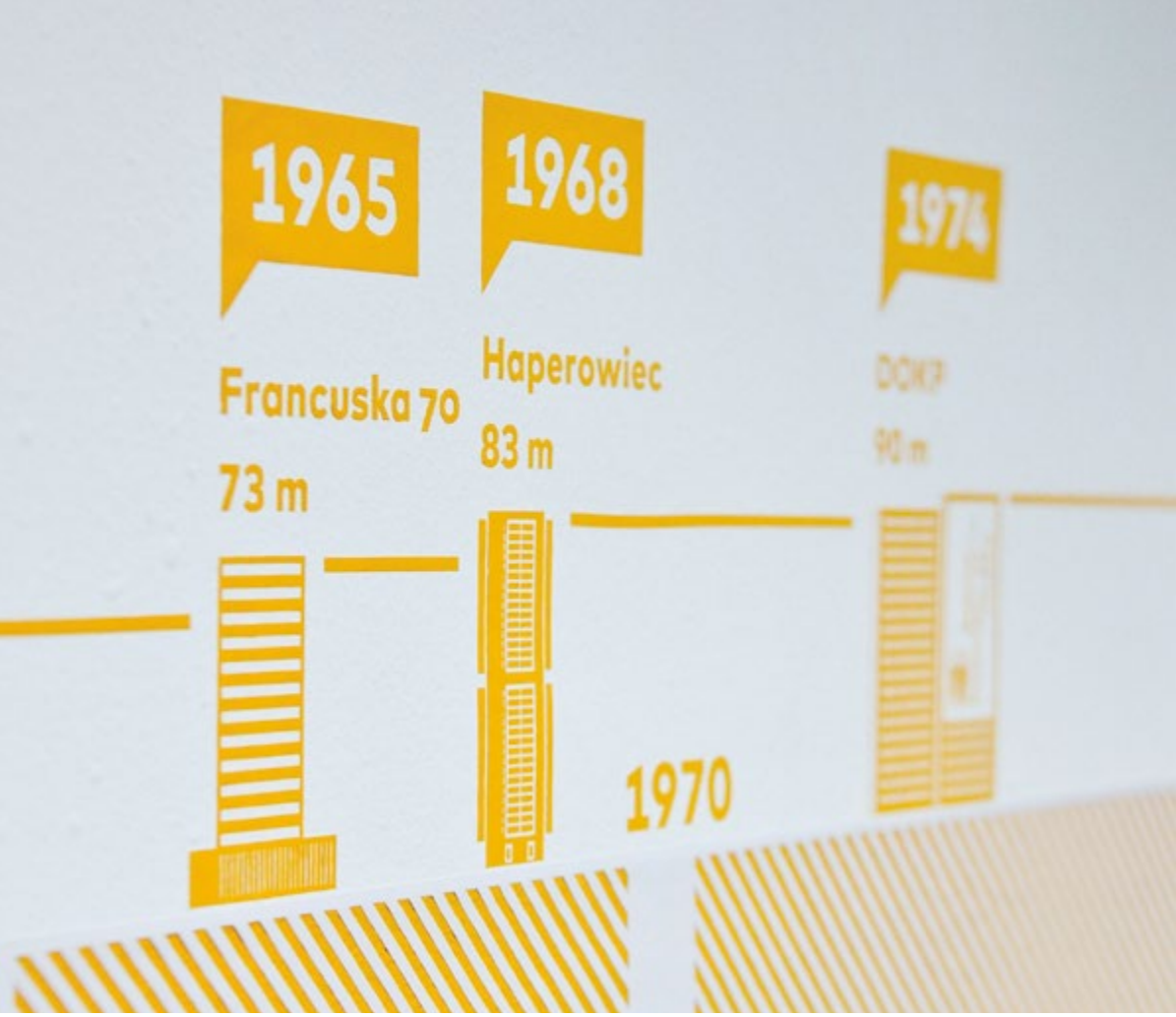
Greens around you

O jakości miejsca zamieszkania nie decyduje wyłącznie dostępność terenów zielonych, ale również ich charakter. Podstawowym parametrem jest w tym przypadku wielkość i rodzaj zagospodarowania – w różny sposób wpływają na otaczanie dużo i zwarte kompleksy leśne, zakomponowane parki, czy niewielkie skwery przy ulicy/osiedlu. Dobrana są ich funkcja i czas użytkowania. By ocenić, czy powierzchnia tych obszarów jest wystarczająca, trzeba przyjrzeć się także temu, jak dużą liczbę mieszkańców służą. Ze względu na utrudniony dostęp do precyzyjnych danych demograficznych powiązanych z punktami adresowymi, bilansowanie obejmuje powierzchnię wszystkich kondygnacji nadziemnych budynków mieszkalnych, położonych w strefie 10-minutowego dojścia.

The quality of residential areas is not determined solely by the availability of green spaces, but also by their character. The key parameter in this respect is the size and type of development – the effects of large and dense wood complexes, architect-designed parks or small lawns of the crossroads are all different, due to their diverse functions and times of use. To assess whether the size of these sites is sufficient, one needs to consider the size of the community they are designed to serve. Due to the difficult access to accurate demographic data associated with particular addresses, the balancing process includes a total area of all above-ground floors of residential buildings located within the 10-minute walk zone.



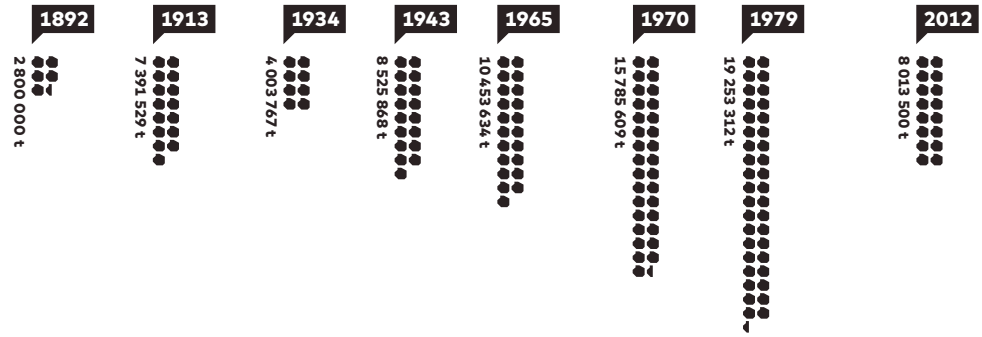
śródmieście
city centre

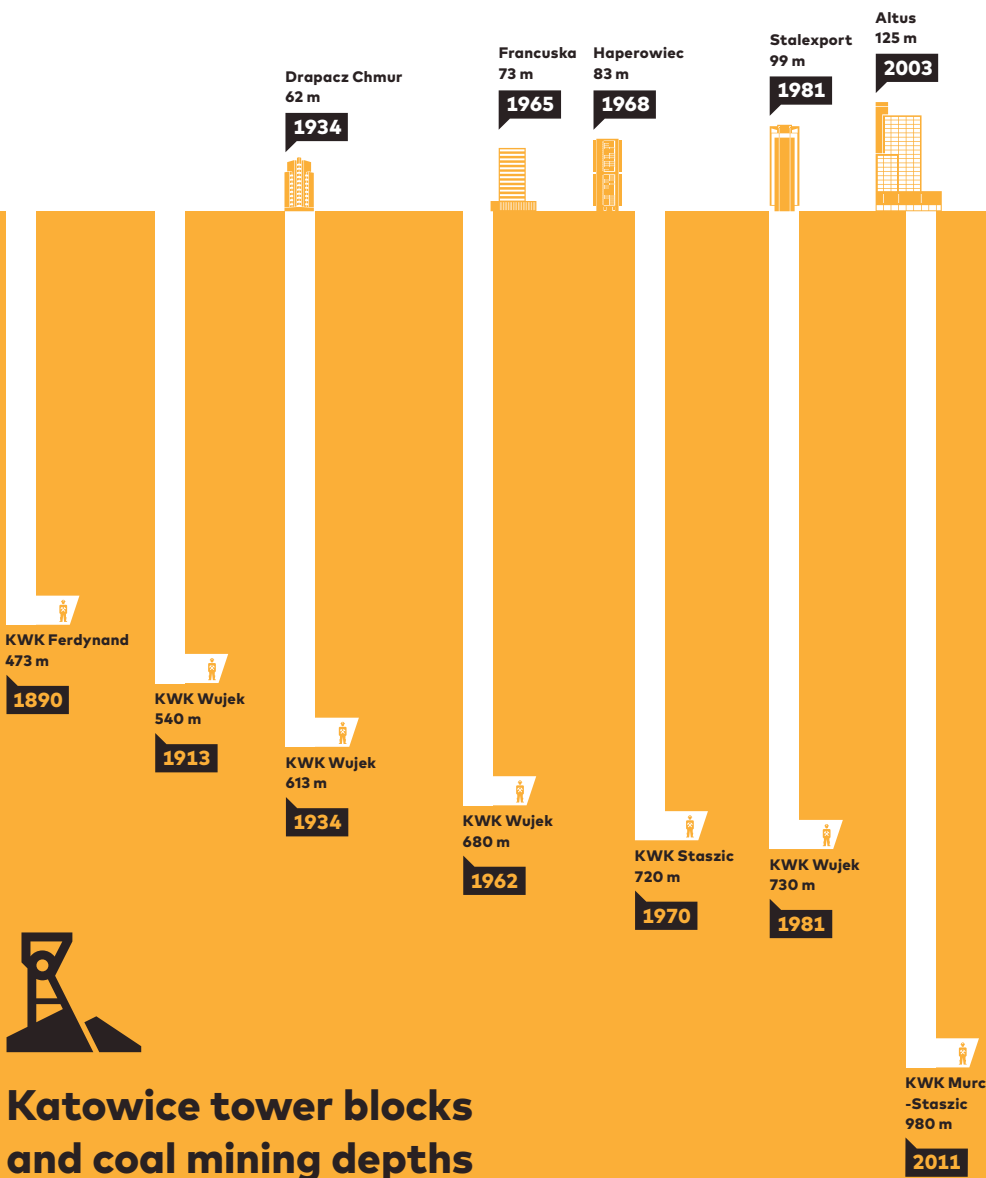


OPTIMISM SURPASSES UNCERTAINTY

It is no coincidence that from the mid 19th century, Katowice was dubbed the American City, not only as a promised land giving people work, but also as a test ground for the most complex of transformations effected at breakneck speed and with no regard for own heritage. Katowice's landscape and identity were largely shaped by mining and metallurgy, the industries which decided both its economic condition and the location of new developments built around local industrial plants. The resulting city merely followed the randomly distributed system of mining workings and infrastructure. Currently, the city is looking for alternative ways of grow and find a new "Katowice dream" for the future.

Coal mining in contemporary Katowice





Katowice tower blocks and coal mining depths

Demografia

Demography

Liczba ludności
Population

1960
269 926

1965
286 044

1970
305 000

1975
343 723

Studenci szkół wyższych
University students

= 1 000 **studentów** students

5 480
studentów
students
1960

13 654
studentów
students
1971

1960 1970

Mieszkańcy zatrudnieni w przemyśle
Residents employed in industry

45,4%
74 453
zatrudnionych w przemyśle
employees in industry

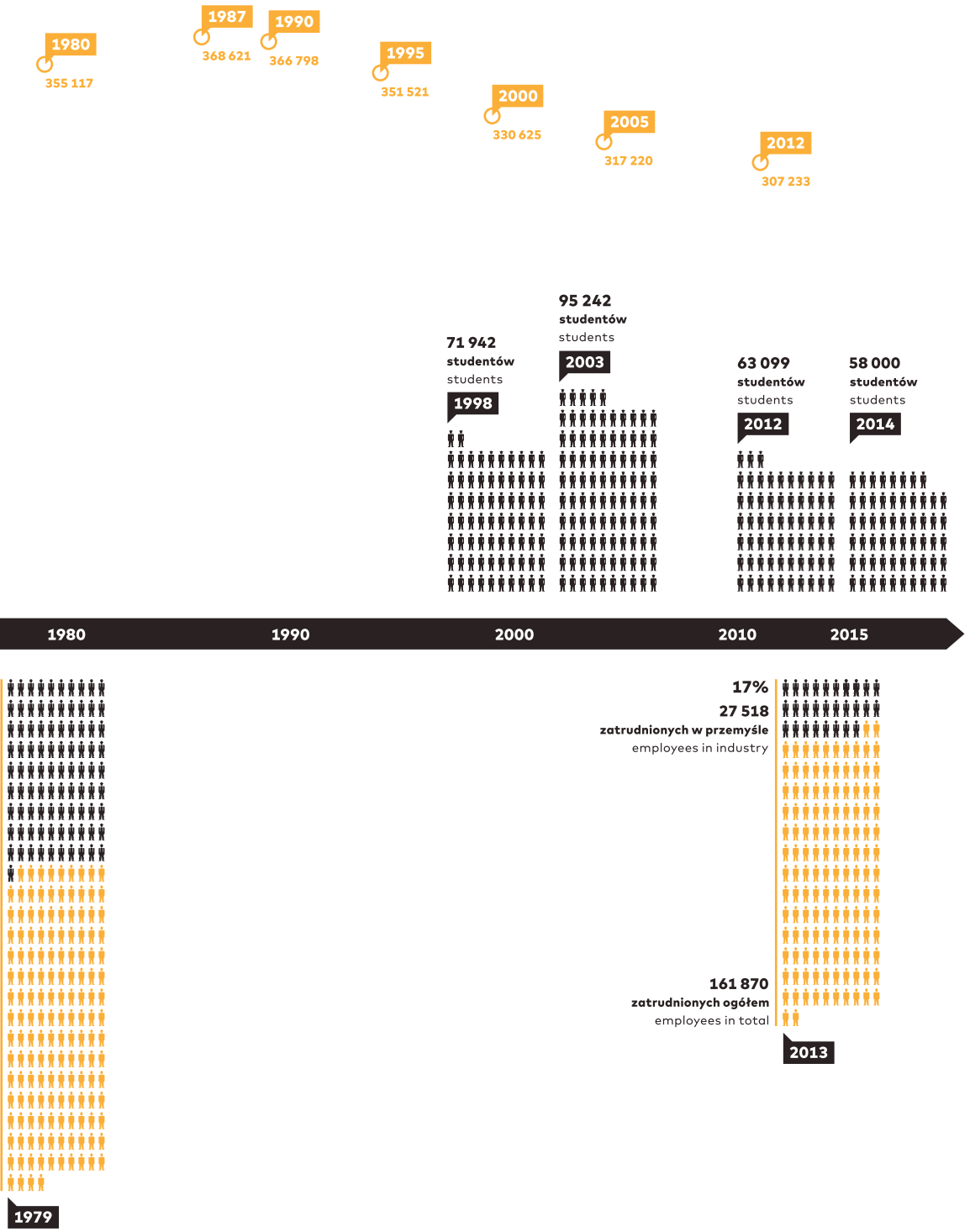
164 159
zatrudnionych ogółem
employees in total
1960

37,5%
91 440
zatrudnionych w przemyśle
employees in industry

243 645
zatrudnionych ogółem
employees in total

= 1 000 **zatrudnionych ogółem**
employees in total

= 1 000 **zatrudnionych w przemyśle**
employees in industry


1980
355 117
1987
368 621
1990
366 798
1995
351 521
2000
330 625
2005
317 220
2012
307 233
71 942
studentów
students
1998
95 242
studentów
students
2003
63 099
studentów
students
2012
58 000
studentów
students
2014
1980
1990
2000
2010
2015
17%
27 518
zatrudnionych w przemyśle
employees in industry
161 870
zatrudnionych ogółem
employees in total
2013
1979

Higher education

Despite a decline in student numbers in Poland due to demographic reasons, Katowice remains an important academic centre.

Recent years have seen the emergence of a number of new university facilities:

- Centre for Modern Information Technology
- Scientific Information Centre and Academic Library
- new building of the Academy of Fine Arts

Currently underway is the construction of the new premises of the University of Silesia's Faculty of Radio and Television, designe to become part of a large university campus in the city centre.

Number of higher education institutions

◆ = 1 higher education institution

Services for Business

New office buildings replace mine shafts in the cityscape. 2014 saw 10,000 people working in Katowice's business service centres. Since 2013, this figure increased by 20%, which shows that it is an increasingly important part of the economy.

Employees in business services centres

= 1,000 employees

Office space

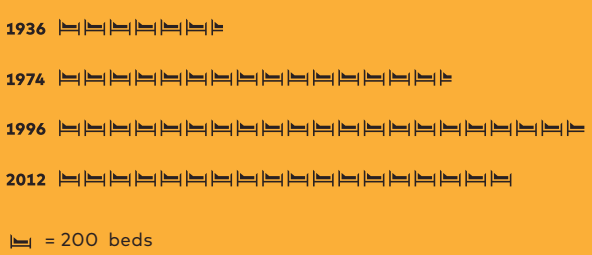
= 20 000 m²

Healthcare

Many hospitals and medical services emerged as a result of intense urbanisation and the development of heavy industry. Currently, they offer services not only to Katowice residents, but also to patients from within and beyond the region. A similar function is performed by the Medical University, which attracts students from across the globe.

Number of physicians

Hospital beds



Culture

€ 300 000 000 was spent in Katowice over the last 10 years on restoration and construction of cultural infrastructure.

