Smart City Governance - AI Ethics in a Spatial Context

Select papers from 2021/2022

Larsson, Stefan; Tanqueray, Laetitia

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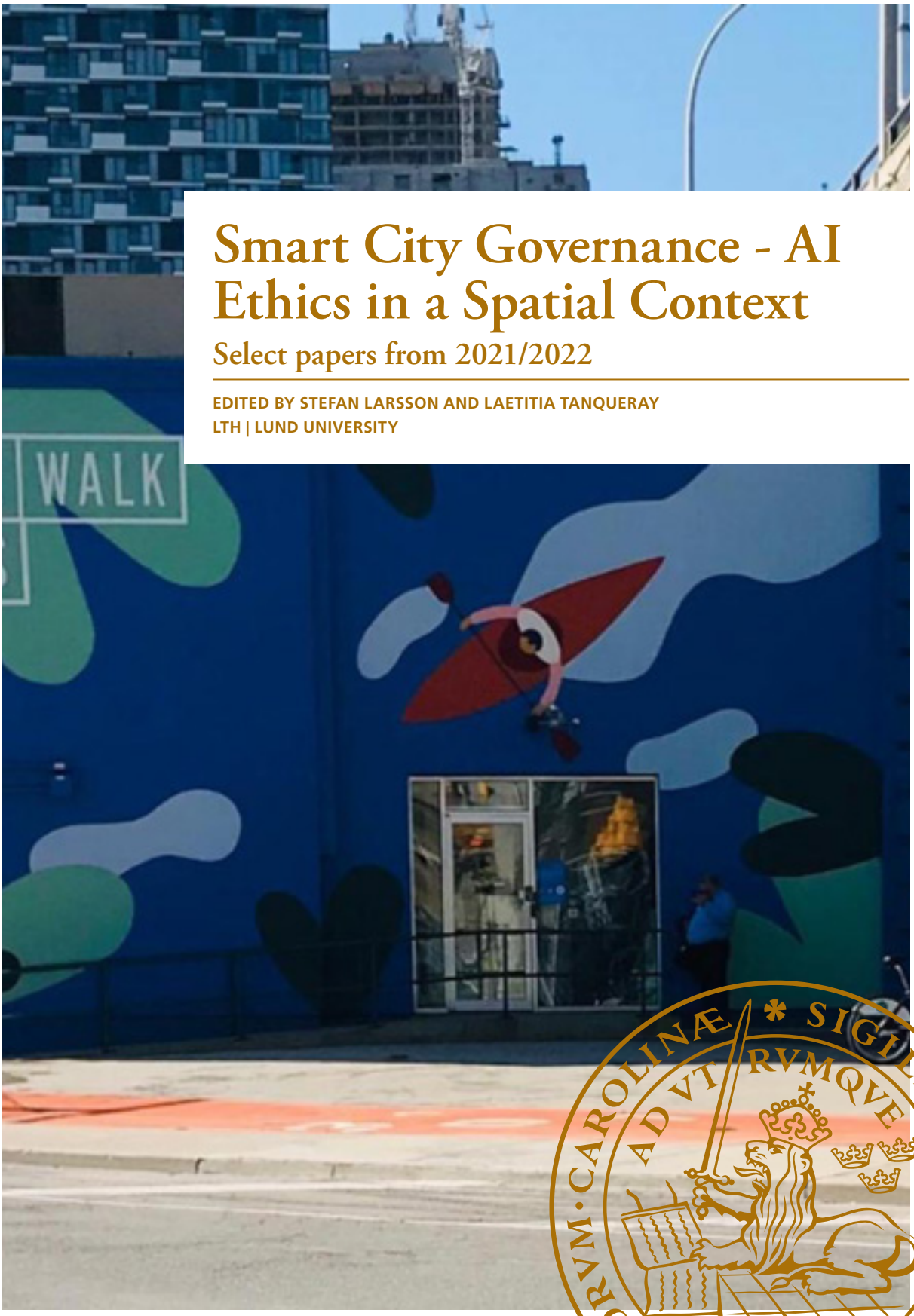

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Select papers from 2021/2022

EDITED BY STEFAN LARSSON AND LAETITIA TANQUERAY
LTH | LUND UNIVERSITY

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LUND
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Stefan Larsson, Laetitia Tanqueray (eds.)

Smart City Governance: AI Ethics in a Spatial Context

VFTN75; TFRO60 2021/2022

LTH, Lund University 2022

Cover Photo: Kalle Pettersson

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1 Foreword

This volume presents select papers written by students in the 2021/2022 version of the course on *Smart City Governance: AI Ethics in a Spatial Context* at LTH, Lund University, Sweden. The purpose of this volume is to show the framework of the course and display what types of papers can be produced from it, primarily, perhaps, for next years' students.

Stemming from the interface between the Division of Real Estate at the Department of Technology and Society and my own research in the fields of governance issues relating to autonomous and AI-driven technologies, the course had its inaugural semester starting the fall of 2020 for its very first time. By that point, the global pandemic made teaching and learning online part of the normal routine. Writing this in January of 2022, I'm looking back at a course where most lectures in November and December 2021 were taught on campus even if hybrid or all-online teaching was used occasionally. This enabled us to actually visit a nearby city proclaimed to become a "smarter city": Helsingborg!

Despite the infancy of this course – only running for two years now – we have managed to expand the students allowed to take this course. The first year combined students from three different civic engineering programs; on data, land surveying and ICT. In an effort to create a truly cross-disciplinary take on aspects of technologies in cities, this – second – year also invited students from outside the engineering faculty, from the humanities and the social sciences. Next year we hope to include students from the architectural program as well.

This meant a combination of syllabi, with the engineering students (in what's known as VFTN75),[1] and the non-programme students in the "free-standing" course (TFRP60).[2] From a student perspective everything was combined, and more so, the assignments and the final papers were generally written in groups of three. These groups were assigned randomly with the only rule that the students should share student background as little as possible, to ensure diversity of thought. So, all groups included at least one that was not from the engineering faculty.

[1] https://kurser.lth.se/kursplaner/21_22%20eng/VFTN75.html

[2] https://kurser.lth.se/kursplaner/fk_2021_ht/TFRP60.html

I'd like to thank the inquisitive students for reaffirming my belief in the need for more interdisciplinary and critical teaching on applied technologies. Furthermore, Laetitia Tanqueray, better known as Tish, has been absolutely central for the setting up and running of this course. I am also very grateful for the additional supervision from my PhD students Kashyap "Kash" Haresamudram and Kasia Söderlund. Lastly, much of the teaching was done by the fantastic guest lecturers – so indispensable for the fulfilment of the course's interdisciplinary ambitions. Thank you!

January, 2022, Malmö

Stefan Larsson

2 The Balancing of Urban Technologies

The course finds itself at an important intersection, which involves multidisciplinary perspectives on technological solutions, see Fig. 1. The illustration shows the various aspects that are considered in the course. Each of these bubbles represents different considerations. The technological part includes artificial intelligence (AI) and predicting methodologies, along with image-recognition. It also rather unavoidably includes data collection practises and other aspects of the broader perspective on digitisation and platforms. The second bubble is around the spatial context, particularly the urban area. Here the purpose is to look at current "smart" applications in various cities (e.g. Helsingborg) as well as how technology is used in prospective "smart" international cities. The final bubble concerns issues of governance, and should be seen as a wide critical frame to conceptualise and theorise on the other two: How are urban technologies governed? How, for example, are privacy, participation or transparency relevant here? What notions of AI governance have emerged recently, and how do they relate to an urban/spatial context? The course's ambition is to converge these areas into one, which hopefully enables students to critically appreciate the intricacies of balancing interests and innovations.

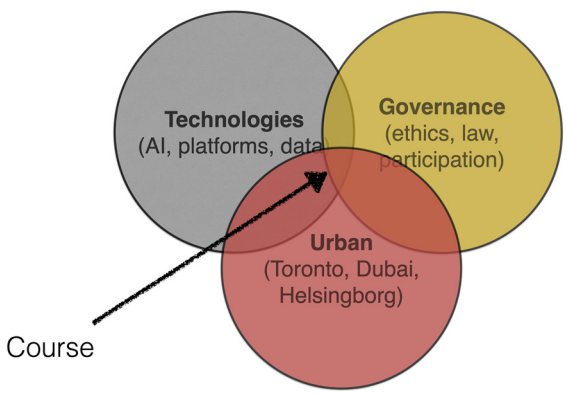

Figure 1: The course as a Venn diagram.