New buildings:

- Symfonia Centre for Science and Music Education
- Rondo Sztuki Art Gallery
- Dąb Centre for Culture
- Seat of the Polish National Radio Symphony Orchestra
- International Congress Centre
- New Building of the Academy of Fine Arts
- New Silesian Museum

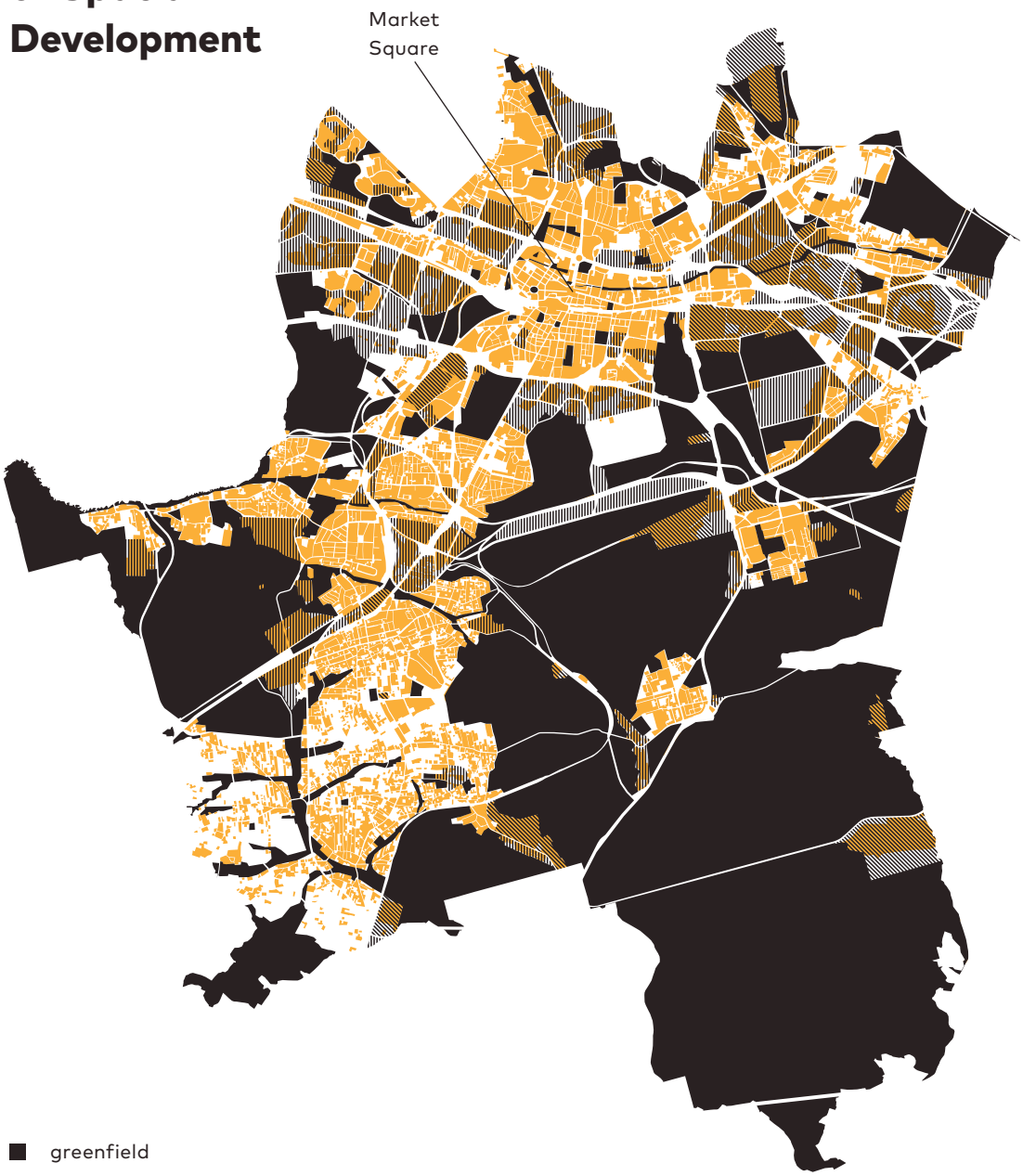
Restoration and conversion:

- Spodek Arena
- Silesian Philharmonic Hall
- Youth Palace Culture Centre
- Katowice History Museum. Department in Nikiszowiec
- Centre for Polish Scenography
- Silesian Theatrte

Cultural infrastructure expenditure 2005–2015

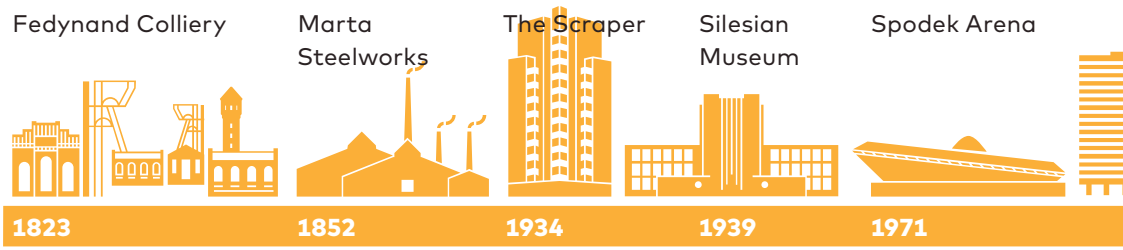
€ 300 000 000

The Study of Spatial Development



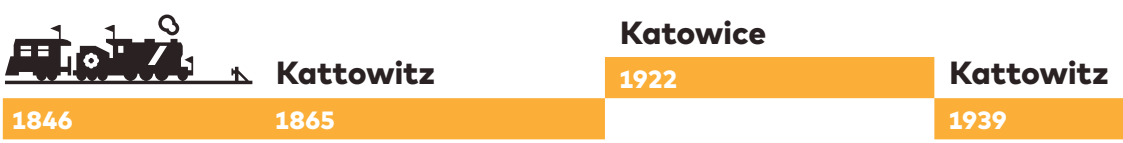
The Study of Spatial Development Conditions and Directions is an outline of a vision for the urban development of Katowice as a metropolitan centre. The document presents a city with a plan for high-standard residential developments as well as a range of regionally significant functions, including administrative/office space, conference/exhibition centres and academic, cultural, commercial and social services (particularly healthcare) facilities. These functions will also will be sited in previous industrial infrastructure areas (industrial plants and transport networks), as a result of current or future restructuring plans.

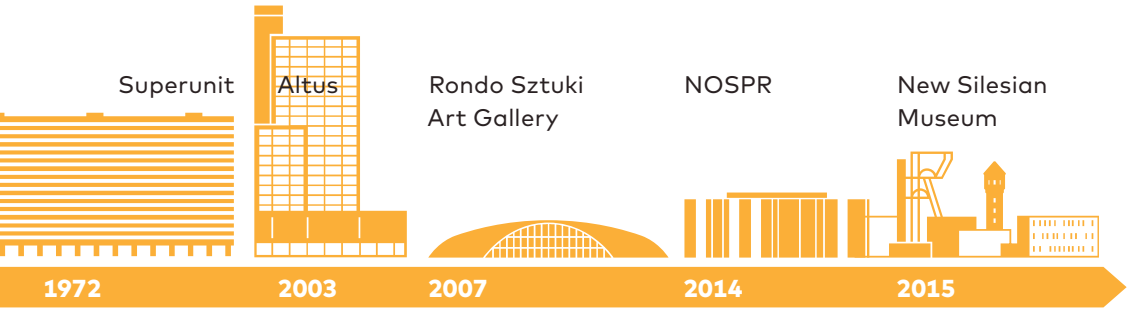
And although the production function will not disappear completely from the city, its role will be significantly reduced. The quality of the living environment will be primarily determined the nature and availability of open spaces, sports and recreation areas and public spaces, all interconnected by walking and cycling routes. The green space system will be made up of large vegetation complexes, parks, including new city greens located in rehabilitated former industrial sites in the northern part of the city as well as the valleys of numerous rivers and streams in the south of Katowice.



BOLDNESS POINTS THE WAY

The rhythm of the city's history is marked by bold visions put forward in defiance of previous achievements. Once every few decades, Katowice reinvents itself: the boundaries are moved, existing built-up areas are redeveloped, the inhabitants and their customs change. This constant flux determines the landscape of the city and its multi-faceted identity. This is best illustrated by the history of Katowice's most important street, now called Korfantego Avenue, whose route, following that of a previous country road, has not changed since the Katowice was granted civic rights. However, most of the buildings in its vicinity were gradually replaced by new ones to match the new urban plans, while the street name was also changed several times.





city

Contemporary city

See animation on Korfanty Street
j.mp/mlab_28

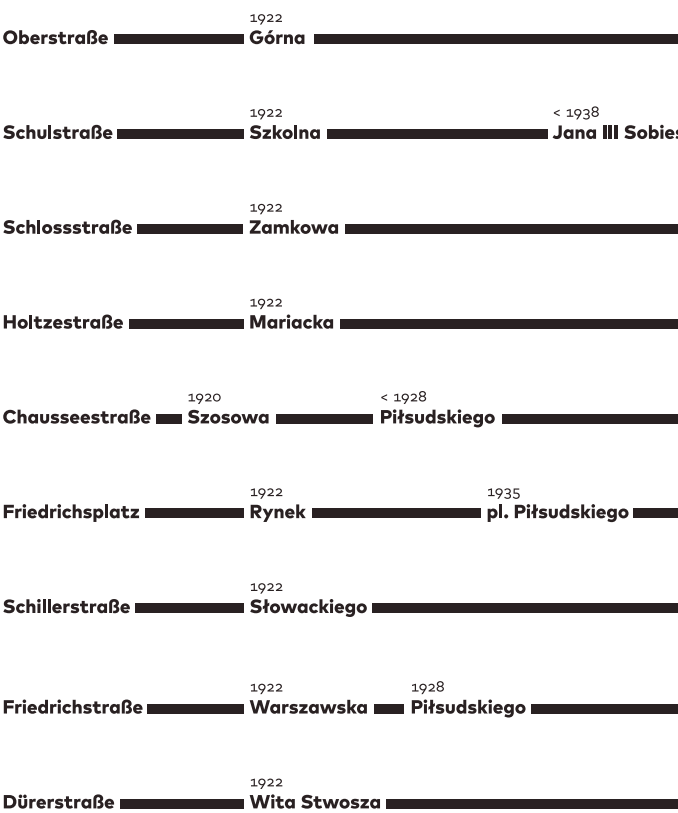
Katowice
1945

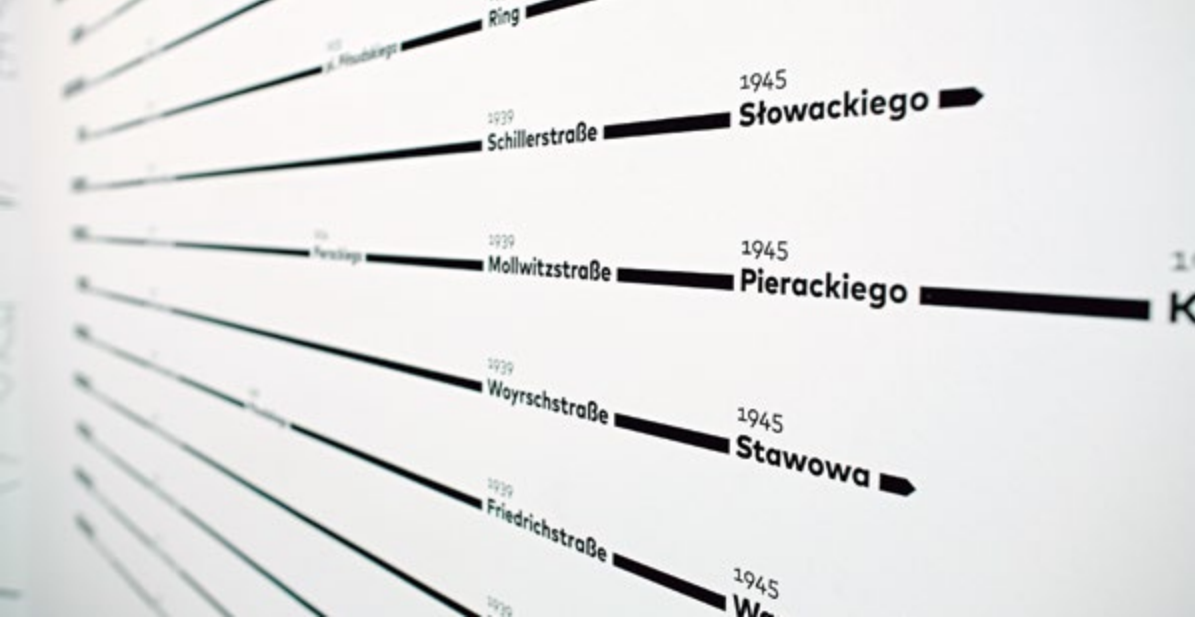
Stalinogród
1953

Katowice
1956 2015

Katowice street name changes

Looking at old street names in Katowice, one realises just how complicated the city's history was. Aside from the obvious symbolic acts of using the names of political leaders, e.g. Engels, Hitler, Piłsudski or Korfanty, noteworthy is also the sphere of culture and the "noble rivalry" between Słowacki and Schiller. In many cases, the street names remained unchanged, the city's administrative status being reflected only in the language used at a given time.





1939 **Bismarckstraße** 1945 **Górna** 1962 **Ormowców** 1990 **św. Anny**

skiego 1939 **Hermann Göring Straße** 1945 **Jana III Sobieskiego** < 1959 **Engelsa** 1990 **ks. bpa Bednorza**

1939 **Ludendorfstraße** 1945 **Zamkowa** 1946 **Armii Czerwonej** 1990 **al. Korfantego**

1939 **Holtzestraße** 1945 **Mariacka**

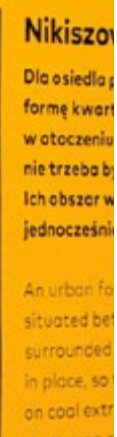
1939 **Adolf Hitler Straße** 1945 **Oświęcimska** 1962 **Obrońców Westerplatte**

1939 **Ring** 1945 **Rynek** 1953 **pl. Stalina** 1956 **Rynek**

1939 **Schillerstraße** 1945 **Słowackiego**

1939 **Friedrichstraße** 1945 **Warszawska**

1939 **Dürerstraße** 1945 **Wita Stwosza**



1 Central Katowice

After World War II, the development options for the city centre were quite clear: either to increase the intensity of land use, or restrict coal mining in its surroundings. For this reason, work began in the 1950s on new urban plans subordinated to the demands of the industry. Due to the geological condition and technological requirements, high-density development in Katowice was planned exclusively within the districts of Koszutka, Ligota, Piotrowice and Panewniki as well as in central Katowice where a safety pillar was left underground to avoid any "controversy between the city planners and the mining authorities"*.

2 Nikiszowiec

An urban form of multi-family quarters was selected for an estate situated between the Nickisch (Poniatowski) and Carmer (Pułaski) mine shafts, despite the fact that it was to be surrounded by woodlands. It was no coincidence either, as the coal production system and other economic factors were again critical in making the decision. The industrial plant had already had safety pillars in place, so there was no need to impose any additional restrictions on coal extraction. Although the pillar layout determined the maximum area of development, it did not put any limit on the height of the buildings.

3 Giszowiec

The Erben Giesches corporation management decided to build a housing estate in the form of detached family houses on large plots for economic reasons. Thanks to such urban layout no expensive methods of underground operation were required, nor did the architectural solutions used needed any additional protection against mining damage. These arguments beat some of the scheme's drawbacks, including investment needed to prepare a vast area of land and felling a considerable expanse of woodland as well as higher cost-effectiveness which could be achieved by building multifamily housing with a similar number of quarters.

* Janusz Ziółkowski, *Rozwój demograficzny i przestrzenny Stalinogrodu na tle warunków społeczno-gospodarczych [The Demographic and Spatial Development of Stalinogród against Socio-Economic Conditions],* in: "Przegląd Zachodni", Year XI, 1955, Volume III, Instytut Zachodni, Poznań 1955.

SURVEY OF EXHIBITION VISITORS

Will network projects concerning history replace traditional galleries and museums? Will the interactive map as a new tool for telling the history of the city spark interest among audiences? Are statistics boring? A survey among the visitors of the exhibition *Appetite for Radical Change. Katowice 1865–2015* questions some common ideas about how to showcase history using digital technologies.

The intention of the exhibition's creators was to present the history of Katowice in such a way as to enable the visitor to become acquainted with it in fifteen minutes. For this purpose, the content is presented using diagrams, animations, maps and data visualisations, while the design draws on Isotype, the famed visual language created to be comprehensible for all recipients by communicating complex information clearly. So what were the perceptions of the exhibition? It was its public perception with particular emphasis on the reaction of visitors to data visualisations and the use of digital tools in creating exhibitions that we were keen to find out through our study.

The survey questions were primarily concerned with how the use of visual language affects the understanding of data related to the history of Katowice and how an exhibition consisting of charts, diagrams, pictograms and animations is perceived by the visitors. We were also interested to find out whether they find the interactive map suits their needs and whether their interests and personal ties with Katowice impact on their opinion on the exhibition.

The exhibition was open from 21 March to 8 May 2015 in Katowice's Gallery of the City Gardens. The study was conducted by means of paper questionnaires available in the gallery from 17 April to 8 May in paper and online. In all, 223 15-question forms were completed and returned, accounting for around 10% of the exhibition turnout. Of these, 123 people used the paper form and the remaining 100 opted for the online version.

The detailed results of the study are presented on the following pages. Listed below are a few key conclusions from the analysis:

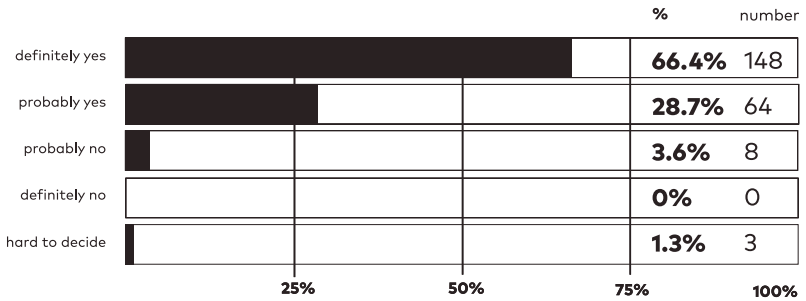
- 66.2% of respondents said that the arrangement of the exhibition presenting data graphically (using data visualisation) makes it considerably easier to understand the history of Katowice, including 60% of those having "no ties to Katowice".

- 49.1% of respondents said that the quantitative data presented allow them to compare content on Katowice with significantly greater ease(another 42.3% responded with “rather yes”). These high figures show that using quantitative approach is conducive to a clearer presentation of selected events and issues. Visualised numerical data can act as an important complement to the linear narrative.
- While visualisations, diagrams and charts enjoy a favourable reception among the visitors, presenting history in a linear, descriptive manner is still important to some of them. Also, 60.8% would prefer the use of a mixed form of presentation with both synthetic visual data and traditional artefacts.
- Only 4.5% of respondents would prefer to visit the exhibition only on the Web. This means that such extreme digitisation of cultural heritage is not received enthusiastically and, despite the development of new technologies, traditional galleries still cater to the needs of exhibition goers.
- Although fridge magnets with Katowice’s iconic buildings grab the visitors’ attention, have no real merit and as such are rated lowest as a medium of conveying historical content. As many as 28.3% of respondents said they the interactive map presented information in the least comprehensible way. We have observed that it was not very intuitive to use and lacked clear instructions, the conclusion being that in the future we need to explain the use of such exhibits more accurately. While using interactive media, we must ensure that they are user friendly.
- 20.7% of respondents visited the exhibition mainly because they wanted to see how data visualisations were used, while 32.4% of the visitors came out of interest in Katowice’s history, which is a reflection of the main target groups of the exhibition. Interestingly, as many as 58.1% of respondents had no previous contact with any Medialab activities.

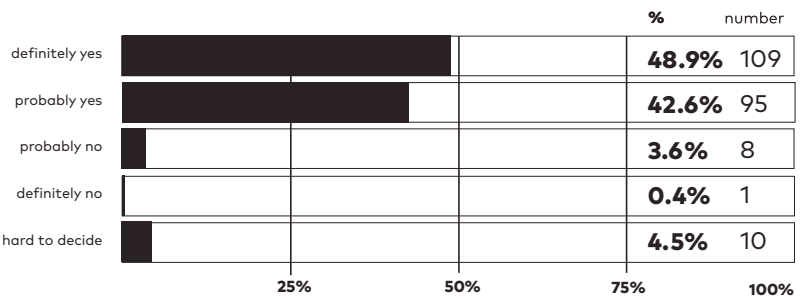
The study was conducted by Magdalena Chmiel of her B.A. dissertation defended in 2015 at the Faculty of Philology, University of Silesia.


całe miasto
entire city
Tereny o ograniczonym dostępie do zieleni
Areas with limited access to greens
śródmieście
city centre

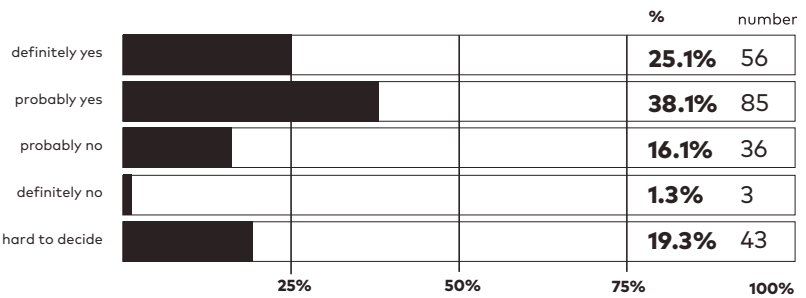
Has the graphical presentation of data (using data visualisations) made it easier for you to understand the history of Katowice?



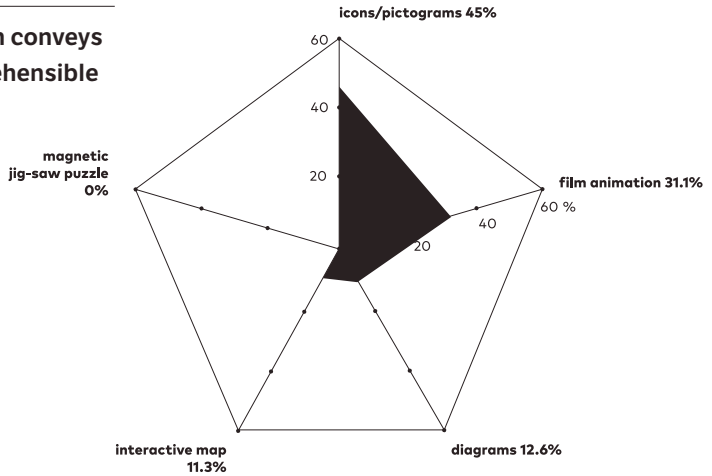
Has the collected numerical data enabled you to easily compare information on Katowice?



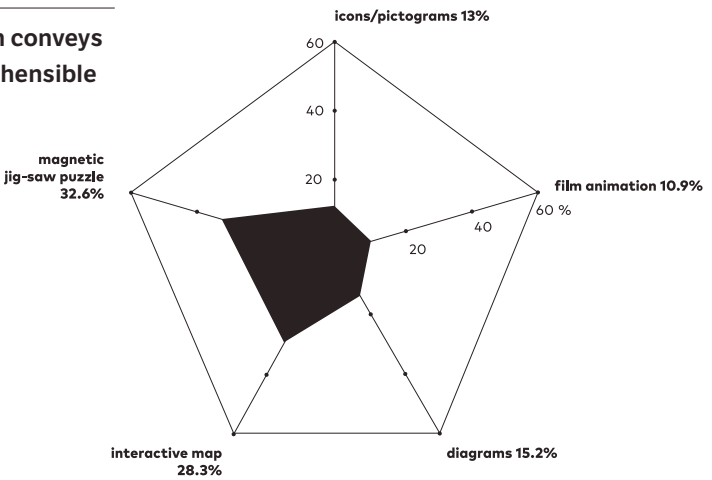
Has the exhibition enabled you to review the stereotypes associated with Katowice?



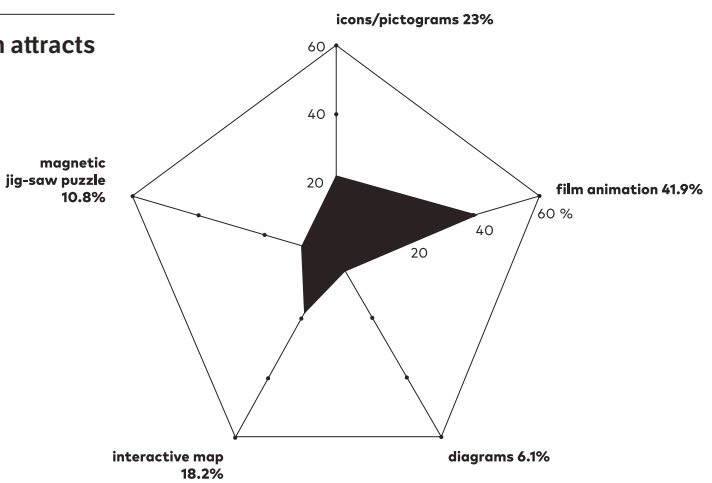
Which part of the exhibition conveys content in the most comprehensible way?



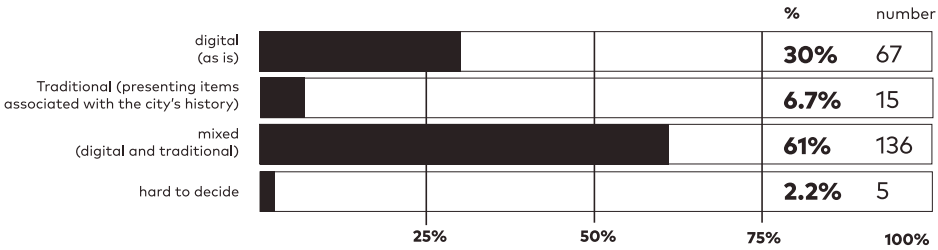
Which part of the exhibition conveys content in the least comprehensible way?



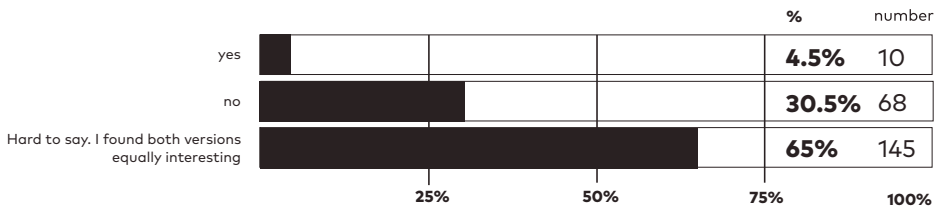
Which part of the exhibition attracts most attention?



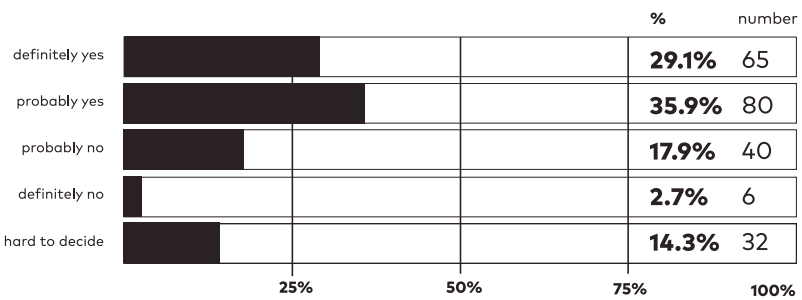
Which format of content presentation do you prefer?



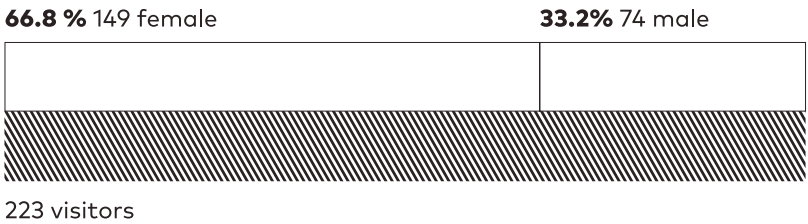
We intend to create an online version of the exhibition. Would you rather visit the exhibition online than in the gallery?



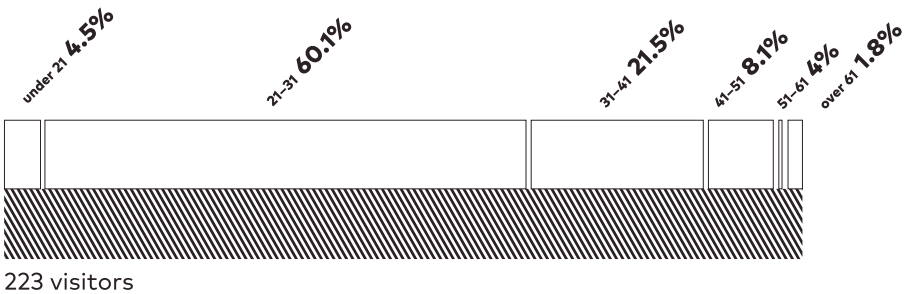
The exhibition contains the map katowickiebudynki.eu. Would you be willing to add information about the date of creation and/or architect of a selected building?



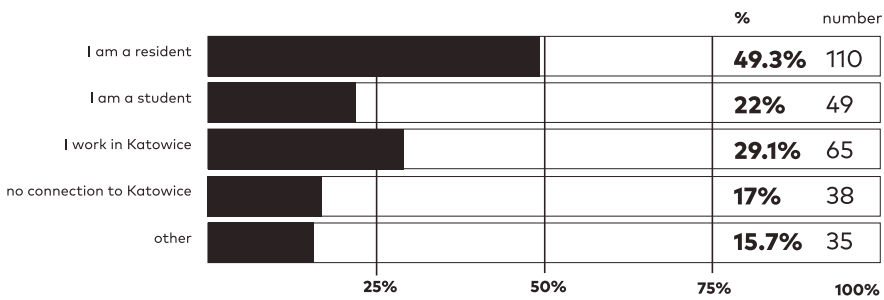
Sex



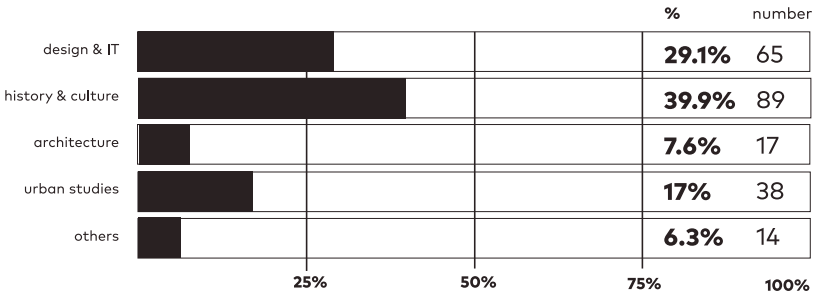
Age



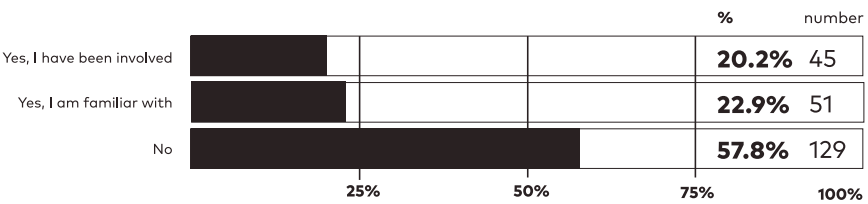
What is your connection to Katowice?



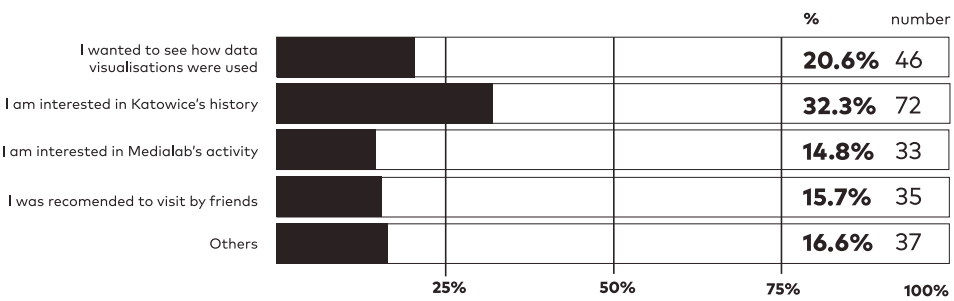
Which area is closest to your interests?



Have you had any contact with Medialab activity prior to visiting the exhibition?



What prompted you to visit the exhibition?



Katowice Icons

Katowice Icons is a set of pictograms representing the city's most iconic buildings. You can download them as a font under a free license and use freely in other projects. The symbols of characteristic Katowice buildings are accompanied by pictograms of people and objects characteristic of the industrial Upper Silesia.

The creators of the exhibition were faced with the need to create a unique visual language which, in combination with maps, diagrams and numerical data visualisations, would help illustrate the most important processes related to the demographic, spatial and economic development of the city.

The inspiration came mainly from the interwar and post-war Katowice iconography with particular focus on elements relating to German Bauhaus. In addition to the minimalist black and yellow colour scheme, the FF Mark typeface was used to reference the simplicity and geometric forms characteristic of modernism. In formal terms, the project bears a direct reference to the Isotype Institute and the universal visual language created in Vienna in the interwar period.

As an inspirational point of reference, the exhibition creators used pictograms designed by the graphic artist and designer Gerd Arntz

The pictograms can be used in various ways, including educational publications and the city's promotional merchandise. A set of 10 magnets with line art images of Katowice's architecture icons from different periods is now commercially available.

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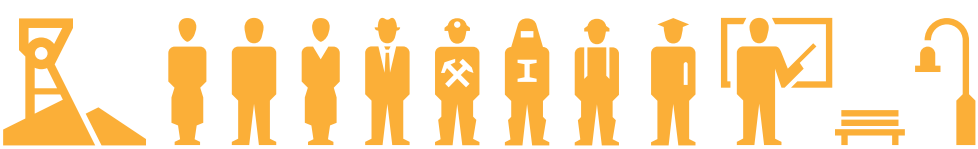
State Archives in Katowice
Katowice City Archives
Silesian Centre for Cultural Heritage
Surveying Department of the City of Katowice

download font
j.mp/mlab_50



KATOWICE, OPEN CITY

KRZYSZTOF TRZEWICZEK | DAVID SKOPEC | MICHAEL HEIMANN

2013	workshop series 5×3 days
methods & tools	spreadsheets, design thinking, prototyping, Python
partner	Academy of Fine Arts in Katowice

30% 50% 20%

The Python programming language as a tool for studying the city and learning the principles of the design process, allowing users to create new data-driven services and products.

During the two editions of the workshop, we completed seven projects, including a prototype information campaign for graduates in humanities as well as an air quality information system for Katowice. As the detailed project documentation is available online, let us just focus here on the stages of its implementation: **j.mp/mlab_38**.

The key tool used during the workshop was programming. Starting from the basic regular expressions (formal language of recording patterns repeated in the text), and ending with simple scripts in the Python programming language, participants were able to get a closer insight into the world of data. They gained hands-on experience of what types of data is used and how the software can be used for its aggregation, processing and understanding. This technical and highly formalised insight into the field of information allowed the participants to open up to a new type of work, i.e. data-driven design.

But just how do we obtain data and prepare it for further work? Usually, we can get it in three forms: regular tables stored in various files, using specially prepared access points to web databases (public API), extracting data directly from the web content (web scraping). Each of these methods has different characteristics and is useful in different situations. When all put together, however, they form the basic repertoire of resources needed by a visual designer.

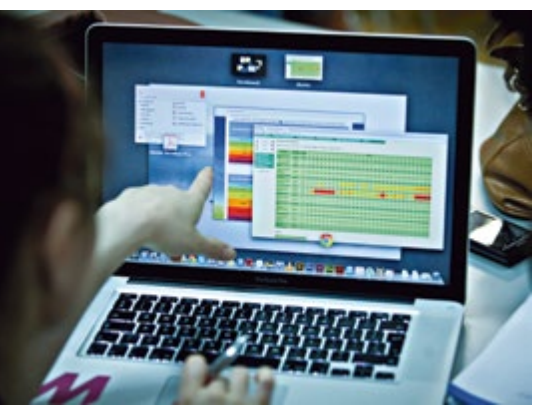
The knowledge of this set of tools gave participants an idea of the possible ways of working with data and created a good basis for conceptual operations. Aided by workshop leaders, the participants asked some initial questions, trying to define a problem area of interest to them and bring the data contained in the stories to the surface. A key problem was to

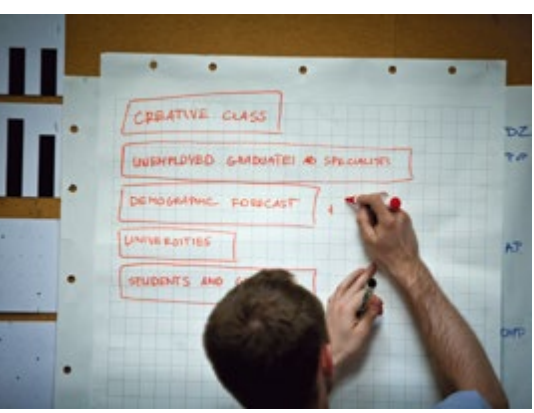
determine the content and the message recipient.

The final stage of the study was to prepare a prototype that will be able to get to the recipients selected at the previous stage. Giving inadequate form to the content could have thwarted the value of the entire project. Often, the problem is an ill-designed chart, unfortunate colours or taking for granted the assumptions made while working on the project. This step required the participants to maintain a critical distance towards their own ideas and turn to the recipient, for whom the work is carried out.

The first edition was attended by Krzysztof Lenk, whose lecture accompanying the workshop was recorded and is available online: **j.mp/k_lenk**.

1	2	3	4	5
reviewing available data	**preparing data for processing**	**searching for stories and narrowing down the area**	**verification of hypotheses with data**	**shifting the focus to the recipient**
tables **the web** **pdf, xls, api**	**acquiring** **refining** **and filtering**	**questions** **hypotheses**	**processing** **prospects** **sketches**	**prototype** **launch**




CREATIVE CLASS
UNEMPLOYED GRADUATE! & SPECIALISTS
DEMOGRAPHIC FORECAST
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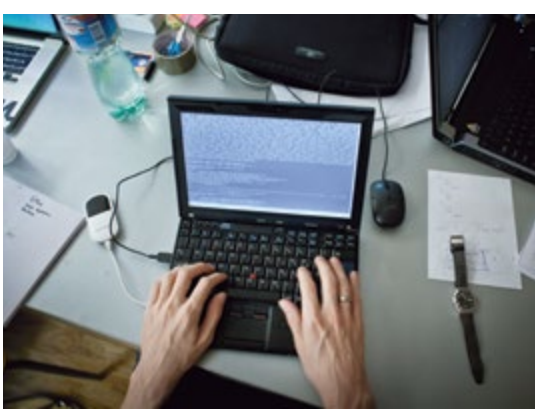


documentation
j.mp/mlab_38

SENSLAB

ANNA WIDERA | TOMAS DIEZ

2015	workgroup
methods & tools	Arduino, Processing, Bare Conductive, sensors

60% 30% 10%

Exploring popular platforms and programming languages which enable the construction of prototype devices for acquiring public space data or responding to changes in the environment.

The group chose air quality monitoring as a leading theme of the workshop. Following a short introduction to the Arduino platform, the participants went on to build simple electronic data acquisition devices. While connecting the sensors and developing software for their devices, they encountered the issues of measurement accuracy and errors. One of the workshop meetings was devoted to the Processing environment and its communication with Arduino for collecting, processing and presenting data obtained in a visual format. Knowledge of the Bare Conductive platform, in turn, was used to build simple interactive installations which react to movement or touch and can be used in various public space projects .

Capable use of devices for independent field research calls for making detailed preparations and developing the most suitable research method. While examining access to light in selected streets, for instance, one needs to make a series of key decisions. How to select the measurement spots: should we take measurements continuously along the entire length of the street or only in selected spots at predetermined spacing? Do we measure the amount of incoming light in the middle of the street, or within the sidewalk or roadway? What time of day and year and what weather is most appropriate? And, certainly, the measurements should be performed several times. In this type of experimental and grassroots projects, it seems reasonable to assume that the inaccuracy of sensors tends to cause similar inaccuracy issues in all streets. Satisfactory filtering of the collected data and repeated measurement taking should yield solid results. Similar studies can be performed using noise, humidity and other relevant sensors.