As put in the syllabus, AI is "increasingly being used to change our cities and manage traffic and movement, meet the needs of commerce, combat crime, monitor individuals and improve our everyday lives. At the same time, legal, democratic and ethical interests need to be balanced against technical needs for optimization". This means that the course is attempting to reflect upon balances between different interests and values

more than attempting to follow any notion of optimisation of urban technologies. That is:

> How may individuals' privacy and rights to codetermination be balanced against development and employment of learning technologies (machine learning / AI) dependent on a lot of data? What is the main legal framework and what ethical guidelines should preferably be adhered to? What degree of explainability and transparency is reasonable towards citizens, and in what ways do expectations and perceived benefits differ in different parts of the world?

In order to address these types of questions, the course utilises both a range of invited guest lectures from various fields, as well as literature offering critical views on the interface between new technologies, society and governance, for example on participation (cf. Cardullo & Kitchin, 2019) and "platformisation" (cf. Andersson Schwarz, 2017; Barns, 2020).

2.1 Smart cities and digital urbanism

Within the collective term "smart cities", one finds a number of technologically grounded ideas about how data collection and its analysis can assist with the city's challenges. The promises offered by the smart city have been expressed as the smart city offering "technological solutions to urban problems" (Kitchin, Cardullo, & Di Feliciantonio, 2019), which echoes Yevgeny Morozov's critical analysis of the platform society's "technological solutionism" (Morozov, 2013), and calling for reflection and perhaps a reframing of how we regard and understand smart cities. At the same time, there is of course much less sensitive sensor-based data collection involved too, for example in traffic management and maintenance of sewage infrastructure, and a number of other areas.

The difficulty in striking balances of interests can arise in traditional surveillance issues that are played out with newer technologies – not least face recognition for use in public cameras. There is also critical insights in the literature on challenges with discrimination and bias that risks being reproduced in predictive data-driven policing tools, so-called predictive policing (cf. Shapiro, 2019). These types of high-risk uses, including the facial recognition in public spaces, are also amongst the most debated topics in the proposal for an AI Act put forward by the EUropean Commission in April 2021.

The governance perspective may also include private/public complexities, including aspects of who has access to what data, for what purpose, and ultimately how we should

understand the shapes and forms of public management in digitised times. This is related to control, issues of *infrastructuralisation* and even competition policy (cf. Larsson, 2021), not least in relation to a commercial development of the publicly controlled urban planning and management of cities, exemplified by the Toronto Sidewalks project (Goodman & Powles, 2019). The value and importance of large amounts of data is emphasised in some research in smart cities (cf. Green, 2019; Sadowski, 2020), including the lack of transparency and *scrutinability* in algorithmic processes (Brauneis & Goodman, 2018).

One critical interface concerns the border or the conceptual transition from citizenship to *consumerism*, and what this would entail in terms of civic rights and public participation (Cardullo & Kitchin, 2019). The concept of *the platform* has been highlighted in relation to a Google-related company focusing on urban development (Barns, 2020; Goodman & Powles, 2019), which also relates to the privatisation of city administration (Cardullo & Kitchin, 2019). All of these conceptual issues can be used to better reflect upon and analyse implications of smart city initiatives.

2.2 Lecturers in 2021/2022

In order to ensure a truly interdisciplinary perspective, we invited a number of guest lecturers.

- **Fredrik Heintz**, is a professor and AI researcher in computer science, Linköping University, who lectured on trustworthy AI.
- **Carl Piva**, CEO of Internetstiftelsen, lectured on sustainability issues from a global perspective.
- **Dalia Mukhtar-Landgren**, is a senior lecturer and researcher in Political Science at Lund University who held a lecture based on her research in urban mobility.
- **Anna Felländer**, founder of AI Sustainability Center, gave a guest lecture and exercise on ethics-based AI-assessment together with **Andrea Risberg** and **Jonathan Rebane**.
- **Jannice Käll**, is a senior lecturer at the Dept. of sociology of law, Lund University, and gave a lecture on spatial and material aspects of law.
- **Johan Linåker**, holds a PhD in computer science and is a researcher affiliated with RISE and Lund University. He lectured on open source and open code in relation to the public sector.
- **Kasia Söderlund**, a doctoral student at LTH's Department of Technology and Society focusing on the legal aspect of AI Transparency and Consumer Trust, gave a lecture on privacy and data protection.
- **Jonas Andersson Schwarz**, an associate professor in media and communication at Södertörn University, gave a lecture on platforms and technological control.
- **Lars Harrie**, professor, researcher and lecturer in geographic information science, Lund University, gave a lecture on digital twins.

In addition, the students wrote a paper in groups of three or four, supervised by Laetitia "Tish" Tanqueray, Kashyap "Kash" Haresamudram and Kasia Söderlund.

2.3 Showcasing students' work

This course requires teachers to bring concepts to life and bridge disciplines together. However, this course would not be what it is without the students. The rest of this anthology will showcase papers that reflect the objective of this course. It demonstrates that despite having the same assignment, they all interpreted smart city governance differently and adapted to each other's skills. The first paper titled "Citizen Participation in the design of Superblocks in the Smart City of Barcelona" considers

citizen participation, but with a critical take on what a citizen is, in the context of replanning initiative in Barcelona. Whilst, the second, titled "Am I under investigation? The use of automatic facial recognition technology in Swedish policing and its implication for the right to privacy" investigates facial recognition technology through issues surrounding privacy within Sweden. Finally, "Public Participation in Smart City Developments: A Case Study on Malmö's Smart Map Project" set out to bridge citizen participation and open source data projects in the context of Malmö.

As an epilogue to this anthology, we have also included a student's (Pontus Westerholm's) assignment based on a missed seminar, in the format of a task. The seminar was a role play between students who impersonated various stakeholders when creating a smart city: some were citizens who were sceptical of new technology; some represented the interest of big corporations; others represented lawyers and politicians. This exercise demonstrated the nuances to smart cities and the not-so-clear-cut answers in order to implement seemingly smart solutions. Pontus wrote the task in the shape of a pre-Socratic dialogue on smart city development.

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3 Citizen Participation in the Design of Superblocks in the Smart City of Barcelona

Citizen Participation in the design of Superblocks in the Smart City of Barcelona

Joanna Liljedahl Hildebrand, Ylva Kjellberg and Judith Baeta

VFTN75/TFRP60 Smart City Governance: AI Ethics in a Spatial Context
Lund University

6 January 2022

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1. Background

In the last two decades, there has been a boom in the number of smart cities across the globe, but predominantly in the Western world. A definition of a smart city is one that "*seeks to improve city life through the application of digital technologies to the management and delivery of city services and infrastructures and solving urban issues"* (Kitchin, Cardullo, & Di Feliciantonio, 2019). However, one of the main critiques from the recent proliferation of smart city projects has been the prioritisation of market-driven high-tech solutions, often imposed by governments and city planners which serve the benefits of private corporations, rather than solutions truly grounded in civil society. Thus, while most smart cities claim to be "citizen-centric", what that means and how that is implemented in practice is oftentimes not articulated (Cardullo & Kitchin, 2019).

Notwithstanding, Barcelona has gained recognition for transitioning from a first- to a second-generation smart city shifting the focus from a more traditional neoliberal technology-driven type of solutions towards a strategy that emphasises non-technological aspects (March & Ribera-Fumaz, 2018) and is characterised by a high degree of citizen participation (Cardullo & Kitchin, 2019). An example of this ambition is the Barcelona Superblock project which represents the transformation of the urban model into a new city structure where citizens are the central players. The vision of the City Council is that Superblocks become a citywide initiative developed through direct dialogue and involvement from residents, associations and organisations. As a result, Barcelona does not only stand out from other smart cities in that they put citizens at the heart of the city's smart planning, however, by the way the city aims to engage with and actively involve its citizens in a participatory process.

The goal of the Superblock project is "to create healthier, greener, fairer and safer public space that promotes social relations and the local economy". The increasing environmental pressures from rapidly expanding cities has led to increased attention placed on the role of smart city development to advance sustainability objectives (Escamilla Solano, Plaza Casado, & Flores Ureba, 2016). Barcelona's Superblock project has been developed with a strong sustainability character as it addresses one of the main targets of Barcelona's 'Citizen Commitment for Sustainability 2012-2022' of increasing participation at the citizen-level. Furthermore, Superblocks has been also framed within the scope of the city's Green Infrastructure and Biodiversity Plan and the Urban Mobility Plan of Barcelona (UNDP Croatia, 2016) and it's closely linked to the ongoing 'Pla Canviem pel Clima 2030', another citywide participatory project aiming to encourage an active role of citizens to promote a more sustainable-oriented culture to intensify climate action.

2. Aim and Research Question

The overarching aim of this paper is to explore participation in the context of the smart city. Smart urbanity adds a digital layer that raises the complexity of interactions between citizens and urban life and challenges more traditional forms of participation (Koplin, 2017). We take Barcelona as a case study to analyse the citizen participation in the design of these Superblocks and the research question we aim to answer is:

How is Barcelona involving citizen participation in the design of Superblocks?