The problem encountered with many inexpensive and publicly available sensors is their low accuracy. While sufficient for many amateur

applications, their limitations must be taken into consideration in each project. Arduino devices are used in art projects in which the status of an interactive installation depends on external conditions. They are capable of measuring the temperature and light intensity in the room, for instance, with a much higher accuracy and resolution than the subjective perceptions of the viewers, which in most cases would be limited to simple oppositions of warm/cold or bright/dark. The same sensors used for building a weather station, designed to make continuous measurements, will also give satisfactory results provided that the obtained results are subject to filtering. This involves removal of any interferences such us results that are significantly different from adjacent measurements. Arduino is a great tool for testing solutions. A prototype built using cheap and widely available sensors can later be modified by adding more expensive and professional sensors with high measurement accuracy and resolution.

TOMAS DIEZ

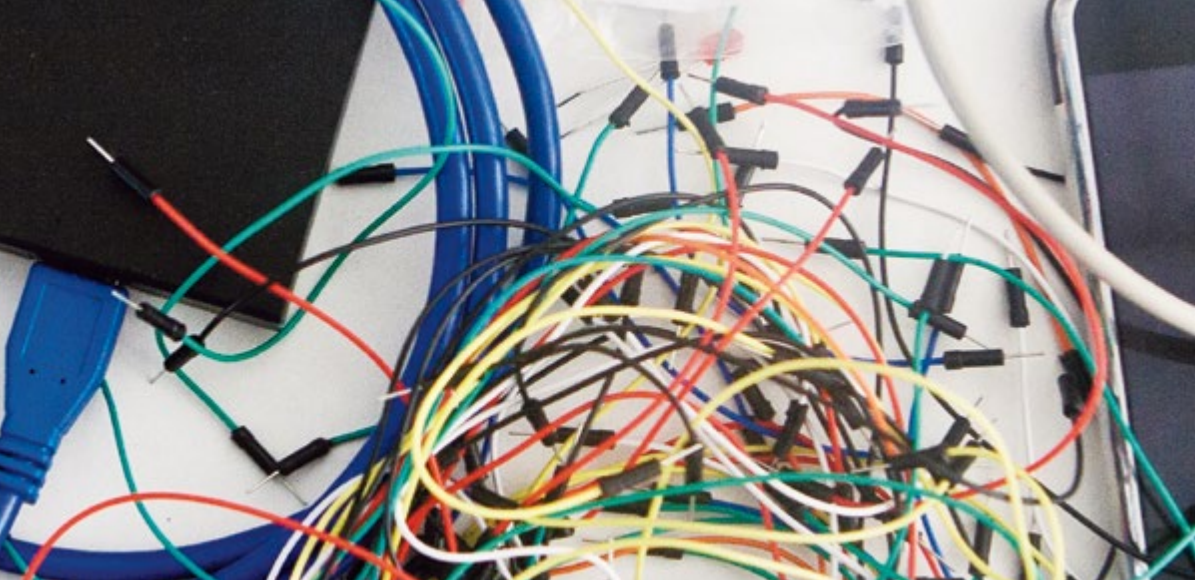
The launch of the SensLab workgroup was attended by Tomas Diez of Fab Lab Barcelona, a co-creator of the Smart Citizen Kit platform equipped with a set of sensors for easy measurement of environmental parameters, such as temperature, humidity and noise, which may then be shared online.

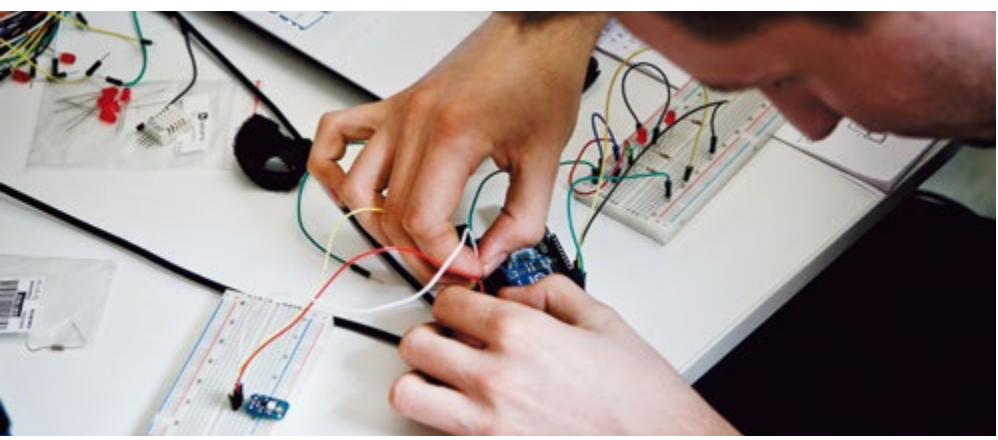
For most participants it was the first time they had worked with electronics and programming. As excessive amounts of new information can act as a disincentive, it is important to motivate beginners with certain early-stage positive effects. The initial stages of the work should thus be short and have clearly defined objectives. Once aware of the possibilities offered by technology and given a confidence boost by the tasks already completed, the participants are much more likely to experiment on their own.

Mapping Katowice green areas

The parameters of any given space can also be measured with experimental methods which are not based on numerical data. We were joined by Marcin Dymiter in 2013 to explore the sound profile of Katowice's green areas, such as parks, squares, lawns and woods. While listening out for the sounds of the city, we were led to some striking conclusions. We understood that the quality of a public space is determined not only by its social function or architectural composition, but also by its sound environment. It is worth comparing e.g. the sound profile of squares in the city centre with recordings of Kościuszko Park, surrounded on three sides by busy cross-town streets.

mapadzwiekowa.medialabkatowice.eu





KINETIC STREET ART

SZYMON KALISKI **MAREK STRASZAK**

2015	2-day workshop
methods & tools	Arduino, Arduino Shield, Processing, prototyping, engines
partner	Academy of Fine Arts in Katowice

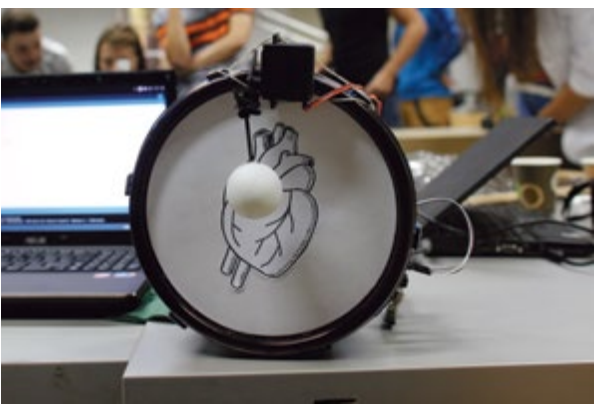
10% 40% 50%

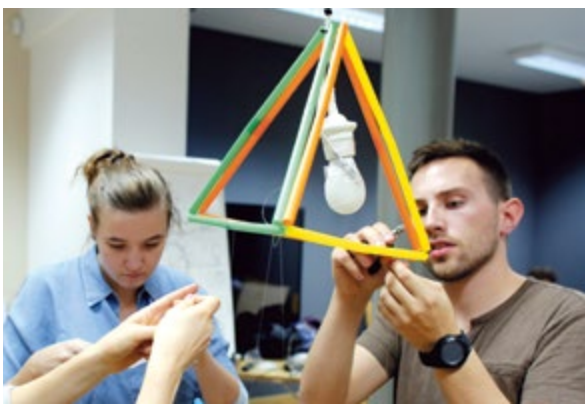
Using the Arduino platform, electronics and servos to create interactive kinetic sculptures for display in public spaces which move based on historical or real-time data.

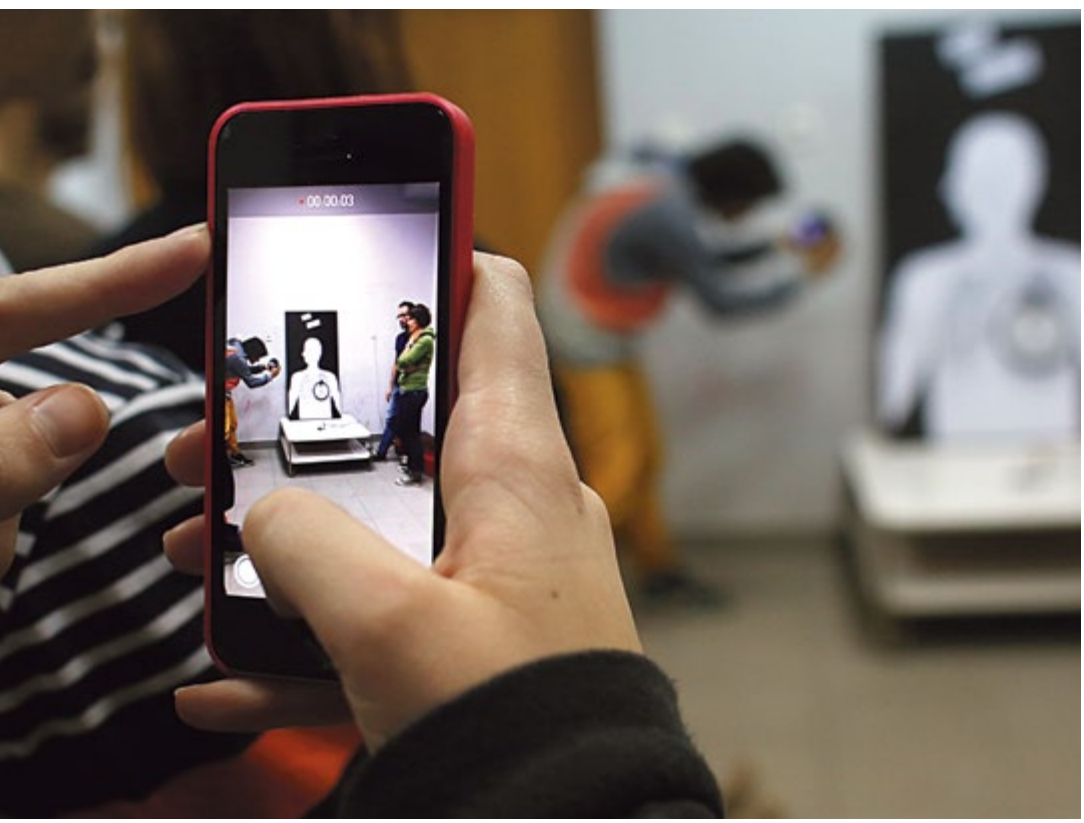
With kinetics being the workshop's main theme, we were interested in physical movement as a medium to display a set of data in urban space. The workshop was delivered in two stages: searching for information to act as inspiration and creating a mobile installation. The participants had a choice whether to use data found on the Internet or start with observation of phenomena around them and design a system to record them in digital form. The data thus acquired was used to build kinetic sculptures representing animated visualisations of selected topics.

The biggest challenge for the participants was the interdisciplinary nature of the workshop, combining work at the cross-section of technology, art and kinetics. Fortunately, thanks to the creation of workgroups, where members were able to contribute the skills they brought to the project, it was possible to create prototype solutions designed to animate public space. The advantage of this kind of grass-roots activities using cheap and Public tools is that they empower people with skills to use commercial technology in an informed way and perhaps even create their own alternatives to the technocratic vision of *smart cities*.

See the video documentation of the projects completed as part of the workshop: **j.mp/mlab_13**.



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DISTRIBUTED TOUCH INSTALLATIONS

Szymon Kaliski also led another workshop in Katowice which generated interactive installations based on the Bare Conductive technology, including conductive paint and an Arduino-based microcontroller. The project documentation is available from the Medialab website: j.mp/mlab_37.

SENSORY CITY

In 2013, Steffen Fiedler and Stephan Thiel of Studio NAND joined Medialab to deliver their project, known as Sensory City. Its participants developed a number prototype solutions for use in public spaces, including, the FlashSensor, i.e. a device that measures the popularity of photographed buildings, the urban game Zigzag for playing while at the bus stop, as well as Luminoo, a lighting system responsive to the environment: j.mp/mlab_19.

THE PULSE OF LUBLIN'S OLD TOWN

PAWEŁ JAWORSKI | KAROL PIEKARSKI
ANNA WIDERA | WALDEMAR WĘGRZYN

2014	3-day workshop
methods & tools	surveys, Arduino, cordon studies, GIS, mapping
partner	Workshops of Culture in Lublin

70% 10% 20%

A comprehensive attempt to examine and visualise the problem diagnosed within a specified section of the city by using various data-driven research methods.

How many tourists visit Lublin's Old Town? What is the resident-visitor ratio? Which gates are used most frequently? Why is the Old Town divided into two different parts: the vibrant east part with a wealth of tourist attractions, and the west side – slightly neglected yet having the potential of enchanting the visitor with its nooks and crannies and untold story?

Be it tourists, residents, students or commuters, the Old Town attracts thousands of people every day with its charm and attractions. Interestingly, it is by no means a homogeneous space, intriguing its visitors with numerous street corners and hidden alleys. During three days in December, we explored different facets of this oldest part of Lublin. See the results of our urban lab project and feel the Pulse of the Old Town.

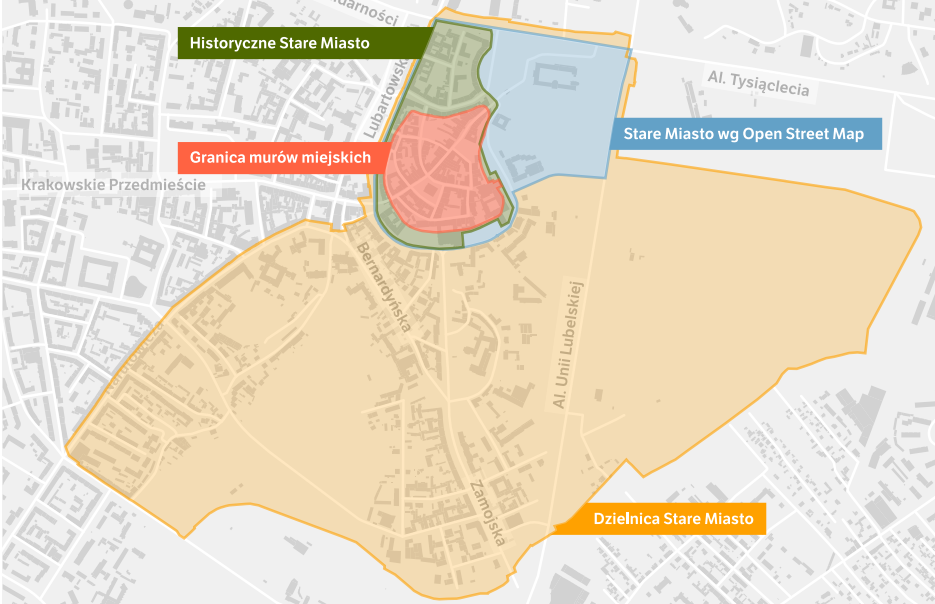
What do we know about the Old Town?

The workshop began with an exercise in creating mental maps of the city. We compared the administrative boundaries of the Old Town with what we imagine them to be by making freehand sketches. To our surprise, we discovered that our drawings were limited to only one route extending between the Krakowska and Grodzka gates.

Next, we visited the city information point to compare our mental maps against Lublin's official promotional materials, which also seemed to follow a certain pattern – all the recommended attractions in the Old Town were only those located in the vicinity of the of the market square and on the right side of Grodzka Street.

Where is the Old Town?

Our doubts were aroused by the ambiguous definition of the Old Town, with various sources indicating



Various definitions of the Old Town area

different boundaries. Its area is variously defined by urban surveyors, architectural historians or creators of social web maps. Finally, for the purposes of our research project, we chose an area matching the medieval town boundaries.

Following a brainstorming session, we asked ourselves why the Old Town's western part does not exist in our minds and Lublin's official promotional materials.

We identified factors useful in the study:

- Who stays in the Old Town?
- How long and for what purpose?
- How do pedestrians move?
- What are the ways of gaining access and possible barriers to moving?
- What are the functions of particular buildings?
- What are the differences between the defined parts of the Old Town?
- What is the social and historical context?

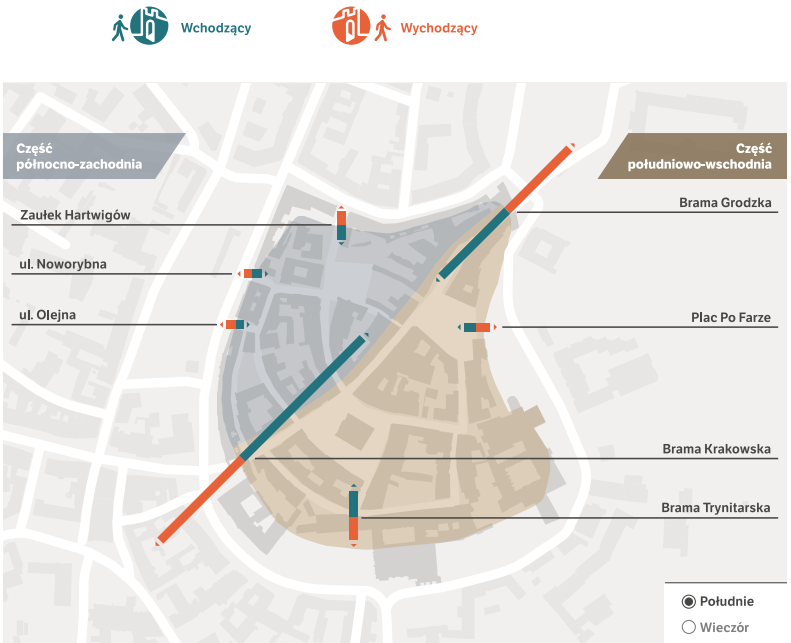
We then set out to select our research methodology, especially the data collection methods. We made an assumption that having no relevant data, we should obtain it ourselves by leading our own research in the city. We opted for a combination of traditional and alternative techniques, including cordons studies, surveys and interviews, photographic documentation, space mapping, urban planning studies and measuring environmental parameters using sensors and Arduino controllers.

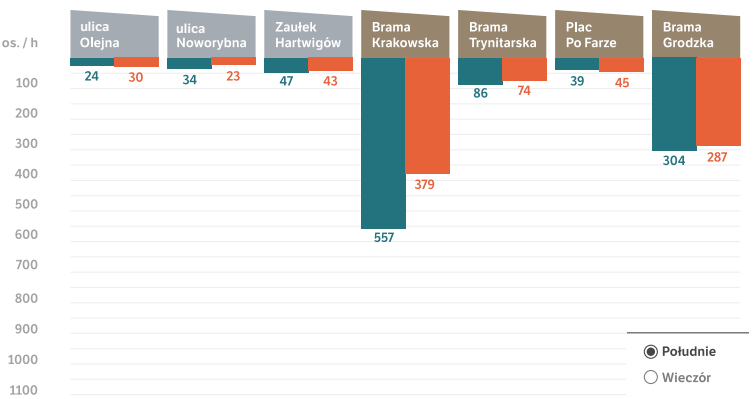
Pedestrian traffic study

We started by running cordon studies at all seven gates and streets leading to the Old Town. With over a dozen people in the team, we were able to gather the relevant data quickly and efficiently and confirm our prediction that pedestrian traffic flows mainly along the axis formed by the two main gates: Krakowska and Grodzka. The

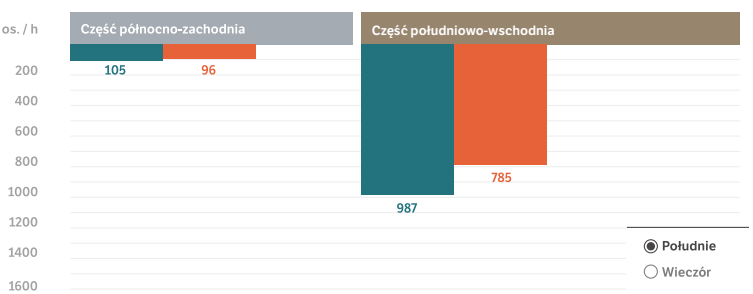
Passers-by at the Old Town gates (at noon)

The study of pedestrian traffic within Lublin's Old Town in the middle of the day shows that it flows mainly along the axis formed by the two main gates: Krakowska and Grodzka. In the north-western part, it is nine times smaller, as most people get there by car.



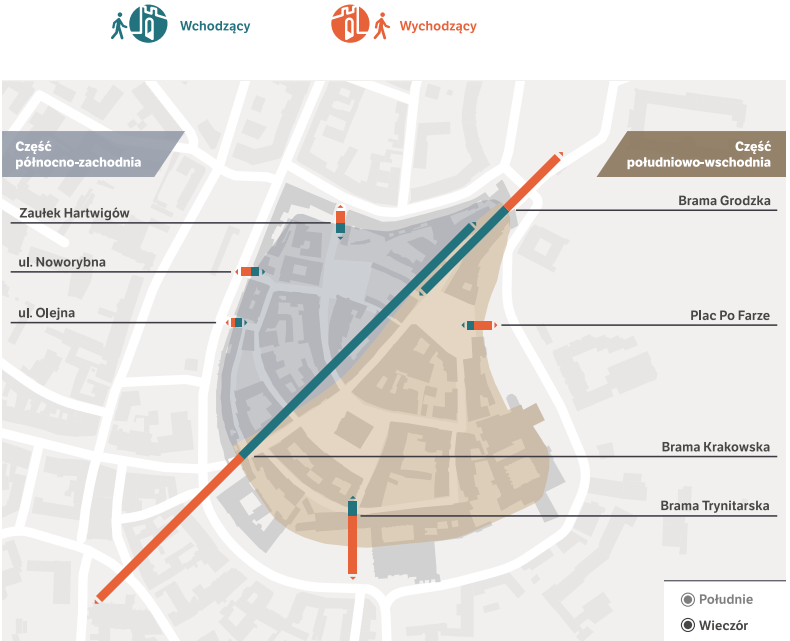


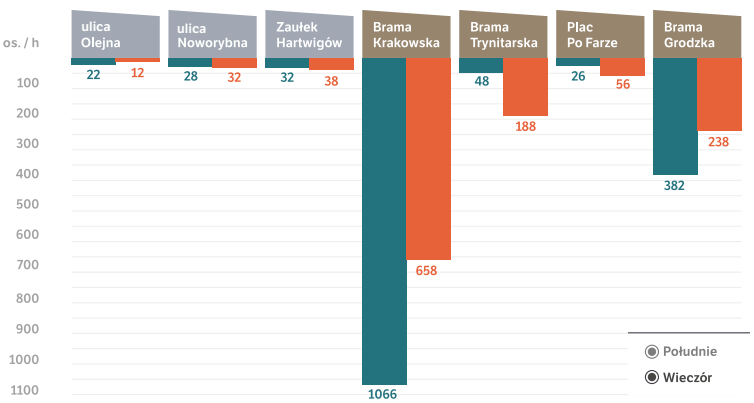
Comparison of pedestrian figures in both parts of the Old Town (at noon)



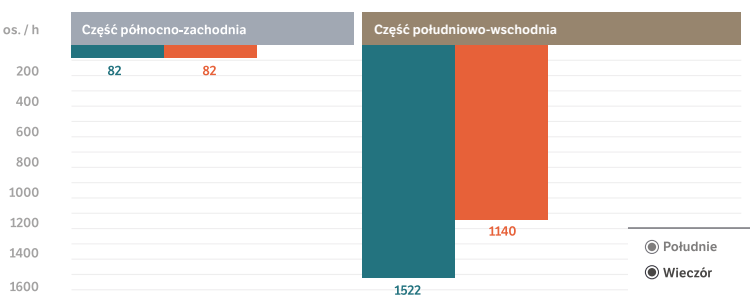
Passers-by at the Old Town gates (in the evening)

In the evening, the disproportion between the western and eastern part it is even greater, as the Old Town is frequented mainly by tourists and people looking for entertainment. The large volume of incoming pedestrian traffic was of due to the time of the study – early evening is the time when people usually come down to the Old Town to meet friends or take part in cultural events.





Comparison of light intensity in both parts of the Old Town (in the evening)



Walking with sensors

The maps show the walking routes in both parts of the Old Town taken by the research team while measuring e.g. light intensity.

number of people in the north-western part was negligible in comparison with the opposite side of the town. It is worth noting that Olejna and Noworybna streets are accessible by vehicle, while the entrance from Zaułek Hartwigów Alley requires climbing a considerable number of stairs.

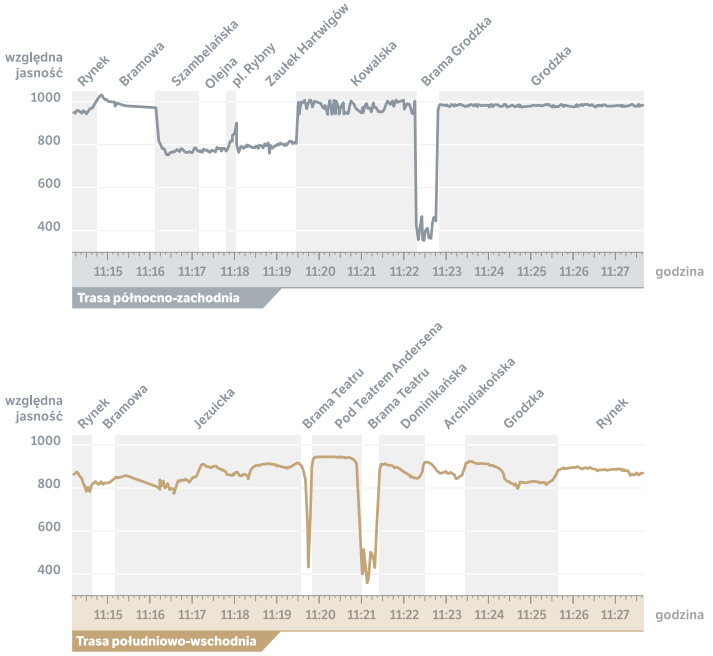
Survey study

Our survey study clearly shows that the north-western part of the Old Town is frequented primarily by the people who live there and other Lublin residents. The other part, covering the market square area and Grodzka Street, is much more diverse and enjoys a wider range of uses: there are lot more tourists here, including those from out of town, people running errands, seeking entertainment or just passing through the Old Town on the way to a completely different destination.

Brightness, humidity and temperature study

During the workshop, we learned the basics of Arduino programming and how to use it to obtain data from simple sensors such as thermometers, hygrometers and photoresistors to measure light intensity. Having built prototypes of appropriate measurement devices, two teams set off to explore the Old Town by measuring the temperature, humidity and brightness in individual streets. Using smartphones coupled with the measurement instruments, they were able to record GPS data to associate the measurements with appropriate geographic coordinates. One of the teams walked along the streets of the western part of the Old Town, while the other took measurements on the

Comparison of light intensity in both parts of the Old Town



eastern side. Below is a map showing the routes of both groups. The measurement data was presented as run charts.

By examining the changes in relative light intensity, we can clearly see the moments of passing through gates and narrow passages. These locations also featured minor differences in humidity. They are visible in the chart with a certain delay resulting from the sensor needing time to adapt to new conditions.

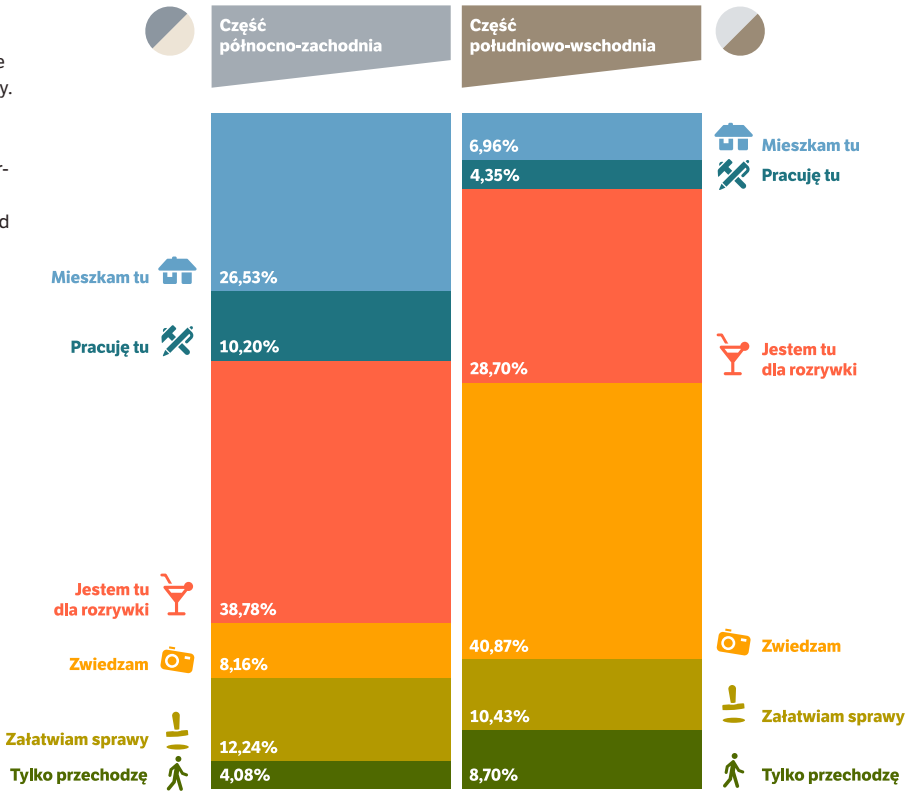
The steady drop in temperature and linear increase in humidity is due the mischievous weather which decided it would be fun to welcome us with rain and cold at the outset of the measurement session.

One would expect significantly lower light intensity results in the narrow streets sheltered by high walls, but the data collected is not so clear. This certainly follows from the imperfections of our prototype measurement instruments, which we had to protect from the rain, thus obstructing the amount of light received by the sensors. Furthermore, the survey carried out in the middle of the street gives slightly different results than a walk along the wall of the building. Light intensity is also dependent on the position of the sun, and therefore, on the time of day and year and cloud cover.

Studying the city with sensors allows for obtaining objective data that is free from any distortions caused by preconceived notions and stereotypes. It must be remembered, though, that it requires collecting large amounts of data. Our one-off measurement session was an attempt to present the method and is certainly not enough to run an in-depth analysis of, e.g. humidity in different parts of the Old Town.

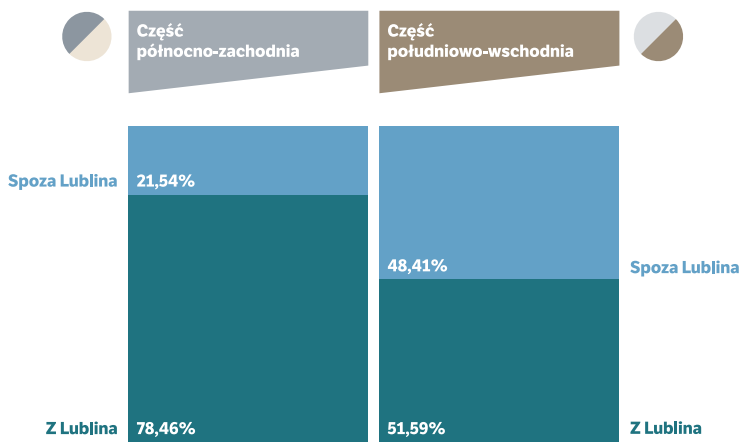
Purpose of visiting the Old Town

Many people frequenting the western part are residents of the Old City. Another common reason for going there is also entertainment, perhaps to visit one of the popular restaurants and entertainment venues in and around the main square. The eastern part, in turn, is popular mostly with tourists on sightseeing tours.



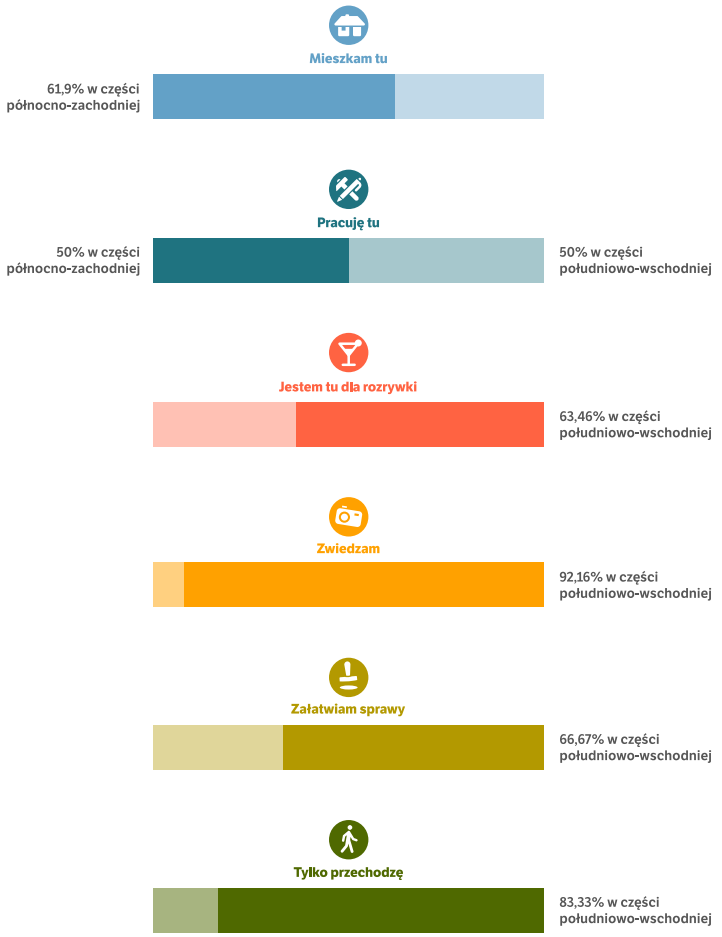
Lublin residents and visitors in the Old Town

Lublin residents form the largest group among pedestrians moving around the western part of the Old Town. In the other part, the number of locals is roughly on par with that of visitors.



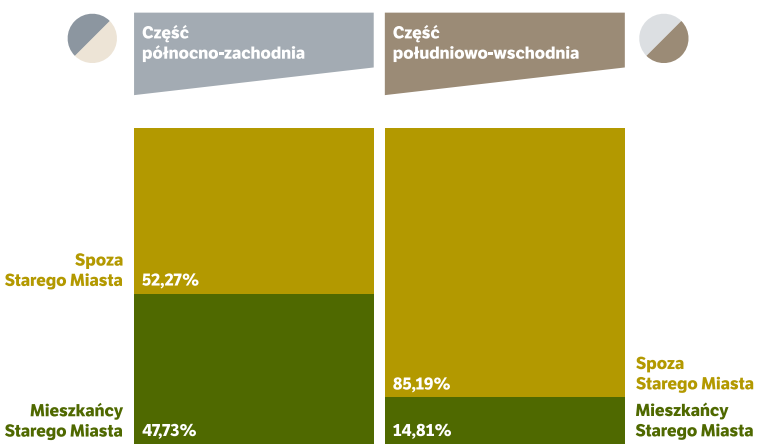
Principal purpose of visiting both parts of the Old Town

Tourists, people running errands and ordinary passers-by make up the majority of pedestrian traffic within the eastern part of the Old Town.



Old Town Residents

Almost half of Lublin's residents visiting the western part are those living in the Old Town.



Exploring the west side

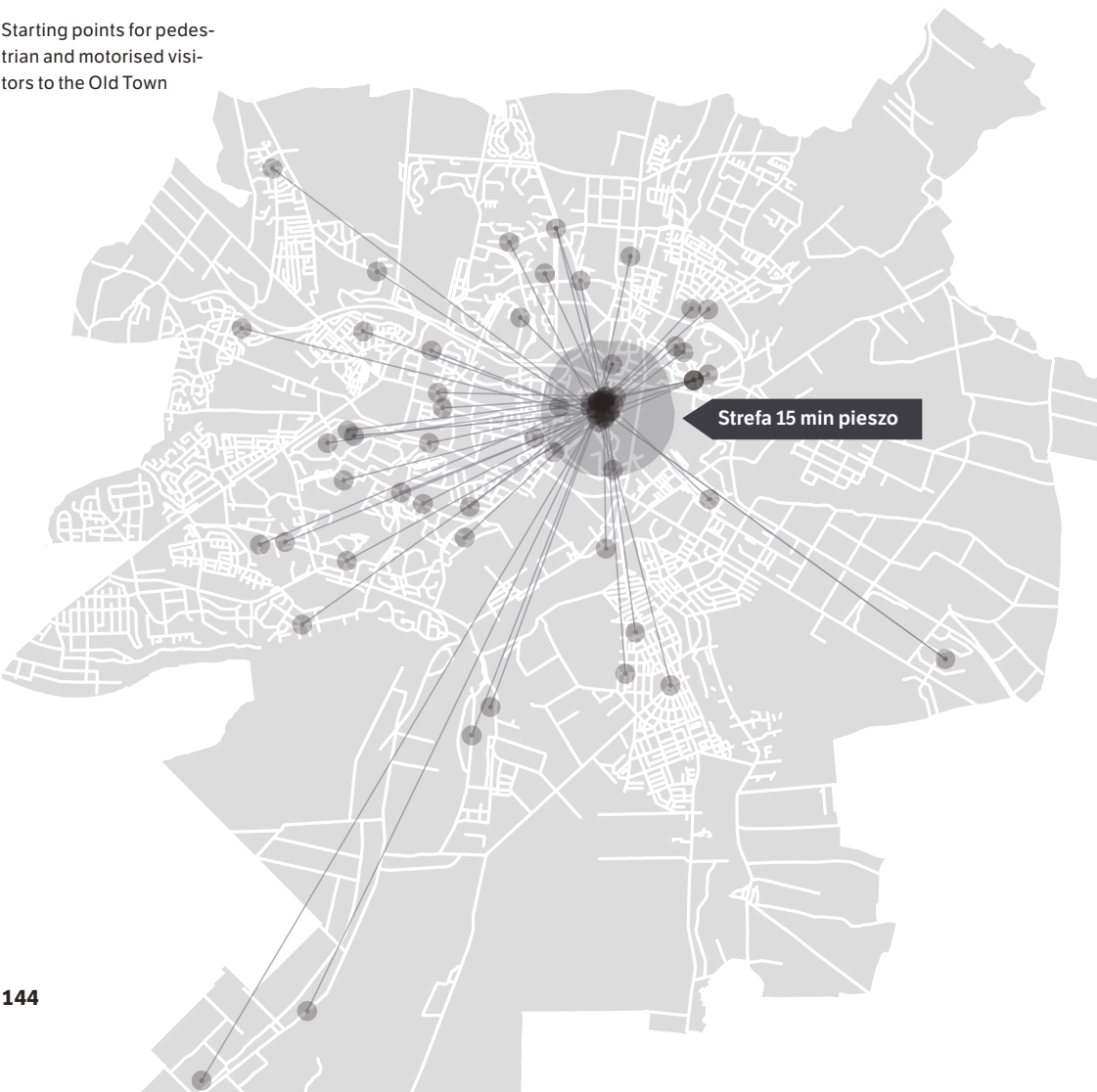
Knowing the results of our research, we decided to map the interesting spots in the west part of the Old Town to find out its potential. We focused on the functions of individual buildings, trying to see whether they included commercial facilities and tourist attractions of interest to visitors. Perhaps this part of the Old Town could become an interesting alternative to those wanting to avoid the hustle and bustle of Grodzka Street?