Participatory designs have increasingly been argued to become an integral part of smart city initiatives and the most suitable approach for experimental visions for cities (Concilio & Rizzo, 2016). In addition, to ensure an inclusive (smart) city, it is crucial to have representation of all groups of citizens in the design process (Jacobs, 1969). Therefore, more participation in the smart city cannot only be only achieved through the implementation of new technologies and it needs to reconsider ways to involve groups of citizens that are at a higher risk to be left out in the process of transformation to smart urban environments, like the elderly, migrants and lower-income communities, or children (Koplin, 2017).

An important part of this paper also includes attempting to clarify what is Barcelona's definition of citizens and which actors are explicitly included in the process of developing the Superblock. We use the scaffold of smart city participation developed by Cardullo & Kitchin (2019) as our main analytical framework to assess how citizens are incorporated and positioned within Barcelona's smart city Superblock project, the different roles they play, and the extent to which this initiative represents the transition to a second-generation model of a smart city.

The remainder of this paper is structured as follows. Section 3 introduces the main theoretical concepts and provides a brief review of the literature related to participation in smart cities. Section 4 explains the methodology and data used in the paper. Section 5 presents the case study of Superblocks in Barcelona. Section 6 develops the analysis of the case study in relation to the theoretical framework and discusses the main aspects of participation. Finally, section 7 concludes.

3. Theoretical Framework

A smart city differs from a traditional city with its smart approaches and solutions using information and communication technology (Schuler, 2016). Its goal is to find more efficient solutions to utilities such as electricity, water, and traffic systems by collecting and processing data. With sensors and other devices, the data is collected and then transferred using either wired or wireless networks and finally processed and analysed by a system that then can predict what will happen next. By doing so the city can become more sustainable and solve other urban issues (Schuler, 2016).

In the rapid development of smart cities, there is increasing pressure on involving the citizens. Many smart cities are produced by states sponsored by corporations and their intentions are not always what is most valuable for the citizens (Cardullo & Kitchin, 2019). Therefore, citizen participation should be implemented in different steps of the development of a smart city to achieve an open and engaged society in a democratic way. Today, many smart cities claim to be citizen-centric, but in reality, the citizens are only considered as end users, and they are not part of the innovative stages (Capdevila & Zarlenga, 2015). Although the technical solutions are implemented by humans, they should not be solely responsible for what affects everyone (Schuler, 2016).

It seems that citizen participation is not binary, where a city either has it or not, but rather a scale. Cardullo and Kitchin created the so-called "Scaffold of smart citizen participation" as a tool to critically examine smart cities from the perspective of citizen involvement, illustrated in Figure 1. The scaffold is based on a conceptual ladder formulated by Sherry Arnstein in 1969, whose aim was to analyse citizen involvement in the planning process of cities (Arnstein, S. R., 1969). The scaffold is, however, broadened to fit the modern city and its belongings. There are four different forms of citizen participation: citizen power, tokenism, consumerism, and non-participation. These levels are illustrated vertically to the left-hand side of the scaffold where citizen power is the ultimate form of participation and non-participation is least significant. On the top of the scaffold there are different columns representing categories, with the first one being the level of participation. The second is role, which represents who is part of the different forms of participation. Thirdly, citizen involvement is illustrated in the different levels and describes how the citizens are engaged in smart initiatives. The fourth column shows the political discourse and the last column, modality, is how the citizens are situated towards the smart city. Initiatives are often taken by city administrators or corporations in the bottom half of the table and in the upper half, the initiatives are formulated by various groups of citizens and are more expected to fail.

<table>
<tr><th colspan="2">Form and Level of Participation</th><th>Role</th><th>Citizen Involvement</th><th>Political discourse/ framing</th><th>Modality</th></tr>
<tr><td rowspan="3">Citizen Power</td><td>Citizen Control</td><td>Leader, Member</td><td rowspan="2">Ideas, Vision, Leadership, Ownership, Create</td><td rowspan="2">Rights, Social/Political Citizenship, Commons</td><td rowspan="3">Inclusive, Bottom-up, Collective, Autonomy, Experimental</td></tr>
<tr><td>Delegated Power</td><td>Decision-maker, Maker</td></tr>
<tr><td>Partnership</td><td>Co-creator</td><td>Negotiate, Produce</td><td rowspan="2">Participation, Co-creation</td></tr>
<tr><td rowspan="3">Tokenism</td><td>Placation</td><td>Proposer</td><td>Suggest</td><td rowspan="5">Top-down, Civic Paternalism, Stewardship, Bound-to-succeed</td></tr>
<tr><td>Consultation</td><td>Participant, Tester, Player</td><td>Feedback</td><td rowspan="2">Civic Engagement</td></tr>
<tr><td>Information</td><td>Recipient</td><td rowspan="2">Browse, Consume, Act</td></tr>
<tr><td>Consumerism</td><td>Choice</td><td>Resident, Consumer</td><td>Capitalism, Market</td></tr>
<tr><td rowspan="2">Non-Participation</td><td>Therapy</td><td rowspan="2">Patient, Learner, User, Product, Data-point</td><td rowspan="2">Steered, Nudged, Controlled</td><td rowspan="2">Stewardship, Technocracy, Paternalism</td></tr>
<tr><td>Manipulation</td></tr>
</table>

Figure 1. The scaffold of smart citizen participation (Cardullo & Kitchin, 2019).

Another key aspect that needs to be considered is who is included as a citizen in a smart city. A citizen is clearly defined by Cambridge Dictionary as *"a person who is a member of a particular country and who has rights because of being born there or because of being given rights, or a person who lives in a particular town or city"* (Cambridge Dictionary, 2021). However, when referring to citizen participation in a smart city, there are contradictions to the statement that everyone is included. In smart city projects, it is often noticed that all groups of citizens are not included, such as children and migrants (Koplin, 2017). Cardullo & Kitchin (2019) divide citizens into three groups, 'general citizen', 'absent citizen' and 'active citizen'. The general citizen is a homogenous group of people who is typically white, male, heterosexual, without disabilities and middle class. They are usually seen as the consumers of services. The absent citizen is the contrariety to the general citizen, someone with individual thoughts, identities, values, and experiences, and is often not included in the implementation of citizen-centric smart cities. An active citizen is a small group of people who are entrepreneurial and willingly active in the innovation and implementation process. This could be by attending hackathons and other events, often sponsored by the private sector. Although the active citizens are a small group, they are often

referred to in smart city documents as citizens which could be seen as misleading (Cardullo & Kitchin, 2019). Being able to attend and contribute to a hackathon requires former knowledge in tech and coding and is therefore a retrained activity. Smart districts or buildings are often exclusive and in gated areas, which excludes a large number of citizens who cannot afford to live there (Cardullo & Kitchin, 2019). This results in the implication of a citizen being even more exclusive in terms of smart city participation.

Finally, there is an increasing amount of migration to cities every year, which implies more negative challenges, both economic, social, and particularly environmental (Escamilla Solano, Plaza Casado, & Flores Ureba, 2016) which is putting pressure on cities to prioritise sustainability aspects in their future smart initiatives. Escamilla Solano, Plaza Casado, & Flores Ureba (2016) analysed three Spanish smart cities with the aim to investigate their sustainable management. Conclusions were made that citizen participation together with environmental management are critical pillars in a smart city. Stratigea, A. et. al. (2017), discusses the challenges in the Mediterranean areas, such as high population density and having attractive tourist destinations putting pressure on local natural resources and affecting the environment as well as being a climate change hotspot. Without being able to reverse the troublesome circumstances, major efforts are needed and therefore smart cities and their solutions are especially desirable in the area (Stratigea, A. et. al., 2017).

4. Methods

The methodology chosen for this paper is qualitative research which allows us to make a more in-depth and nuanced analysis. We will develop a case study on the concept of Superblocks in order to examine the participatory aspects of Barcelona as a smart city. Superblocks were introduced in Barcelona as early as 1993 and can be defined as areas within the city, smaller than neighbourhoods, where car traffic is heavily limited and road space is instead repurposed for green spaces and low impact forms of transport such as walking or biking. The reduction of private vehicles allows for more space for recreation, improved air quality, and reduced noise levels within the Superblock. As mentioned in *Mobility Infrastructures in Cities and Climate Change: An Analysis Through the Superblocks in Barcelona* by Lopez et al. (2020), Superblocks are a low-tech and relatively low-cost operation in the making of a smarter city. No buildings need to be demolished or even remodelled, and the repurposed road space can be converted for other uses easily.