Summary

Our three-day study showed that the pulse of the Old Town is a little uneven, the town being split into two parts: the eastern one – trendier, more lively and enjoying more tourists – and the western one – less obvious and intended more for the locals. This somewhat forgotten part of the town has great potential that still remains untapped.

Pedestrian traffic structure

Starting points for pedestrian and motorised visitors to the Old Town



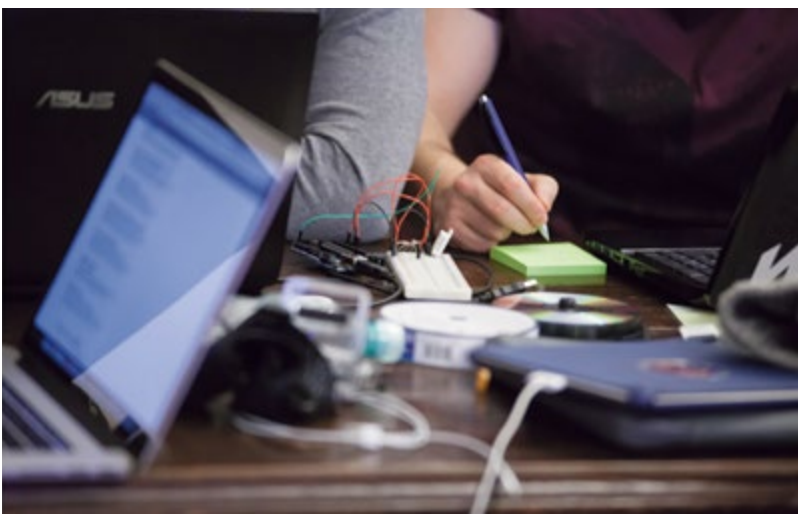
Methodology

The project participants learned three key points: how to define a research problem, how to acquire data and how to visualise the data in a clear and attractive way so that the results can be used as a starting point for an awareness campaign about the city. In order to obtain the data, we used several methods, including standard surveys and cordon studies of pedestrian traffic in the Old Town, spatial studies, mapping space and running space performance studies using suitable sensors and the Arduino platform.

Thanks to our project-based approach, we were able to quickly diagnose the problem. Division into small workgroups made it possible for us to make optimum use of the various competencies brought to the project by the participants. Then, in line with the DIY philosophy, we collected data "manually", using both standard non-automated methods and digital tools.

While working in a dozen-or-so-strong group allowed us to quickly perform time-consuming and complicated tasks, it also meant that we had to maintain high discipline and good division of labour among the individuals and ad hoc task teams.

Visit our project documentation page to see detailed visualisations showing how the residents and visitors make use of Lublin's Old Town.
pulsmiasta.medialabkatowice.eu



Participants

Ivan Davydenko, Magdalena Kasprzak, Urszula Kłoczowska, Michał Korba, Grzegorz Kufel, Krzysztof Lipka, Jonasz Łęczyński, Agnieszka Łopacka, Elżbieta Majorczyk-Grabińska, Berna Öcal, Patryk Omiotek, Marcin Pendel, Małgorzata Richter, Barbara Wrońska

Project coordination

Łukasz Wiącek, Agnieszka Wojciechowska

DATA-DRIVEN INVESTIGATION

Zone Silesia. The History of the Katowice Special Economic Zone
Air Pollution: Data-Journalism to the Rescue

NICOLAS KAYSER-BRIL **LAURA MOTET**

PIERRE ROMERA

2014–2015	workshop 2×3 days
methods & tools	CartoDB, Datawrapper, GIS, Google Sheets, Kimono, OpenRefine
partner	The Scientific Information Centre and Academic Library

30% 40% 30%

Using a data journalism workshop to conduct interdisciplinary research into selected problems and issues relevant to the city and the region.

The project participants are given step-by-step instruction in implementing projects based on the method of large data sets analysis: from conducting online research, through defining a design problem, to taking advantage of user-friendly tools to create visual messages. The result of the work is a simple web page showing the results of the completed study.

The workshop is designed to learn the principles for implementing data-driven projects i.e. those based on collecting and analysing numerical data sets as a starting point for investigating a given problem. Participants work as part of an interdisciplinary team to make better use of their respective skills and explore the specific nature of collaboration within a project workgroup. As a result, the team is able to complete their project in just three days. The workshop follows the principles of a design process adapted to the specifics of working with data sets. Below is a step-by-step presentation of a possible sequence of tasks, although this may be subject to change depending on the problem selected, data sources or targets defined by the group.

1. Selection of subject matter

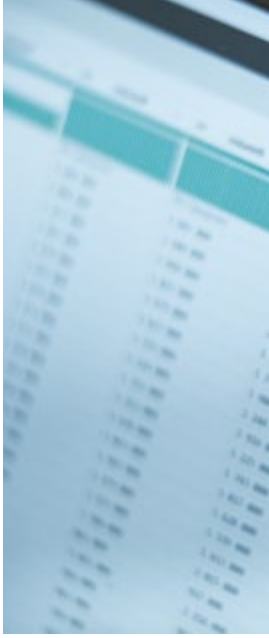
The subject is chosen in an arbitrary way prior to the project commencement, because not all issues can be researched with the adopted methods of work. Ideally, the selected problem should be of vital interest to the city and the local community and with relevant information to be found in public databases and data sets easily accessible online or otherwise.

In our case, it was the functioning of the economic zone and a study of air quality in the region.

2. Acquisition of data
At the early stages of the project, each data set concerning the subject is potentially interesting and useful and the greatest possible number of data sources should be collected, including databases, spreadsheets, research papers, press releases, etc. The more data, the better.

3. Formulation of hypotheses
Parallel to data acquisition, a brainstorming session should be conducted on the subject as a speculative tool to identify the possible narrative directions, which will be verified during data analysis. As for the economic zone, we put forward a number of which only a few were suitable for exploring further, including: What is the zone's contribution to the economy of the city and the region? Are tax breaks an effective tool to create more jobs and ensure faster economic growth? Does the zone promote a new dangerous industrial monoculture, similar to the mining and metallurgy industries in the past?

4. Division into workgroups
Depending on the topic and complexity of the problem at hand, it seems sensible to employ a division of labour by dividing the participants into



smaller teams responsible for implementing specific parts of the project. During our economic zone project, two-person teams would prepare the subsequent parts of the article, presenting different views on the subject under scrutiny. The makeup of the workgroups may change as the project progresses. Towards the end, we formed several teams with different competencies. One group developed the texts, another prepared an interactive map, yet another worked on the charts, etc.

5. Revision of hypotheses

This stage involves analysis of the data and verification of the assumptions made at the beginning of the project. Working with an experienced team, one may be inclined to make advanced analyses that will allow for the discovery of other interesting relationships within the collected data.

6. Production of narratives

Having completed the analyses and decided on the final format of the message, we may proceed to describe and visualise the examined problem so as to produce a coherent narrative based on individual parts. After completing the necessary editorial and design steps, work results can be made available for public discussion.

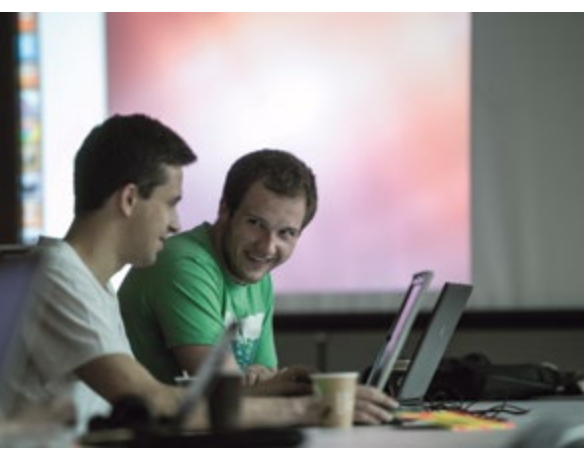
The specific character of data journalists' work is presented by Nicolas Kayser-Bril in his article *Introduction to data-driven investigations,* published herein.

The detailed course of the workshop and the working methods used are described in *Poradnik metodyczny. Edukacja kulturowa* (tom 2) [*Teaching Guide. Cultural Education* (Volume 2)], as edited by Karolina Sikorska and published by the Zamek Culture Centre. The book is available in pdf format: **j.mp/mlab_22**.

The project results are available on specially designed websites. View the Zone Silesia. The history of the Katowice Special Economic Zone: **ksse.medialabkatowice.eu**.

While staying in Katowice, the workshop leaders gave the following lectures: Nicolas Kayser-Bril – *How to get started in datajournalism when you're not "The New York Times"*, Pierre Romera – *Why does my mother think I fix computers in newsrooms?* Slides from these are available online at Medialab's website: **j.mp/mlab_31, j.mp/mlab_30**.

documentation
j.mp/mlab_34
j.mp/mlab_35



CONNECTING WITH YOUR URBAN ENVIRONMENT

WESLEY GRUBBS

2014	3-day workshop
methods & tools	statistical analysis, Arduino, cordon studies, creative process, Processing, sensors, interviews

30% 40% 30%

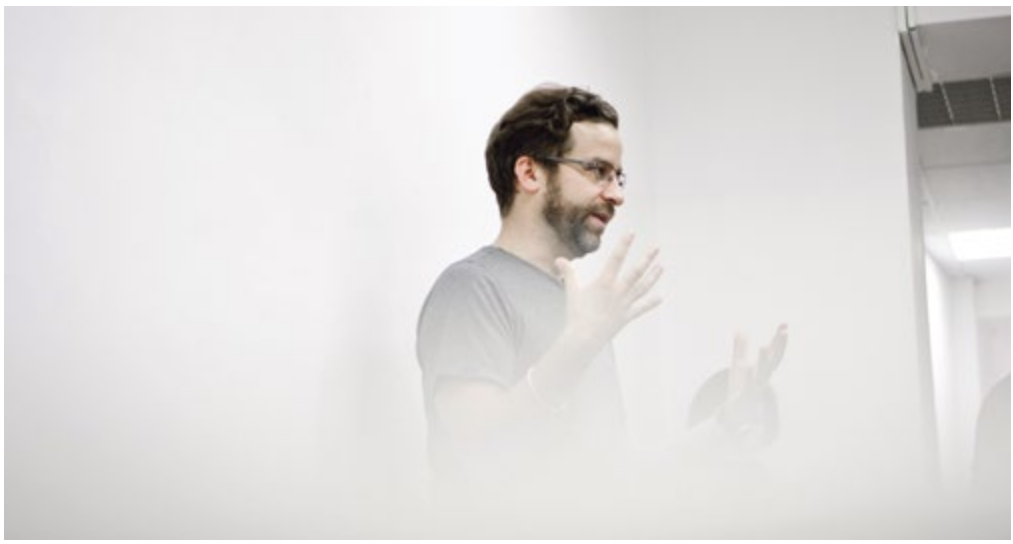
Using traditional and alternative methods of data collection in urban space and transforming them into datasets to be analysed and, eventually, visualised as part of a creative process.

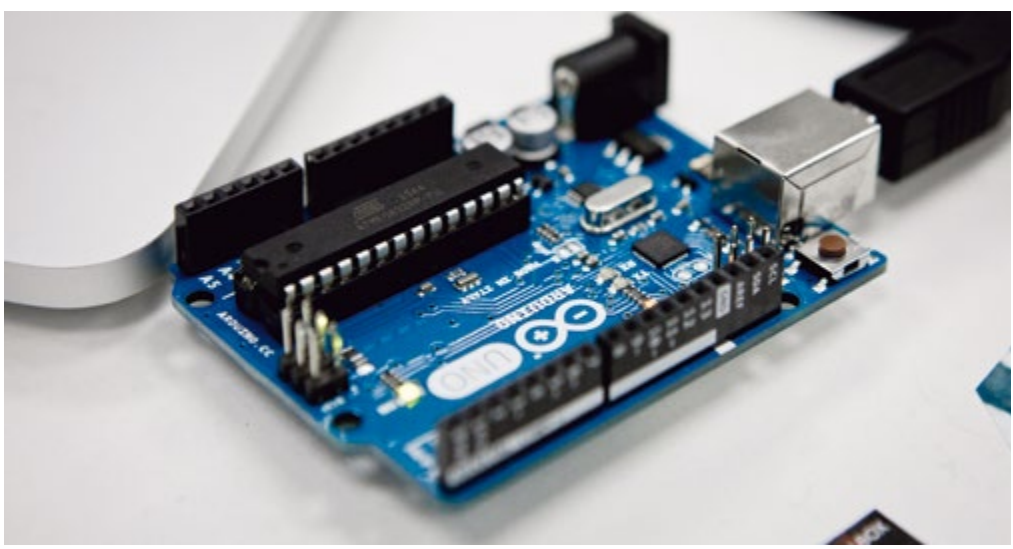
The workshop was focused on exploring techniques for gathering, understanding and visualising data from the urban environment. Using some more traditional and non-traditional techniques, the participants learned how to build datasets relating to the bustle of the city, the papers we read, busy cafes and other intriguing aspects of everyday life. Then, using statistical models, the participants tried to identify some trends and relationships within the collected data and finally arrive at relevant visualisations through engaging in a creative process.

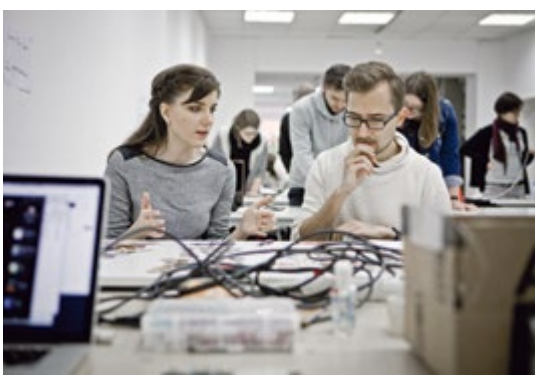
An interesting experience was the process of conducting measurements in the city space using sensors and Arduino controllers. The participants were able to see that the process is not a neutral and objective activity. It was necessary to take into account a number of external factors affecting the quality of the measurements, such as the weather and correct positioning of the sensor, but also, incidentally, the impact of the measurer's body, which turned out not so transparent after all. This led to some interesting situations and important questions, particularly in semi-public and private spaces, e.g.: How to conduct research in the supermarket? Ask for permission, or make the measurements inconspicuously, without alerting the security guards? The same dilemma faced by the workshop members who had to count the congregation during a service in nearby St. Mary's Church. Research activities in public space using Arduino controllers sometimes led to surprising reactions, when e.g. passers-by erroneously took the microcontroller board interspersed with colourful wires to be, well, a bomb!

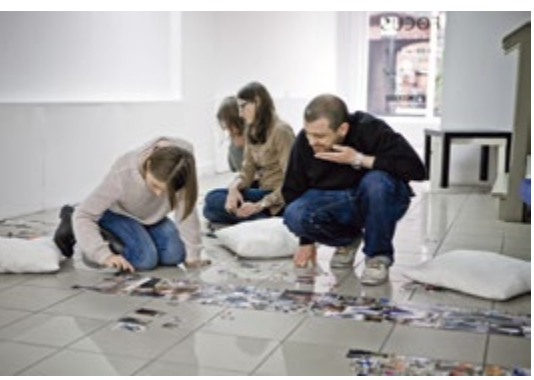
The greatest advantage of the workshop was the creative approach to the different stages of the design process and realising, e.g., that analytical methods of categorising and

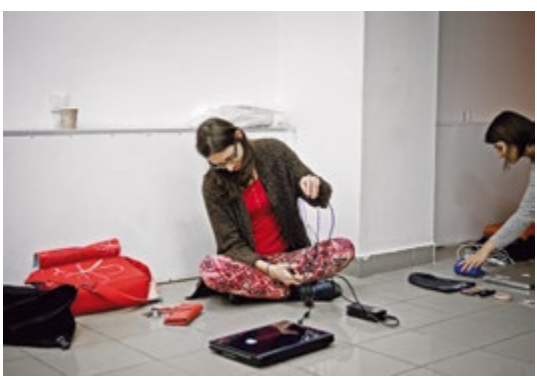
organising content may be applied not only to official statistical data stored in spreadsheets, but also to various daily life activities. So, not all is lost if you do not have access to data you are interested in. In many cases, you can gather it yourself by conducting your own investigation in the urban environment. A non-standard approach to data processing is also useful for content presentation. Using the Processing tool, the participants tried to create interactive narratives that would engage the user and give them the opportunity to explore the problem at hand. After all, no-one said that a visualisation should always be in the form of a static graph or table?











WILD STYLE. DATA VISUALISATION IN PUBLIC SPACE

STEFFEN FIEDLER | STEPHAN THIEL

2014	3-day workshop
methods & tools	data sculpture, graffiti, information bombing, field measurements, design process, interviews
partner	The Scientific Information Centre and Academic Library

10% 30% 60%

Experimental fusion of data visualisation methods and street art poetics in public space activism.

It may seem that data visualisation has little, if anything, in common with street art. The orderly and precise domain of statistics and analytical methods for interpreting data seem to stand in stark contrast to the spontaneous, often illegal and provocative actions in public space. The participants of the workshop staged by Studio NAND were encouraged to combine different data acquisition, processing and visualisation methods with the world of street art in order to bring data and art activism into the public space of Katowice.

The most important stage of the rigorous design process regime was to define a problem in a selected part of the city or deal with the needs of a given group of residents. To this end, the participants had to ignore their beloved spreadsheets and comfortable workstations for a while and conduct field research to gain first-hand experience of the scale of the problem at hand, even if it meant going off into dark dodgy gates or penetrating into the concrete bed of a polluted river.

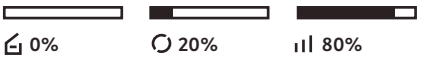
After determining the project's subject matter, the participants went on to acquire relevant data, either independently or from official repositories. At this point, they had to face the most difficult challenges: How to visualise the data in public space to reach the target audience? How to make the visualisation naturally fit in with the context of the explored part of the city? What means to use for the project to inspire public interest, and perhaps even controversy, in the hope of galvanising people into further action towards achieving social change?


FIAT


różnica poziomów: 270m

ANALOGUE ALGORITHMS: A DATA DRAWING WORKSHOP

2015	1-day workshop
methods & tools	analogue, data, data visualisation, drawing, infographics



STEFANIE POSAVEC

Using analogue methods to present data for prototyping and search for unconventional visual solutions.

Data is the raw material from which a range of outputs such as data visualisation, information graphics, and data-driven artworks are created. However, this material is often dealt with digitally and rarely tackled in a tangible, physical way. How would your approach and sensibility within a data project change if you started by working with charcoal and paper instead of code and computer screen?