This paper assesses the extent of citizen participation in the design of Superblocks and aims to draw some initial conclusions regarding the effectiveness of these methods. This aim serves to

deepen the knowledge regarding citizen participation in smart cities and which and how measures could be implemented to achieve this. However, the narrower approach we have chosen for this case study means that some important aspects in the search for participation-specific content that are included in the process of creating and evolving Superblocks will fall outside of scope.

We acknowledge that a complete analysis of Superblocks would require to touch on a much broader number of subjects such as tech, transparency, privacy, and open data and open-source solutions which are key aspects of Barcelona's digital transformation strategy (Barcelona Digital City, nd). Furthermore, improving sustainability in the smart city is an integral part of the Superblock strategy, including environmental, social, and economic dimensions. However, the broadness of these concepts cannot be fully explored through the lens of participation.

Instead, we focus on participatory processes and their implications in spatial governance in Barcelona. Furthermore, a narrower scope means that we can achieve a more in-depth analysis of the specific topic we are researching, in the very particular context of Barcelona's Superblocks. The case study, together with our research question, allows for more targeted research into how the concept of citizen participation ties in with the implementation of Superblocks.

Data

The main data chosen for this research is secondary data sourced from official documents and reports as well as other information available in the City Council and project websites. While a significant part of this data is available in English, we were able to utilise other sources that were only in Spanish and/or Catalan as well thanks to these being the native languages of a member of the writing team. We also complement this data with existing literature and academic papers based on searches on LUBsearch.

Due to time constraints, it has not been possible to organise interviews with relevant stakeholders involved in the Superblocks project which may act as a limitation to the depth of the analysis. However, in order to get a representative picture, we would have needed to interview several representatives from the different groups of stakeholders involved such as residents, commuters, local businesses, public authorities, among others to contrast their different perspectives. To overcome this potential limitation, we have used the scaffold of smart citizen participation (Kitchin & Cardullo, 2019) as a critical analytical framework. Finally, any conclusion reached is based on connecting the theoretical framework outlined above with practical examples from the Superblock initiative.

5. The Case Study

As mentioned above the Superblocks are redesigned areas of the city, where car traffic is heavily reduced and road space is repurposed into mainly recreational spaces. Superblocks have since their creation been used as a frame, opening possibilities to implement highly local measures relating to a number of fields. Sustainability often lies at the core of the implementations of Superblocks, usually in combination to make the city more citizen-friendly. Reclaiming car spaces does not only allow for space for recreation, but it also makes it possible to increase both canopy cover and the number of green areas in the inner city.

Superblocks thereby address the sustainability aspect from several angles, the most obvious one being reducing car traffic and thereby emissions. In addition to this, the increased canopy cover serves several purposes, from providing shade to the citizens during the summer heatwaves, to reducing the urban heat island effect and thereby the amount of energy needed to cool homes and other indoor spaces in the summer (Lopez et al., 2020). The increase in green areas also means an increase in permeable surfaces, improving the city's ability to cope with heavy rainfall and reducing the risk of flooding. The increase in pedestrian-only areas has also proved beneficial to local businesses, keeping the inner city alive. Steps are also taken to revive neglected old industrial areas and buildings, creating new hubs for innovation and economic growth (Ajuntament de Barcelona, nd).

As illustrated in Figure 2 below, the implementation of a Superblock drastically reroutes traffic along its perimeters, decongesting the inner parts of the block and freeing up space for playgrounds, green spaces, public outdoor gyms, and pedestrian and cycling lanes. The design is made to prioritise walking as a form of transport above other forms, followed by cycling and public transport, with private vehicles at the bottom (Lopez et al., 2020). The city's 2024 Urban Mobility Plan, which has gained initial approval, aims to increase sustainable forms of transport and match this with a corresponding decrease in journeys by private vehicle from 26.04% to 18.48% by 2024 (Ajuntament de Barcelona, 2021). The undergoing Superblock projects will also lead to one million square metres of road space being "opened up to citizens" (Ajuntament de Barcelona, 2021).

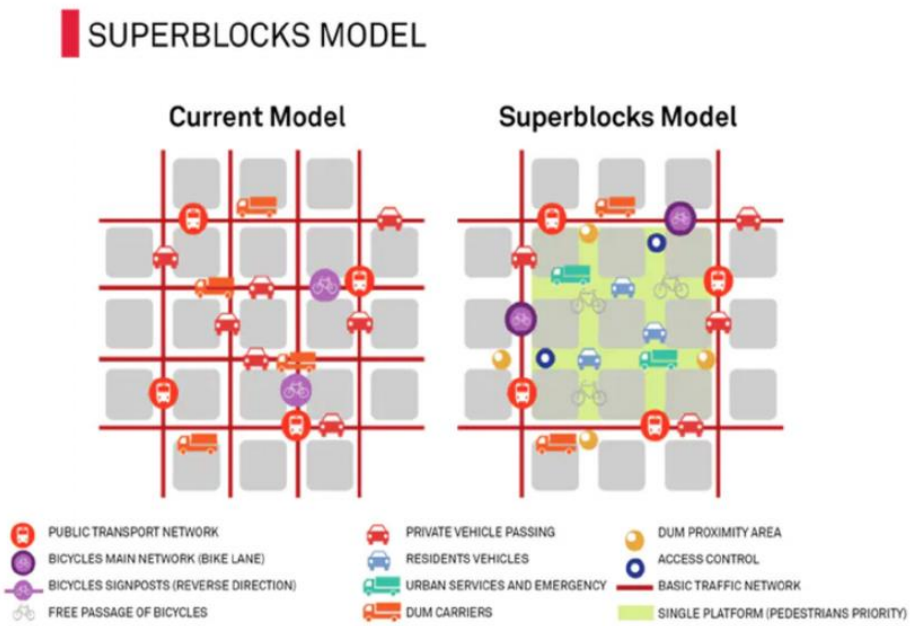

Figure 2. Superblock mobility model (Lopez et al., 2020).

Public opinion on the implementation of Superblocks has varied. Out of the first Superblocks to be approved and implemented, two out of three faced strong opposition from the beginning. During the implementation of the two Superblocks in Vila de Gràcia in 2006, the opposition was met with some 150 meetings, a majority of which took place in the evening to allow more people to participate, where citizens could voice their concerns and learn more about the project. Eventually, the initial proposal was accepted. Similarly, the introduction of the Poble Nou Superblock led to opposition from affected citizens, mainly due to the removal of bus stops and the expected increase in traffic along the Superblock perimeter (Lopez et al., 2020).

In 2018 three more Superblock initiatives were approved, in San Antoni, Les Corts, and Hostafrancs, none of which faced such opposition from the civil society. The Superblock initiative continues to expand to include more areas and has since 2015 been a central part of Barcelona's strategy to improve the city for its citizens, in a sustainable way (Lopez et al., 2020). Looking into the future, Barcelona is aiming to redesign 21 streets by 2030, starting in 2022, and the 2024 Urban Mobility plan outlines a vision for the creation of 503 Superblocks in the future (Postaria, 2021). However, as we point to later in the discussion, the transformation of the urban space remains

rather concentrated in certain areas of the city and might not involve and benefit all citizens equally.

6. Analysis & Discussion

A platform for participatory processes in Barcelona

In an effort to uphold the democratic values, uphold the plurality of opinions and encourage active citizen participation, the City of Barcelona has created the 'Citizen Participation Regulation' (Ajuntament de Barcelona, n.d.), a set of guidelines with the aim to provide a number of different channels and opportunities to ensure citizens' right of participation. Based on these guidelines, the participatory process in Barcelona involves a series of meetings organised during a previously delimited period of time to promote debate and contrasting arguments between the citizens and/or municipal representatives. These participatory processes can be initiated top-down by the City Council as well as a result of bottom-up citizen initiatives. Furthermore, all the participatory processes are published and updated in the online platform "decidim.barcelona"[1] (translated as "We decide Barcelona") to ensure transparency, openness and collaboration.

Partially addressing the question of who is considered a "citizen" in this participatory process, we observe that any individual over the age of 14 years old is allowed to register in decidim.barcelona online platform, at no cost, by providing an email address. Individuals can keep the anonymity of their contributions by using an alias as their user. Thus, citizen, in this case, is defined in a relatively broad sense and, for example, it could include commuters who work in the city but reside outside the limits of the municipality. The Citizen Participation Regulation, however, establishes a narrower definition of a citizen when it comes to initiating one of these participatory processes as it is a requirement to be officially registered as resident in the municipality.

Furthermore, barriers directly related to the accessibility to digital platforms can hinder the degree of citizen participation. For example, the need to own or have access to a smart device with an internet connection as well as a relative degree of digital skills to be able to navigate the interface. Language may also act as an important barrier as the platform is only available in Catalan and Spanish which may exclude migrants and tourists.