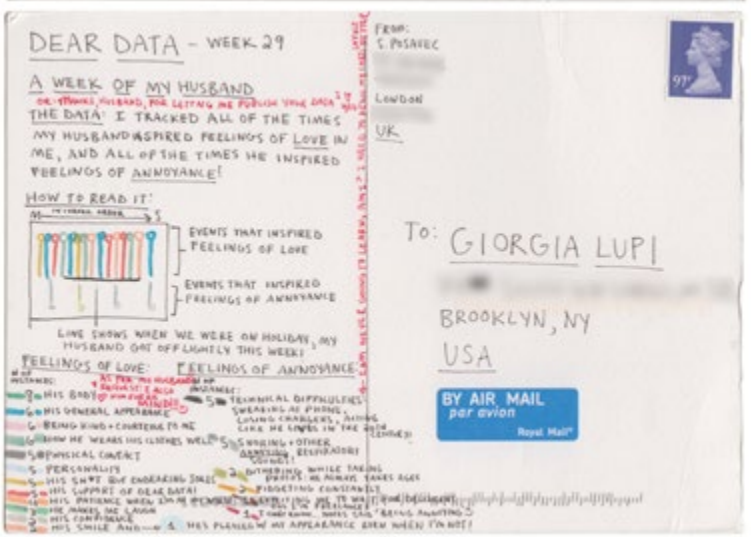
Participants sought ways of communicating data that are more emotive and textured than traditional visualisation methods and examined the effect of different art techniques and materials on communicativeness in the hope of striking that hard-to-find balance between readability and aesthetics. The aim of the workshop was to create a generative system through using a handmade design process, where participants with all their imperfections are meant to replace the computer. These imperfections, however, are seen as an advantage, rather than a hindrance.

The exercises were designed to visualise at least three weather and air quality parameters in a selected period. Manual work using drawing materials allowed participants to quickly test different options, which enhanced the possibility for creative visual outcomes. Even though large collections may require the use of automated data processing and visualisation techniques, analogue methods of work may prove a great tool

for promoting unconventional design solutions and prototyping.

Stefanie Posavec, along with Moritz Stefaner and Stephan Thiel, also took part in one of the art+bits festival's panel dedicated to data visualisation and the new model of knowledge in a networked environment. She gave a talk on, inter alia, the Dear Data project which completed in collaboration with information designer Giorgia Lupi.

Dear Data
dear-data.com

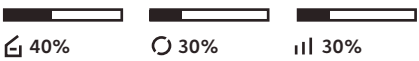



WE PROCESS
5.6
BILLION
EMAILS PER DAY.
'expands
essence of data
using context
and metaphor...
allows the user to
gain a deeper
POSTER
INFOGRAPHIC

MODERN CITY IN THE MAKING. KATOWICE 1865–2015

CHRISTOPHER BURKE
STEFFEN FIEDLER
TOMASZ BIERKOWSKI
STEPHAN THIEL
JUSTYNA KUCHARCZYK
IRMA KOZINA
ROBERT KRZYSZTOFIK

2013–2015	workgroup
methods & tools	spreadsheet, design thinking, GIS, creative process
partners	Academy of Fine Arts in Katowice, Katowice History Museum



Using the design process to create a suggestive visual language that makes it possible to present the city's history through a narrative based on challenging its stereotypes.

The culmination of the Modern City in the Making workgroup's effort was an exhibition titled *The appetite for radical change. Katowice 1865-2015*, presenting the history of the city through maps, animations and data visualisation. The interdisciplinary project, including cultural researchers, designers, architects and spatial planners, took part in several meetings, workshops and lectures. Their task was not to create a universal and objective story about the city's history, but to look at Katowice from a new perspective through the use of tools for data processing and visualisation.

The exhibition references the activities of the Isotype Institute and the universal visual language created in Vienna in the 1920s. Inspiration came particularly from a series of innovative museum exhibitions staged in Austria's capital at that time, and also from Otto Neurath's famed *Modern Man in the Making* (1939), a history book describing the story of modern society in an accessible way. Our project's title is an obvious reference to this publication.

The first stage of the project saw the participants learn about the history of Katowice and participate in *Transformation and Visualisation*, a seminar led by Isotype researcher Christopher Burke of the University of Reading. The most time-consuming task during the project was to collect data on the city's history. Fortunately, most of the information required was found in documents made available by the Silesian Digital Library.

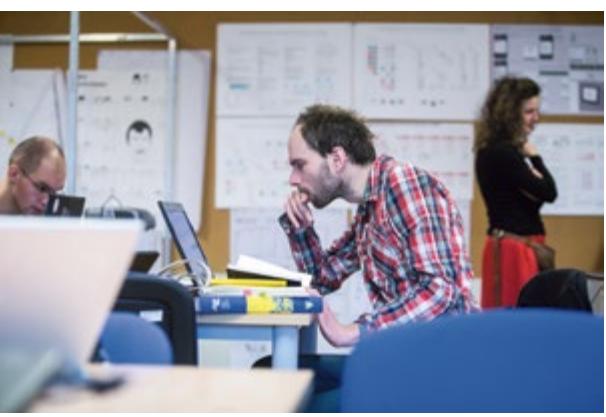
The next challenge was to create a clear narrative in order to avoid the problem of information overload and the desire to present all interesting facts in the history of Katowice

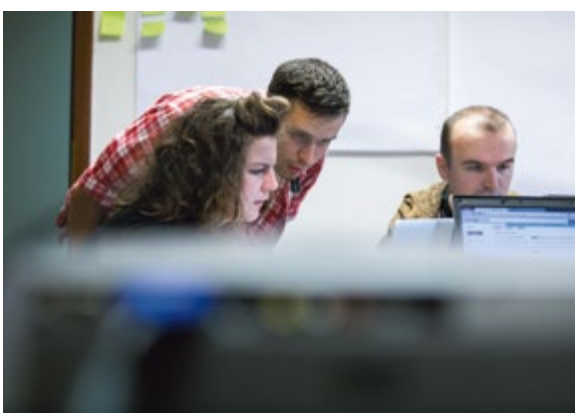
without an organised hierarchy of content. This was accomplished through adopting a set of project principles as well as defining the purpose and audience of the project. Of particular help in this respect was the introduction of a narrative built around stereotypes about the city and the region. This facilitated the selection of appropriate content and made the experience far more engaging than it would have been with a linear narrative.

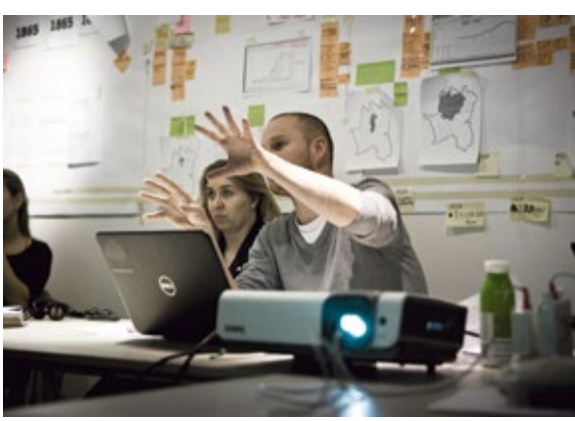
At the final stages of work, we once again had to take a critical approach to the gathered content and adopted visualisation ideas. It was hard to resist the temptation of using the oh-so-trendy multimedia and interactive installations, even though common sense told us that the presentation of data on detailed large-format maps would create a more striking effect if they were plotter-cut out of PVC foil and stuck onto a white wall. Eventually, we managed to find a balance between the dynamic media and the static elements produced using classic analogue methods. For the results of our team's effort, please see *Appetite for Radical Change. Katowice 1865-2015* herein.

Isotype Publications
Many materials by the Isotype Institute, including the book *Modern Man In The Making*, can be found in online digital repositories. The Medialab website provides links to the most interesting and diverse publications, including the *International Pictorial Language*, giving a detailed account of visual language principles, as well as the post-war *Social security: the Story of British Social Progress and the Beveridge Plan* and *Education for All: in the Western Region* published in Nigeria to aid people with literacy issues: **j.mp/mlab_47**.

Some interesting thoughts on the experience of participating in the venture as well as its biggest challenges and methodology can be found in accounts provided by participants: Bartek Krzeminski (in *Medialab, or open Katowice at your fingertips*, published in Reflektor magazine **j.mp/mlab_24**) and Sebastian Sikora in his design blog: **j.mp/mlab_25**.







THE REVERSAL OF ROLES: VISUALISATION AS A METHOD FOR CHANGE

2013	3-day workshop
methods & tools	speculative design, mapping, modeling, simulation on paper, process visualisation

20% 40% 40%

MAREK KULTYS

LINA AUE POGATSCHNIGG

Combining information design and speculative design methods in order to use the visualisation process to prepare and implement social change scenarios.

Is it possible to reverse the visualisation process, so as not to provide information on the current status of the world and its processes, but, instead, give us an insight into what needs to be done for the world turn into a dream come true? The workshop was an attempt to combine information design with speculative design. Our task was to invert the traditional use of visualisation and give it a task-oriented role, rather than the usual descriptive one, and thus make it a cognitive tool.

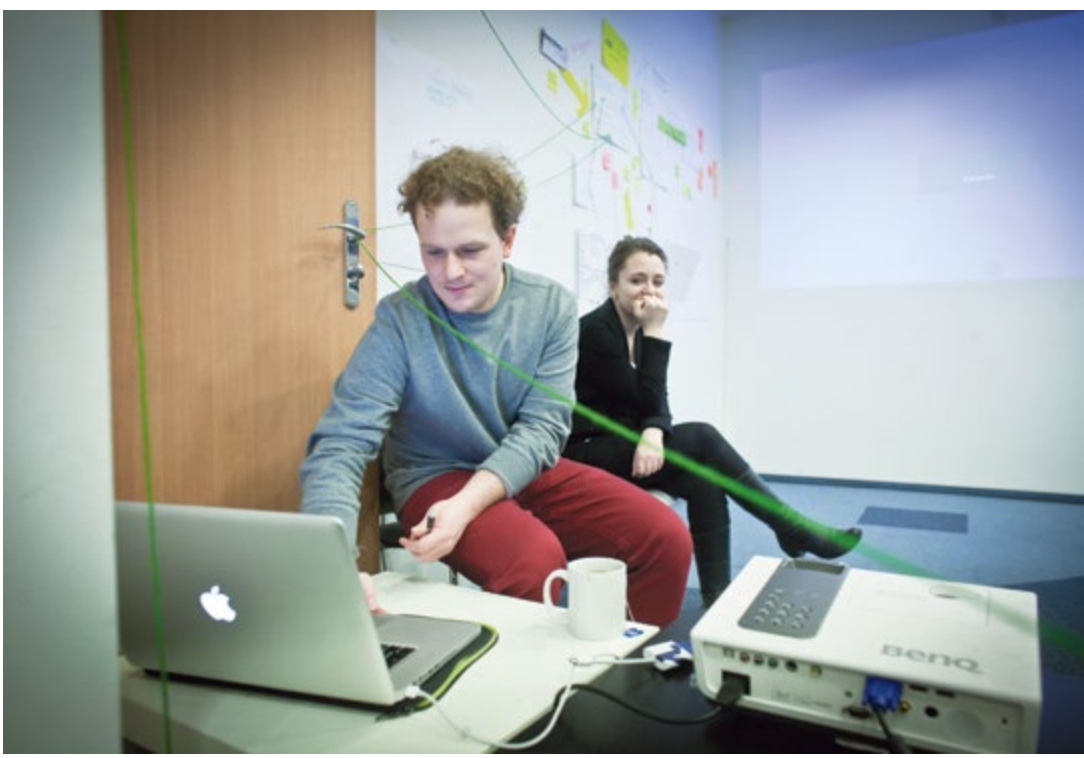
In order to create a map of local circumstances and put forth a design intervention to bring about change in the life of the community, the workshop participants had to go through several stages of the design process. First, it was necessary to make a list of local decision-makers and other actors along with economic, legal and social networks, and put them on the map to get a picture of the local conditions. Then, they used the map to develop speculative scenarios leading to the desired change, while considering the system implications of each of the proposed scenarios and taking into account some conventional, but also non-conventional, modes of operation. As the last stage, the participants tested the selected scenario through simulated enactment in order to consider its positive and negative effects, identify potential opportunities, threats and risk areas.

Four teams of designers, social activists, architects, IT specialists, civil servants and artists made extensive research into their chosen spheres of life. Then they used the results to create a visual tool (map, diagram, connection network) in order to speculate on the proposed changes. The result of the teams' work teams were several scenarios and proposals for design interventions.

The first group took on environmental awareness among residents of Zakopane. The result was a functional draft of a mobile application which uses environmental pollution data and augmented reality to help residents observe the scale of air pollution caused by burning rubbish in their homes and promote the understanding of related health hazards.

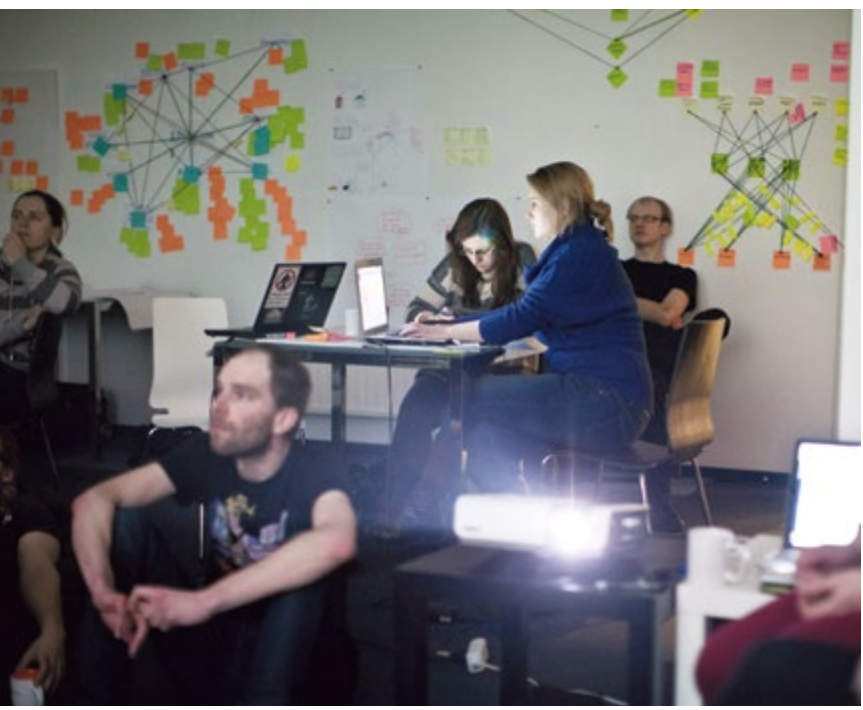
The second team focused on the issue of effective communication between the local administration and the community. By developing a map of fictional and existing paths of communication between the authorities and residents, the participants arrived at two scenarios. The dystopian one described a city in which civil servants modelled their behaviour on the residents' attitudes, whereas the utopian scenario presented a reality in which public debate and public consultations could be held while preparing drinks together.

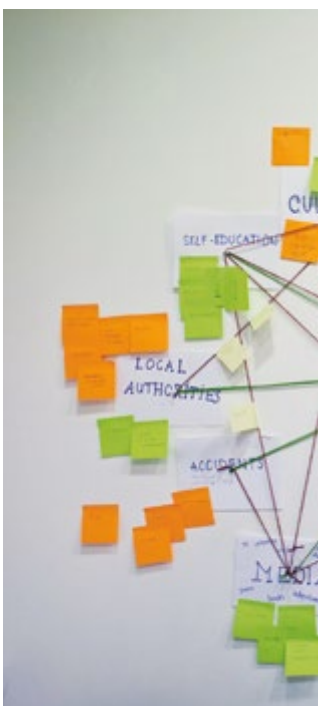
The third group set out to examine the problem of fragmented local and disappearance of neighbourly rapport. As a result of a detailed study, the participants created a map of locations and times of day in which selected categories of people meet.



Based on this visual representation of the state of affairs, the group proposed a series of fictional design interventions to enable residents to meet in public spaces. These included collective colouring of apartment blocks facades or devising an intercom "virus" to force residents who share the same staircase to get to know their neighbours.

The fourth team took up the issue of promoting social involvement of local communities. Beginning with the visual mapping of the ways in which three maverick professionals (artist, philosopher and economist) can inspire people to action, the team developed the idea of Ecofilar, a locally administered platform where individuals can work on their projects. As a model scenario for the platform's operation, the team chose a project to develop, implement and popularise Polish graphene as part of the locally developed Graphene Valley.





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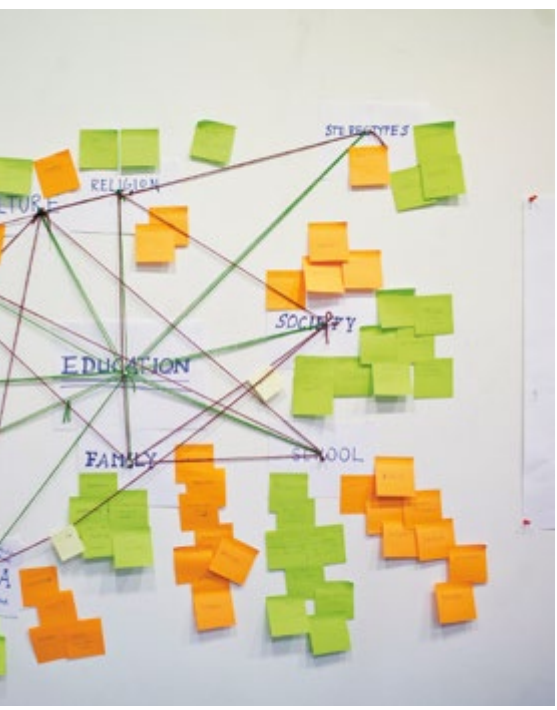

RELIGION
EDUCATION
FAMILY

MAPLAB: ANALYSIS AND VISUALISATION OF SPATIAL DATA

PAWEŁ JAWORSKI **PAWEŁ MARYNOWSKI**

PAULINA URBAŃSKA

2014–2015	workgroup
methods & tools	QGIS, OpenStreetMap, CartoDB, Mapbox, TileMill
partners	Silesian Centre for Cultural Heritage, Katowice City Archive, Wikimedia Polska Association

30% 50% 20%

Studies of Katowice's spatial development with the use of geographic information systems and data visualisation through maps.

MapLab, a workgroup operating under Medialab Katowice, was established to conduct moderator-supervised studies on spatial planning and urban design in Katowice. In order to investigate the development and performance parameters of areas with different functions, the team uses open geographic information system (GIS) software and data provided by the City Hall. MapLab participants learn how to interpret, organise and process spatial data relating urban issues of varying degrees of complexity. Thanks to collaboration with designers, the workgroup members can become familiar with different ways of visualising their studies.

The meetings can be attended by individuals who have not yet had the opportunity to use the tools for spatial data analysis and visualisation. During the one-day courses, they can learn the basics of working with GIS software and conduct simple analyses and gain practical knowledge on different systems for presenting data using online maps, such as CartoDB, Mapbox and OpenStreetMap.