[1] https://www.decidim.barcelona/

Participation in the Superblock initiative

The Barcelona Superblock initiative corresponds to a participatory process formally initiated by the City Council in February 2021. The process has been designed around four main phases and has involved a diverse group of actors and participatory actions presented in the following discussion. The information regarding the different phases is publicly available through the portal decidim.barcelona under the initiative "Superilla Barcelona a l'Eixample"[2]

Table 1. Summary of the participatory process for Superblocks

What is being decided?	The general criteria for the urban transformation of the superblock model.
Who is participating?	Open to the general public; residents, businesses, and associations in the area; sectoral organisations with a city vision.
How are decisions being made?	The objective is to collect feedback and insights for the elaboration of a document that determines the new criteria for public space and for the preliminary special projects of key city nodes.
Initiating group	Barcelona City Council
Timeline	01 February 2021 - 31 December 2021
Phases	Phase 1. Diagnosis Phase 2. Proposals Phase 3. Feedback Phase 4. Monitoring

Starting with a diagnosis, the goal of the initial phase was to define the main criteria for the new model of urbanisation considering aspects such as new public infrastructures, proximity and accessibility and environmental relevance. For this purpose, an interactive and collaborative map was published in the decidim.barcelona portal to gather citizen feedback reflection relative to the areas of the Superilla (Figure 3). The diagnosis was complemented by several participatory actions such as informative sessions open to all citizens and other activities in the public space such as informative carts on key strategic streets to raise awareness and encourage citizen participation (Figure 4).

[2] https://www.decidim.barcelona/processes/SuperillaBarcelona/steps

Figure 3. Interactive map of Barcelona Superblock for the diagnosis phase. Available at decidim.barcelona

Figure 4. Informative carts on key strategic streets to inform citizens. (Betevé, 2021)

Based on the insights and information collected during the diagnosis, the second phase corresponds to the elaboration of proposals for the new design of public spaces within the Superblock. To incorporate the perspectives of citizens, local businesses, and associations the Council has continued to organise thematic walks around the neighbourhoods and exploratory walks to also capture the gender perspective in the perception of the city spaces and how to shape future

planning. In addition, there have been open meetings of the different working groups held in public spaces such as squares throughout the summer and a survey was conducted with local businesses.

Furthermore, with the aim of involving professional and technical players in the project and fostering innovative ideas, the City Council organised two parallel design competitions themed around proposals for green streets/hubs and squares. The objective was to find simple and resource-efficient solutions that integrate nature and biodiversity with simple and resource-efficient spaces designed for people at the heart. The competitions received over 80 submissions together and winners were chosen by a jury (Ajuntament de Barcelona, 2021)

The third phase consisted of a feedback phase on the outcome of the proposals received in the previous phase. A compilation report was shared with all participants in the process and discussed between the promoting groups of the initiative. These sessions were open to the general public to attend and streamed online due to the ongoing pandemic. Finally, the participatory process will conclude at the end of this year with the drafting of the executive projects and the initiation of the works. At the same time, the different neighbourhood groups will hold meetings with the drafting and operating teams to monitor and validate the actions.

Superblocks within the framework of the scaffold of smart citizen participation

In this section, we turn to the scaffold of smart citizen participation by Kitchin & Cardullo (2019) to analyse the Superblock initiative in terms of citizen participation. In this framework, 'Citizen Power' is classified as the ultimate representation of citizen participation in the process of design and creation of a smart city, however, it is oftentimes hard to find real practical examples in key decision-making processes (Kitchin & Cardullo, 2019).

In the case of Barcelona, we have seen how the City is making strides towards a form and level of participation characteristic of 'Citizen Power', mainly with the creation of the 'Citizen Participation Regulation' and the decidim.barcelona platform. This is particularly noticeable in the political discourse which strongly links the need for citizen participation with values of democracy, pluralism, equality, and inclusivity. In addition, it creates a formal mechanism to channel bottom-up citizen initiatives. Nevertheless, the process appears to be highly bureaucratic with several requirements and formal steps to it which often hinders citizen engagement whereas more experimental and dynamic forms of citizen participation such as 'living labs' or 'hackathons' tend to be more engaging (Kitchin & Cardullo, 2019). Moreover, as pointed out before, the existing mechanisms may be limiting participation to more vulnerable citizen groups (Koplin, 2017).

This tendency to more formal and bureaucratic processes of citizen participation in Barcelona is also reflected in the analysis of the participatory process for Superblocks in the previous section. This initiative in particular has been initiated top-down by the City Council and participation is

included along the way. While the ambition appeared to be to create spaces for citizen discussion and co-creation, our analysis shows that, in general, the level of participation is closer to 'consultation' or 'placation' as citizens are requested to provide feedback on proposals and we have also identified opportunities for citizens to provide alternative suggestions in open meetings and the interactive maps for example. In any case, these forms of citizen participation are closer to 'Tokenism' (Kitchin & Cardullo, 2019).

When it comes to the role, citizens are rarely positioned as leaders or decision-makers. Instead, they are closely seen as participants or proposers, or even merely residents as not everyone will have the opportunity to participate in an active manner. Notwithstanding, the design competitions organised by the City Council can be seen as a step towards 'Citizen Power' as it opens the opportunity for citizen involvement based on their ideas and vision for green streets and squares, and selected winners might have the opportunity to enact the 'maker' role in the future. However, these competitions are arguably open to a selective number of citizens with a particular skill set. Initiatives like the information carts and the exploratory walks are meant to bring the general public closer to the project, however, the potential for greater involvement in those is less ambitious. Therefore, the participatory process of Superblocks could have benefited in that sense from running experiments such as 'living labs' where citizens are able to make more active contributions without needing to be highly skilled. It is important to note the context in which the participatory process has taken place as the effects of the Covid-19 pandemic may have limited the opportunities for interaction in physical spaces overcompensating with potentially less accessible digital ways of participation.

Is Superblocks really an inclusive smart city solution for Barcelona?

Thus far, the analysis has mainly focused on the participatory process for the design of Superblocks in Barcelona. However, a final consideration that requires being addressed is whether Superblocks will really provide a more inclusive space for all citizens. Barcelona has a population of 1.6 million within the limits of the city. While the initiative claims to be "citywide", Superblocks are only being developed in the Eixample which covers the areas closer to the city centre in Barcelona where people with higher socioeconomic status typically reside. The peripheral neighbourhoods where most working-class live are not included in the initiative which furthers the risk of exacerbating a dual in the city model where neighbourhoods and citizens are divided by class.

7. Conclusion

Barcelona has gained recognition for transitioning to a second-generation smart city where rather than technological solutions driving the transformation of public spaces and services, the city is putting citizens at the heart of their smart city planning while doing so with a high degree of citizen participation (Cardullo & Kitchin, 2019). The overarching aim of this paper has been to understand citizen participation in the smart city through a qualitative study. For that we have analysed the case study of Barcelona's Superblocks to answer the research question: *'How is Barcelona involving citizen participation in the design of Superblocks?'.* While the assessment of wider digital technologies is not the central part of this study, our analysis of the methods of participation employed by the city has revealed that digital solutions play an increasingly prominent role in the wider transformation of Barcelona into a second-generation smart city. The city has initiated a participatory process to allow citizen participation which can be done mainly through the online platform decidim.barcelona. The City has also developed an interactive digital map to involve citizens in the diagnosis of spatial issues. At the same time, the city also organises regular open meetings and other complementary activities on the streets that have the potential to extend participation to less technology-savvy citizens.

Employing the scaffold of smart citizen participation developed by Cardullo & Kitchin (2019) as an analytical framework we conclude that most of the forms of citizen participation enabled by the City Council are closer to 'tokenism' rather than 'citizen power' as citizens are generally involved as proposers and participants whereas opportunities to co-create are available to a much lesser extent. An exception to this tendency can be found in the two design competitions organised with the goal to involve professional and technical players in the Superblocks project. This not only fostered more innovative ideas but enabled a greater degree of citizen empowerment. However, participation in these competitions requires certain skills and are not directed to a wider citizen audience. We conclude, therefore, that the participatory process of Superblocks could have benefited from running experiments such as 'living labs' that has the ability to engage a wider range of citizens as well as involve them more in a more active manner. Finally, as one of our last reflections, we raise the concern that Superblocks may not lead to a more inclusive city space altogether but instead it will exacerbate already existing inequalities and create a more dualistic model of the city space. Indeed, the Superblocks project is not a "citywide initiative" but it is being developed in areas of traditionally higher socio-economic status whereas peripheral neighbourhoods are outside of the scope of this new urban development model.

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4 Facial Recognition Technology in Swedish Policing and the Right to Privacy

Facial recognition technology in Swedish policing and the right to privacy

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Abstract

In the 'smart city', digital and automated technologies can improve the efficiency of police work. While having the potential to make the crime-solving process faster and increase public safety, they also have the potential to infringe upon the citizen's moral right to privacy. Using two common themes in the literature on privacy in the smart city and in relation to automated methods for policing—firstly increased public safety through efficiency, and secondly panopticism as an effect of increased surveillance—this paper discusses the Swedish Police's use of automated facial recognition technology in criminal investigations from the perspective of privacy of a moral right.

Contents

1 Introduction

The European Commission defines a 'smart city' as "a place where traditional networks and services are made more efficient with the use of digital solutions for the benefit of its inhabitants and business" (European Commission n.d.). With this definition, a smart city could include a vast amount of different types of technological instruments to increase efficiency in city life, including automated digital technologies for police work. While automated technologies have the potential to increase efficiency in criminal investigations, they have a perhaps equally great potential to seriously infringe on citizens' privacy.

Technologies that could be, or to a degree already are, implemented in the domain of security in the smart city are for example digital surveillance systems, centralised control rooms, and predictive policing (Kitchin et. al., 2018). One of the most controversial digital techniques for crime investigation- and prevention used today is facial recognition technology built on artificial intelligence (AI). In the past two decades, tools for automated facial recognition have been taken into use by law enforcement authorities in a range of countries and became a tool used officially by the Swedish Police in 2020 (Frenker, 2020). The increased surveillance and subsequent invasion of privacy that these new methods of policing rely on are frequently discussed in regards to smart technologies within the field of law enforcement (Kitchin, 2014; Kitchin et. al. 2018; Joh, 2018, 2019; Reiman,1995).

Concern over ever-increasing surveillance and how it affects citizens' privacy is not limited to policing. In the wake of the visions of the smart city and the data-driven implementations that are supposed to bring such smartness into being, it is a worry that has been brought up as a response to the very idea of the smart city (Murakami Wood, 2015: Joh, 2019). With the function and abilities of the police as enforcers of the law, the issue is arguably more pressing here than in other fields of society (Joh, 2018), making it especially important to consider from a wider moral perspective, and not only from the perspective of the current law.

1.1 Purpose and research question

The purpose of this paper is to discuss the right to privacy in relation to the use of automated facial recognition technology as an aid in Swedish policing. By using the notion of privacy as a moral right as our point of departure, our aim is to contribute a novel perspective to the discussion regarding the use of automated facial recognition technology by Swedish Police by looking at both how the technology can be justified, and possible issues that could arise from its use. Understanding the right to privacy as a moral right to control access to and use of information

about oneself, the research question that we will attempt to answer is *how does automated facial recognition technology as currently used by Swedish Police relate to the right to privacy?*

1.2 Structure of this paper

The rest of this paper will be structured as follows. In the next section, we will give a brief overview of what facial recognition technology is, how it works, and its use as a tool in Swedish policing. This will be followed by an overview of previous research on surveillance and privacy in the smart city in general, and as related to facial recognition technology as an aid in policing in particular. In the section after that, we will go into some depth regarding privacy as a moral right. In the section thereafter we will critically discuss the use of facial recognition technology as a method in policing through what we have found to be the two main themes in the literature, namely 1) increased public safety through efficiency, and 2) panopticism as an effect of increased surveillance. Finally, in the last section, we will finish with some concluding thoughts.

2 Background

2.1 Facial recognition technology (FRT)

The technology of facial detection and facial recognition has developed rapidly over the last decade. Facial detection is the technique developed to detect faces in video or image material, while facial recognition provides the further function of finding if faces are matching (Fei et al., 2018). FRT can be used to match faces one-to-one to determine if two images contain the same face (verification), or one-to-many to search through a database to look for a match for a specific face (identification) (Selinger & Leong, 2021). Continuous advancements in deep machine learning have aided the development of building AI technology with deep neural networks (Chun-Rong, 2020). These technological advancements have not only proven to be very helpful for developing efficient applications today, but provides reason to believe that the key algorithms that the tools are built upon will continue to improve.(Appleby & Engström, p . 6).

AI applications for FRT require a lot of data to train on to more accurately recognise faces. The training data, which consists of large datasets comprised of images, help fine-tune the key finding algorithms the technology uses when

identifying faces (Zhang et al., 2020). When the application has been trained, it can search for a face in any selected database. Thanks to the training data the deep learning system learns to account for differences in for example size, lighting, pose, and position of the face in the image, meaning the subject in the footage does not have to be directly facing the camera to be identified. When these factors have been neutralised the bio-metrical analysis is performed (Chun-Rong, 2020).

2.2 FRT as a tool in Swedish policing

Swedish police have used software for automated facial recognition since 2019, starting with a case-based pilot study carried out during March 2019 to May 2020, where the system was tested in real criminal investigations (Appleby & Engström, n.d.; Polismyndigheten, 2019). The system is comprised of software from public as well as private actors, and was trained on data sets by these suppliers (Polismyndigheten, 2019). After the pilot study, the technology became approved for continued use by the Swedish Data Protection Authority (Datainspektionen, 2019). However, the use of FRT by Swedish police is still heavily restricted: it can only be used to search through material that has been collected as part of investigations, and it is only allowed to search for faces of people that are in the registry of previously convicted or suspected persons (Datainspektionen, 2019).

The pilot study was a collaboration between several departments and was in dialogue with the Legal Affairs Department and the Swedish Data Protection Authority to assess the legality and privacy concerns pertaining to the project. The aim of the pilot was mainly to develop a framework for and test automated image analysis software for use in criminal investigations, as well as to asses the benefits and legal implications of the implementation of the program in regular police investigations by the Swedish police (Appleby & Engström, n.d.). Although the pilot only tested FRT as used on already collected material, a pro memoria outlining the legal aspects of the pilot does somewhat indicate an interest in development of FRT in real-time (Polismyndigheten, 2019).[1] The framework developed in the pilot is designed to be in pace with growing possibilities for more data analysis and allow for updates of the system when newer algorithms become available. One notable benefit of using the tool includes heavily decreased processing times for analysis of image and video data. In one case the working hours reportedly were decreased

[1] "The research and developmental work is carried out in two tracks … The second track relates to development work at both the IT department and NFC and aims to enable the use of image analysis tools … [The] development includes different types of image analysis tools in order to—in real-time or afterwards in connection with criminal investigations—automatically find or react to the presence of different objects in camera material", (Polismyndigheten, 2019, p. 1). Translated from Swedish.

from 12 working weeks with five analysts, to only three days when one analyst used the new technology. (Appleby & Engström, n.d.)

While the system had no connection to any database containing images connected to known identities when tested in the pilot study, after official implementation the system is used in correlation with the Swedish Police's registry of previously convicted persons, or persons that for some reason are considered as suspects (Signalementsregistret) (Datainspektionen, 2019). The program provides the user with a ranked list of 'best matches' to the input data which are then manually reviewed by the human analyst, and thus no verification of identities is made by the system itself (Appleby & Engström, n.d.). The data that is being analysed and the produced analytical data is stored in a database for a maximum time of 30 days (Appleby & Engström, n.d.; Polismyndigheten, 2019). The organisations' Legal Affairs Department, as well as the Swedish Data Protection Authority (Integritetsskyddsmyndigheten [IMY], formerly Datainspektinen), have instructed the Swedish Police Authority to formulate a code of conduct defining who can use the technology and under what circumstances. An important question is also when it is absolutely necessary to use the tool, as it is deemed important to minimise the processing of biometric data such as faces.(Appleby & Engström, n.d.)

Footage from surveillance cameras is an important source for material in investigations where FRT is used. In 2021 The Swedish Police Authority owned about 420 permanent surveillance cameras placed in public spaces in Swedish cities (Polismyndigheten, 2021), of which 150 were installed in 2020 (Olsson, 2020). More cameras for surveillance of public spaces are wanted by the Police, but have been hindered due to lack of funds (Enström, 2021).

2.3 Previous research

Rob Kitchin (2014) suggests that one emerging concern regarding smart cities in a general sense, is the surveillance society they can create due to the volume of data that are being collected and connected. The digital systems that monitor society today is largely operated independently from each other, making the surveillance fragmented. The move towards integration of systems and data streams to create a more effective city, however, also work to "move the various oligopticon systems into a single, panoptic vantage point" (Kitchin, 2014, p. 13).