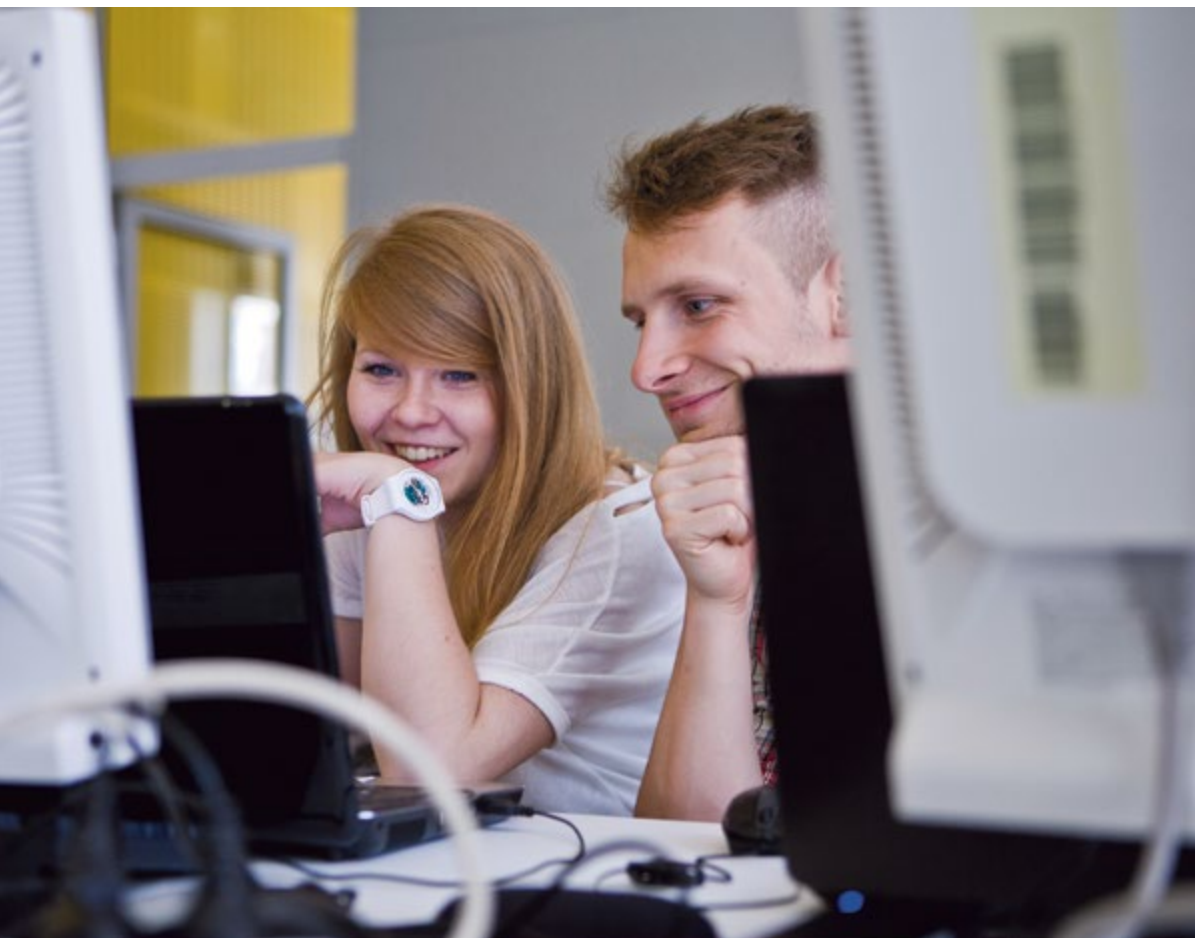
At the turn of 2014 and 2015, the workgroup completed a series of spatial analyses for the exhibition *Appetite for Radical Change. Katowice 1865-2015*, including a study of the surface area and accessibility of Katowice's green areas. Since March 2015, MapLab is has been working on Katowice Buildings, a map-driven project designed to survey the names of architects and dates of creation of particular city buildings.

Currently underway is the team's the flagship research project, known as *Wczytani w Kościuszki* [Reading Deep into Kosciuszko Street], delivered jointly with the Hu-Ta Foundation and Kultura Obrazu Foundation. Thanks to the cooperation with the

A search is carried out n collaboration with the Katowice City Archive to find documentation relating to buildings in Kościuszko Street. The participants of meetings and mapathons held as part of the project, write articles on various buildings for Wikipedia. The collected content will be used to create a project presenting the history of what is one of Katowice's most important streets.

Dąb District and Kościuszko Street

As part of its activities, MapLab was also involved in educational events targeted at the inhabitants of those locations where our studies were conducted. Regardless of the weather, which was not always conducive to exploring the city, many local residents joined us on walking tours led by experts on Katowice's history and passionate Katowice enthusiasts: Maciej Szołtysek (Dąb) and Przemysław Piwowarczyk (Kościuszko Street).

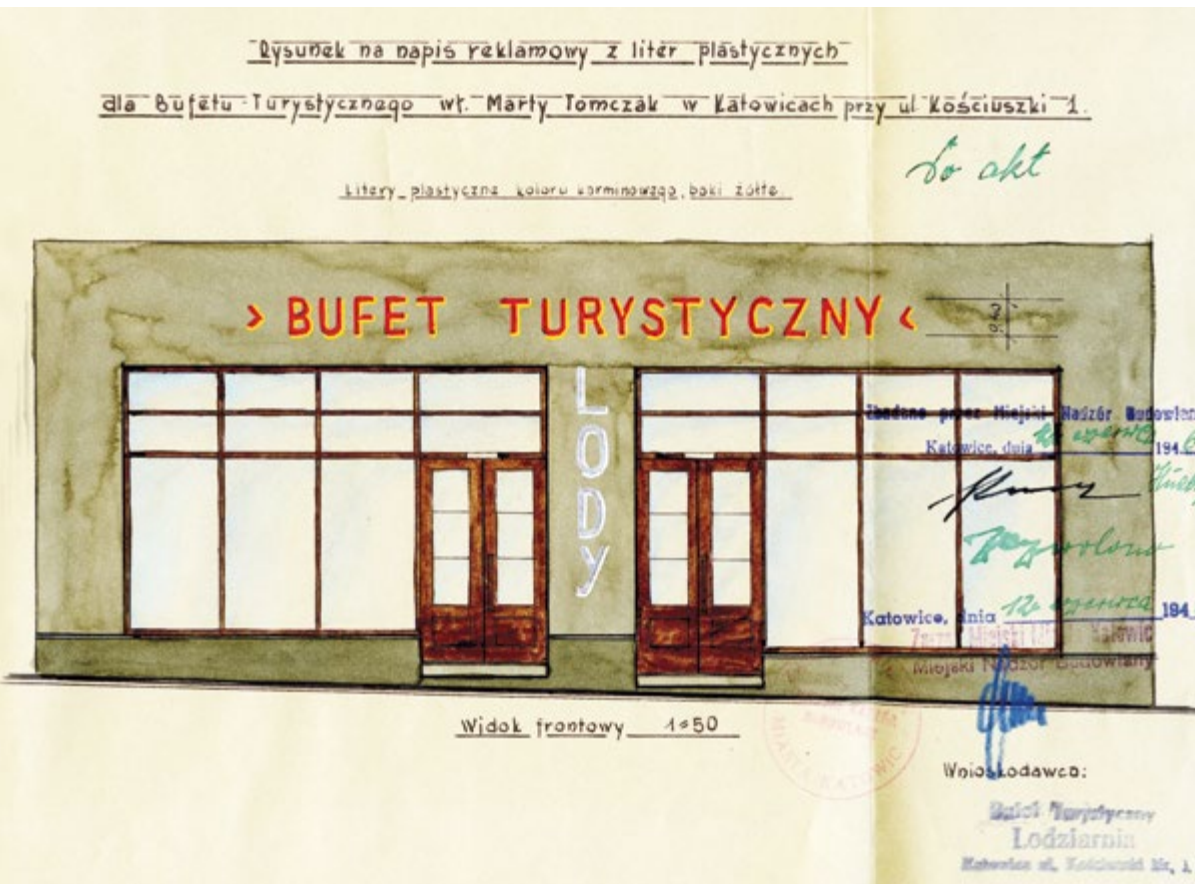


Radical Maps – Introduction to DIY Map Making
In his online lecture, given at the launch MapLab, Stephan Thiel of Studio NAND reviews the tools and methods for creating online maps with particular emphasis on open source tools. The examples presented include both historical and modern data visualisation possibilities using maps: **j.mp/mlab_40**.

Hacking Cultural Heritage
During the workshop, led by Rui Guerra & André Gonçalves, we used data from public digital repositories (e.g. in particular the Silesian Digital Library) as well as content published on social media, trying to find alternative ways of telling stories based on large data sets: **j.mp/mlab_45**.

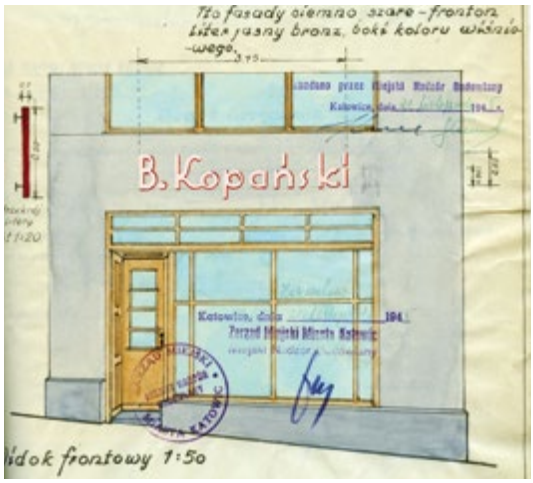
Study of Kościuszko Street
As part of a mapping project of Kościuszko Street, we started a search in the Katowice City Archive to gather information about its buildings and their inhabitants (study to be continued in 2016). Our interest was sparked by, among others, shop sign and shop window designs. The scans on this page show documents concerning the demolishion of a modernist building at No. 1 Kościuszko Street.

History of Kościuszko Street
Visit the project website for an essay by Przemysław Piwowarczyk about the history of Kościuszko Street as well as other materials and links to our own Wikipedia articles on the street's buildings: **j.mp/mlab_46**.



Visual materials:
Katowice City Archive

documentation
j.mp/mlab_46


B. Kopański
Widok frontowy 1:50


› fotomat ‹
Skala 1:50


Tekstylia-Galanteria
Widok frontowy 1:50


Radio-Fala
RADIO-FALA


KIOSK WĘDLINY
K


PIWO TYSKIE
PIWO TYSKIE
PIWO TYSKIE
Rysunek do podatku od szyldów

KATOWICE BUILDINGS

2015	product
methods & tools	GIS, Mapbox, TileMill
partner	Surveying Department of the City of Katowice

30% 10% 60%

Creating interactive online maps with the most important information about Katowice buildings to promote an understanding of the spatial development of the city.

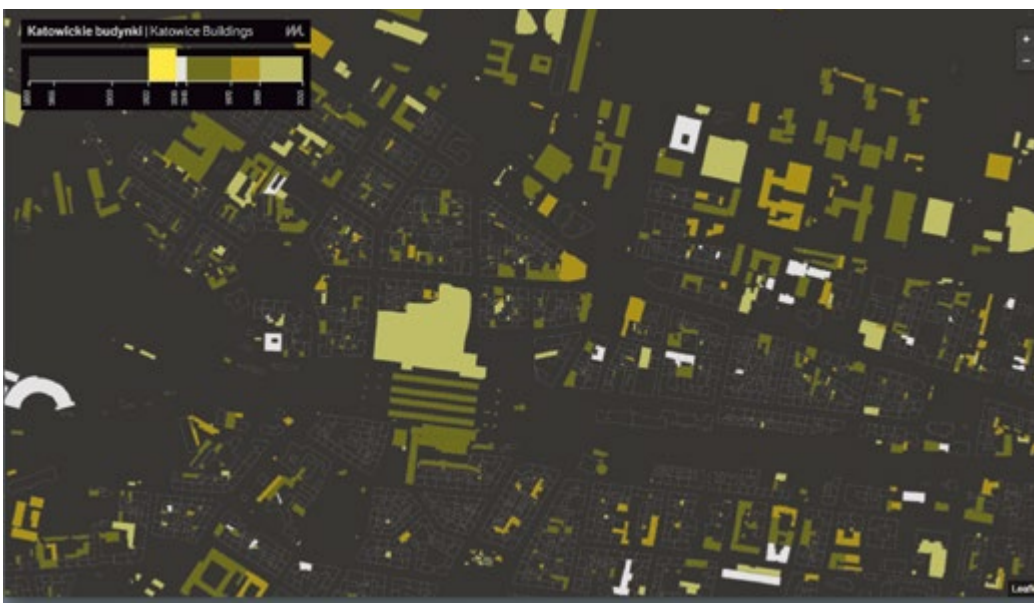
In terms of its history and architecture, Katowice is something of a unique phenomenon among Poland's largest cities. Despite being the youngest one, it boasts the most interesting though sometimes underrated, architecture, from the working class residential estates and the majestic temples of industry, bearing witness to social progress and civilisation, through Poland's best examples of interwar and post-war modernism, such as Spodek Arena, to contemporary public facilities, including the Academic Library and the new home of the Silesian Museum.

While preparing our exhibition *Appetite for Radical Change. Katowice 1865-2015* on the history of the city, we created a detailed online map of Katowice buildings. Thanks to data obtained from the Surveying Department of Katowice's City Hall, we were able to specify the address and commissioning dates. A number of selected buildings on the map, especially those in the city centre, also bear the name of the architect and a link to a relevant article in Wikipedia.

Inspired by projects using colour maps to present erection dates of particular parts of Portland and Brooklyn, we decided to take the idea further by introducing a number of improvements. First of all, we have identified important periods in the city's history allowing users to view and compare selected layers, so that it was easy to find, e.g. only pre-war buildings or projects completed after 1989.

documentation
katowickiebudynki.eu


Katowickie budynki | Katowice Buildings
1907
ul. Rynek 2
Carl Moritz


Katowickie budynki | Katowice Buildings


Katowickie budynki | Katowice Buildings
1930
ul. Adama Mickiewicza 3
Stanisław Tabertski

During our regular mapathons, organised in collaboration with experts from the Silesian Cultural Heritage Centre, we supplement the erection dates and names of architects for central Katowice's most important buildings and write Wikipedia articles about them. Residents can also submit their comments and suggestions using a special form: **j.mp/kato_budynki**.

In order to help residents gain a better understanding of the city's spatial development, we also used available data to create a map showing the layout of the city centre in different periods of history: **j.mp/mlab_15**.

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Data processing: Paweł Jaworski
Layout: Zofia Oslislo, Justyna Kucharczyk
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Development: Stephan Thiel

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Specification	**PAPER:** **Munken Pure 240 g** (cover) **Munken Pure 120 g** (inside) **TYPOGRAPHY:** **Adelle** (Type Together) **LFT Etica** (Leftloft, Type Together)
Print	**PETIT LUBLIN, www.petit.lublin.pl**
Medialab Katowice Team	**KAROL PIEKARSKI – programme** **OSKAR ADAMUS – production** **MAGDALENA CHMIEL – promotion**
Publisher	**Institution of Culture *Katowice: City of Gardens*, Katowice 2015**
The Polish and English language version of this book in PDF format is available for download at	**medialabkatowice.eu**

Delivered with financial support from the Ministry of Culture and National Heritage and U.S. Consulate General in Kraków

Ministerstwo Kultury i Dziedzictwa Narodowego.

KATOWICE ala odmiany | 150 lat

Instytucja Kultury KATOWICE Miasto Ogrodów

Medialab Katowice

ISBN: 978-83-63304-87-4

Medialab Katowice is an experimental project combining creative, research and education activities. Participants of interdisciplinary projects placing themselves at the intersection of art, design and technology use digital media to research the city and create new narratives for Katowice. Medialab is a forum for the exchange of ideas and knowledge, meeting inspiring artists and designers, as well as a collaboration platform for artists and institutions from different countries: universities, NGOs and creative-sector companies. The project involves workshops, interventions in public space, exhibitions, lectures and discussions. There are also several workgroups focused on areas of city data visualisation, spatial analysis (MapLab), and the Arduino platform (SensLab).

medialabkatowice.eu

SELECTED 2013–2015 MEDIALAB EVENTS ASSOCIATED WITH DATA PROCESSING AND VISUALISATION

CITYLAB

2013 exhibitions, debates, lectures, workshops

A temporary meeting platform for people from different backgrounds working together on new ideas and alternatives for the city. This urban laboratory is designed as a testing ground anything from minor improvements to potential trends and scenarios for the development of the city as well as a showcase for projects completed by Medialab in 2013.

Participants
Edwin Bendyk, Christopher Burke, Verena Gerlach, Marek Kultys, Grzegorz Młynarski, Studio NAND

documentation

2013.medialabkatowice.eu
miastolab.medialabkatowice.eu

URBAN DATA STORIES

2014 workshops, lectures, workgroups

A series of interdisciplinary meetings for designers, programmers, city planners, activists, journalists and people from other professions, working together on acquiring, processing, analysing and visualising data in order to study and describe city-related issues.

Participants
Wesley Grubbs, Rui Guerra & André Gonçalves, Paweł Jaworski, Nicolas Kayser-Bril, Studio NAND

documentation

urbandatastories.eu

REDISCOVERING THE CITY

2015 conference, workshops, hackathon

A conference on new methods to study, describe, explore, discover and reclaim the city, with particular interest in grassroots and community oriented solutions based on data processing technologies. The event gave particular attention to projects completed in Central Europe offers a unique opportunity to observe the local application context of certain universal and globally-shared technologies.

Participants
Artur Celiński, Tomas Diez, Martijn de Waal, Adam Greenfield, Daniella Huszár, Milica Milunović, Krzysztof Nawratek, Osamu Okamura, Kristien Ring, Milota Sidorova, Magdalena Siwanowicz, Paulina Sobieszuk, Ján Studený, Studio NAND, Bogna Świątkowska

documentation

rediscoveringthecity.eu
summary.rediscoveringthecity.eu

ART+BITS FESTIVAL

2015 workshops, lectures, workgroups

A large part of the festival was devoted to data visualisation and new knowledge models in the network society as well as critical reflection on smart cities. In addition to lectures, seminars and workshops, the festival showcased several projects visualising large data sets, including *On Broadway* and *Selfiecity*. He also held a hackathon dedicated to public transport in the Katowice conurbation.

Participants
including: Steffen Fiedler, Lev Manovich, Dietmar Offenhuber, Stefanie Posavec, Moritz Stefaner, Stephan Thiel

Partners
Netizens Digital Innovation House, Academy of Fine Arts in Katowice

documentation

artbits.pl

This unique new book explains the basic principles of data-driven projects, such as data acquisition, processing and visualisation methods, which can be used in city research and exploration.

The selection of texts and Medialab Katowice's overall programme policy both spell a precisely defined problem area, namely urban culture exposed to the digital challenge, i.e. the city, which aspires to becoming an equal partner for digitisation (with all its industries, mythology, policies and technologies), rather than being merely its consumer or tax collector. The line-up of authors includes some of the field's household names, but also those emerging commentators, whose presence may come as something of a surprise to many readers. Contentwise, the book provides an interesting selection of both ground-breaking views on the current status of digital and urban culture and a number of articles offering practical guidance. Thanks to that, it will certainly be of use and interest to practitioners (activists, animators, producers, educators), researchers and popularisers of media projects. I am convinced that the book will prove a valuable reference resource to all students of humanities, social studies and engineering who seek to qualify as urban planners, specialists in social communication, journalists, IT specialists, artists, architects, designers, sociologists, etc.

Piotr Celiński, Ph.D.

ISBN: 978-83-63304-87-4