While seeing the potential of smart cities as "too great to let a privacy fundamentalist approach prevent their implementation" (Woo, 2017, p. 968), Jesse Woo also highlights the privacy risks due to surveillance that can come with the development of a smart city, noting that putting sensors in public areas have the possibility to "introduce government surveillance technology into the public square at

an unprecedented level" (Woo, 2017, p. 956)

Elizabeth Joh (2019) sees policing as an inherent part of the 'smart city', suggesting that "as cities become 'smarter', they increasingly embed policing itself into the urban infrastructure" (Joh, 2019, p. 178). The inhabitants of the smart city implicitly agree to constant monitoring of their behaviours in exchange for 'smarter' services, making policing not something added on top of other smart city infrastructure, but inherent to the smart city itself. Following this premise, Joh (2019) suggests that policing in the smart city will rely both on public and on private forms of data collection, making it a public-private hybrid model; that this hybrid model increasingly will resemble methods seen in private security as opposed to traditional policing; and that regulatory attempts will put a spotlight on "the growing clash between intellectual-property rights and public accountability" (Joh, 2019, p. 178), as methods will rely on technologies created in the private sector and whose details subsequently are treated as trade secrets.

In a similar vein, Mitchell Gray (2003) argues that systems for facial recognition will alter how privacy is viewed on a societal level, writing that "As soon as society becomes accustomed to a type of surveillance, the reasonable expectation of privacy has disappeared" (Gray, 2003, p. 325). Using Bentham's vision of the 'Panopticon' and theories of discipline in the tradition of Michel Foucault, Gray (2003) argues that a "surveillance-saturated" society foster self-surveillance and, from this, self-discipline by its subjects: with the camera suggesting constant visibility, contemporary panopticism, the internalisation of the watcher's gaze, has the potential to influence citizens' behaviour at a great scale. Ultimately, argues Gray (2003), the challenge in the ever-expanding surveillance society is to balance privacy and security to "prevent security solutions from evolving into greater threats to the urban fabric than the ones they are meant to solve" (Gray, 2003).

3 Methodology

By reviewing previous research on the general subject of privacy in the 'smart city' and on automated facial recognition technology as used in policing both in relation to smart cities and as a topic on its own, we have distinguished two categories, or themes, of commonly brought up points regarding this method of policing and its relation to privacy. These themes are 1) the possibility of increased public safety through the efficiency of the method, which is seen as justification of the infringement on the right to privacy that the method entails, and 2) the move towards a more heavily surveilled society and the related notion of 'panopticism'. The two

themes are used as a base against which we critically discuss the Swedish Police Authority's recently approved use of automated facial recognition as an aid in criminal investigations. This is done from the perspective of privacy as a moral right. We further understand the moral right to privacy as a right to control access to information about oneself in line with Adam Moore's (2008) control- and use-based definition of privacy.

The literature we base the distinction of the two mentioned themes on is predominantly written in a North American and British context. While conscious of differences in the judicial systems, which naturally makes for further differences in what kind of permissions the Police will have to use technologies such as automated facial recognition, we believe that these themes nevertheless are applicable for our discussion.

4 FRT and privacy

4.1 Privacy as a moral right

There is no agreed-upon definition of the meaning of privacy, or why and in what way it is valuable (DeCew, 2018). Philosophical accounts of privacy have often been discussed in terms of access to a person's body and information, either as control over who has it (e.g. Westin, 1967) or others' lack of it (e.g. Reiman, 1995). Privacy is further commonly considered a right, either from the intrinsic value of privacy in itself or by its instrumental value for the fulfillment of some other value, like autonomy or freedom (DeCew, 2018).

The beginnings of the discussion regarding the right to privacy—in a moral sense as well as from a legal perspective—is generally attributed to Samuel Warren and Louis Brandeis's (1890) article *The Right to Privacy* (van den Hoven et. al., 2020: DeCew, 2018). In response to new technologies and business practices, in particular tabloid journalism and photography, Warren and Brandeis (1890) argued that attention needed to be called to practices that had come to invade "the sacred precincts of private and domestic life"(Warren Brandeis, 1890, p. 195). Arguing the case of privacy as a "right to be let alone" based on a principle of "inviolate personality" (Warren Brandeis, 1890, p. 205), Warren and Brandeis (1890) laid the foundation for the concept of privacy as control over information about oneself (DeCew, 2018).

In this paper, we will understand privacy in terms of control over access to information in line with the account of privacy defended by Adam Moore (1998,

2003, 2008), who argues for what he refers to as a control- and use-based definition of privacy. According to Moore (1998), the right to privacy can be understood as "a right to maintain a certain level of control over the inner spheres of personal information" (Moore, 1998, p. 372). More clearly, Moore (2008) defines privacy rights as

> … an access control right over oneself and to information about oneself. Privacy rights also include a use or control feature—that is, privacy rights allow me exclusive use and control over personal information and specific bodies or locations (Moore, 2008, p. 414)

The value of this right, Moore (2003, 2008) further argues, is as a necessity for human flourishing and well-being: by controlling access to ourselves, we give ourselves space to autonomously decide on the direction of our lives and to develop and grow as individuals (Moore, 2008). We will only concern ourselves with the right to informational privacy, as this is what digital technologies largely affect.

Judith DeCew (2018) notes that one aspect that complicates the discussion about the value of privacy and the possible right to it is how privacy while appearing to be valuable exactly for being a sphere free from interference, at the same time can function "as the cloak under which one can hide domination, degradation, or physical harm" (DeCew, 2018). This twofold function of privacy thus makes it conflict with the value of security—a conflict central to the use of automated facial recognition as a way to handle crime.

4.2 Public safety versus privacy infringement

At the heart of the argument for using facial recognition technology as a method in policing lies the notion, either explicit or implicit, of public safety. Using software to accomplish tasks that otherwise would have been performed manually allows the police to become more efficient in their work. As previously mentioned, according to Appleby and Engström (n.d.) one case in the Swedish pilot study managed to reduce 12 working weeks with 5 analysts to three days with one analyst. Additionally, humans tend to have a higher error rate than well-trained AI applications when it comes to facial recognition (Selinger & Leong, 2021). Relying on people's biological capabilities to identify faces from surveillance cameras thus seem to be less efficient measured both in time and accuracy. Implementation of facial recognition technology in the crime-solving process would thus make the work more efficient, arguably leading to increased public safety.

The increased efficiency of the method is how the infringement on privacy has been justified by the Swedish Police Authority and IMY (Datainspektionen, 2019). Before using a new technology that collects and processes personal data in a way that carries a particular risk of infringement on the personal integrity of data subjects, the Swedish Police Authority has to get permission from IMY (IMY, 2021a). According to IMY, it always has to be taken into consideration if the collection and processing of the data is justified, reasonable, and proportional, and the processing of the personal data needs to be proportional to the benefits gained from the use of it (IMY, 2021b, 2021c). However, as the Police's processing of personal information falls under a special law, they do not have to take proportionality into consideration (Polismyndigheten, 2020). That the request by the Swedish Police Authority in this case was deemed to fulfill these criteria is due to the efficiency of the method—according to 2 c. 1 § Brottsdatalagen (SFS 2018:1177), it is permissible for the Police to process personal data if it is necessary for the duty to (for example) investigate or prosecute crime, and *necessary* is in the context interpreted as something needed to perform a task in an effective manner (Datainspektionen, 2019).

On this view, then, the increase in public safety justifies an infringement on privacy to *some* degree, and the degree to which the use of facial recognition tools infringe on privacy is not above that threshold. Taken that this general line of argument is valid, it is still unclear what the degree and type of privacy that it is permissible to infringe upon are, and how much more effective this method has to be in comparison to non-automated methods for the infringement of privacy to be acceptable. This is true not only from a moral perspective, but also legally: from how necessity has been interpreted in this context, it would seem that the effectiveness of a privacy-infringing method would not have to be that much larger to be considered permissible from a legal standpoint, only more so than it would have been to not use said method.

While algorithms for facial recognition might be able to go through and match faces faster and better than a human would be able to, they are by no means infallible. According to Buolamwini et. al (2018) it was found that some datasets (IJB-A and Adience) used to teach AI were largely composed of lighter-skinned subjects (79.6 percent and 86.2 percent, respectively), and that error rates for darker-skinned women (who had the highest error rate) could be as high as up to 34.7 percent higher than the error rate for lighter-skinned men (which had the lowest error rate). As the tool used by Swedish Police provides a list of 'best matches' for a human analyst to examine, the possible risk of erroneously identified people suffering from the mistake is lesser than if no human acted as a control-mechanism—however, depending on how much trust is given to the tool, there are still risks that

people will be harmed through erroneous ”identification”. Although we might like to think we are smart enough to not blindly trust in technology, every news story about a driver that, despite doubt and with disastrous results, followed the directions given by their car’s navigation system should remind us otherwise.[2]

With the possible consequences in mind, perhaps the efficiency should not only be considered from the perspective of efficiency in identifying the right person, but also how this efficiency might mean a higher number of wrong persons are identified too. In recent years, there have been reports of wrongful arrests based on faulty matches by facial recognition tools in the United States. Adding to this, not everyone is equally vulnerable to being harmed due to a bad match (Selinger & Leong, 2021). Going in line with research showing that darker-skinned faces are especially prone to be misidentified by facial recognition algorithms (Buolamwini & Gebru, 2018), the people arrested due to a false match appear to predominantly be Black (see for example news reports by General & Sarlin, 2021: Hill, 2020a, 2020b). We see no reason to believe that the algorithm used in the Swedish Police’s facial recognition tool would go against the current and perform equally well on darker-skinned faces as on lighter-skinned ones. Further making the harm disproportionately distributed in the Swedish case if there is a false match that is taken as true, is the fact that the tool only is allowed to search against the registry of faces belonging to previously convicted or suspected persons (Datainspektionen, 2019), thus increasing the risk of a specific group being harmed.

It should be noted that harm due to a false match getting verified by a human analyst is not something that is inevitable in the Swedish case. However, as this is something that has already happened elsewhere, the possibility of this being a consequence should be taken into account even if the risk is slim. But, even if the technology were to be good enough that it never misidentified a face—and so never gave a human the opportunity to act on a false match—the question remains if the direction this would take society in is something that we truly want. This will be discussed in the next section.

4.3 Surveillance and panopticism

As the very purpose of the police’s use of facial recognition technology is to keep track of and find people, it is no surprise that a frequent theme in the discussion

[2]Examples of this phenomenon include tourists being misled by their GPS to drive into the Pacific (Fujita, 2012), approximately 100 cars getting stuck on a muddy dirt road after following a suggested detour around heavy traffic by Google Maps (Lopez, 2019), and, disastrously, a man following GPS directions and driving off a partially demolished bridge, killing his wife that was in the car with him (Holley, 2015).

surrounding the implementation of automated facial recognition methods concerns the possible effects of increased surveillance. A common concern in response to law enforcement's use of digital, automated technologies for surveillance is that the increased surveillance of citizens is a move towards a 'panoptic society' (Gray, 2003; Reiman,1995; Kitchin, 2014). While this type of concern overall is future-oriented, focusing on the impact on society if the technology is expanded to, for example, allow for real-time facial recognition, it covers the more conservative use of automated facial recognition too.

First conceptualised by Foucault in the highly influential work *Discipline and Punish*, published in French in 1975, 'panopticism' is a societal state where external surveillance has become internalised by the citizens, leading to self-disciplining of behaviour (Foucault, 2008). The name comes from Jeremy Bentham's vision of the 'Panopticon', a circular prison building designed to function with a single guard placed in a central watchtower. The architecture of the Panopticon promotes constant visibility of the prisoners by the guard, while the prisoners in turn are unable to see the guard. By not knowing when they are being watched, yet being aware of the possibility of it happening, the purpose of the design is to make the prisoners behave as *if* they were being watched at all times, and so regulating their behaviour thereafter (Bentham, 1838-1843, pp.37-173).

Foucault (2008) uses the Panopticon as a metaphor for the system of power and social control that he argues permeates everyday life in general, not only the lives of prisoners. Like the prison is designed to move the enforcement of orderly behaviour from an outside authority to within the prisoners themselves, the possibility of being watched in the panoptic society influence the citizens to self-regulate their behaviour: by knowingly being visible, argues Foucault (2008), a person "assumes responsibility for the constraints of power; he makes them play spontaneously upon himself; he inscribes in himself the power relation in which he simultaneously plays both roles; he becomes the principle of his own subjection" (Foucault, 2008, p. 7).

The notion of panopticism as used to discuss modern surveillance technology focus both on the metaphorical single vantage point created when different types of information from several places can be aggregated and used to construct a digital representation of a person's life (Reiman,1995), and how this might come to influence behaviour in an undesirable way such as choosing to not participate in public political activities due to the possibility of being surveilled (Selinger Leong, 2021). Following Moore's (2006) understanding of the right to privacy as control of access and use of information about oneself, any non-agreed to surveillance is an infringement on privacy to some degree, even if it not necessarily is a big enough infringement to be a harm to our well-being as such. However, since the

non-agreed to surveillance in a panoptic society is constant in the sense that it has become internalised, this surveillance could possibly be a big enough infringement on our privacy rights that it would harm us by, to some degree, hinder our chance to flourish by affecting our autonomy, and thus decrease our well-being.

The permitted use of software for facial recognition by Swedish Police is currently relatively limited in comparison to the actual possibilities of the technology as it is not allowed to be used in real-time, as well as only being allowed to match faces in the registry of criminal suspects and persons convicted of crimes. However, the possible privacy infringement is not restricted only to the people in the registry. Following the concept of panopticism, just knowing there is a possibility that you could be captured on camera makes for a form of internalised surveillance, thus expanding the infringement on privacy outside of the facial recognition alone. As the effectiveness of the method comes from the capacity to go through large amounts of video footage quickly, the incentive for the Police to increase the number of surveillance cameras in public spaces is large. It could be argued that it is here, in the quickly increasing number of cameras that capture material and so might come to instill a sense of perpetual surveillance, more so than in the actual facial recognition software, that the privacy infringement will occur on a large scale.

5 Conclusion

Digital surveillance technologies have the potential to increase efficiency in criminal investigation, but any argument from the point of efficiency has to be viewed against the complex of values society holds as important. The double nature of privacy as valuable as a sphere of inaccessibility by others, while at the same time being a condition that can be used to cause harm, makes the issue of when and where it is morally permissible to infringe upon the right to privacy in the name of security difficult. The contrasting values of security and privacy somehow need to be balanced against each other, but how this balance should look is a hard question to answer.

From a citizen's perspective, it is difficult to make a moral judgment supported by fact about the reasonableness of how the police are using facial recognition software to aid investigations. The amount of information known to the public on how the technology is used in Swedish policing is low, making it hard to know exactly how privacy-related issues connected to the use of such tools are thought about and handled. Further, the guidelines and framework that constitute the boundaries

for the use of facial recognition technology in Sweden are, perhaps necessarily, vague, and could be bent to fit a lot of different situations. What is seen as 'reasonable and proportional' or 'necessary in the investigation context', as the legal framework and ethical guidelines require, can easily change—especially when the societal view on privacy changes.

The private sphere progressively shrinks in time with every implementation of a new 'smart' technology, and especially so when it is done by authorities with special permission to process personal data. This will arguably be magnified in a city built to be 'smart', where there could be potential for the Police to access cameras placed in public spaces as a part of providing smart services. Technology for digital, automated surveillance is improving with great speed, and the use of it is quickly becoming normalised with money seemingly being a larger constraint to its expansion than moral objections based on privacy rights. As a technology with the possibility to change the view on and state of privacy, the question of its use should be considered from a wider moral perspective, not only from the perspective of the current law.

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5 Public Participation in Smart City Developments: A Case Study on Malmö's Smart Map Project

Public Participation in Smart City Developments: A Case Study on Malmö's Smart Map Project

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1 Introduction

Malmö city municipality is one amongst many globally who are using digital information technologies to improve the efficiency of the city. Such developments have cities labelling themselves as smart cities. Such developments are a topic of discussion in academic literature where normative perspectives argue that such developments can improve the efficiency of the city, whilst critical scholars ask: efficiency for whom? One such smart city development in Malmö is an online map project called Smarta Kartan which presents lesser known locations that city dwellers can visit to participate in the sharing economy. The project vision saw an inclusion of city dwellers in the map by implementing in person participation and way for people to contribute by interacting with the code. In practice this vision did not play out as planned. This case then covers the visions and practice of participation in Malmö's Smarta Kartan project.

1.1 Background

1.1.1 Smarta Kartan

Smarta Kartan is a map initially created for Gothenburg by an association called Kollaborativ Ekonomi Sverige together with the municipality of Gothenburg. The idea with the map is that it shows services, places and activities within the sharing economy for the citizens to encourage other solutions than ownership. It is later introduced in other cities as well, including Malmö. The intention of the map is to make it easier for citizens to live sustainably and to get involved in the sharing economy. The map is a digital tool created for citizens to facilitate sustainable lifestyles in the city, and can therefore be considered as a tool within the smart city. What we mean with a Smart City is further described in the theory section. One key concept within the broader Smart City concept is that of participation. Participation is notably one of five core values presented on the website of Smarta Kartan, which makes it interesting to study this on the case. Openness and inclusion are two other values for the project, wherein the map is an Open Source project. The nature of open-sourceness, as it relates to; participation, openness and inclusion for the project are then also focus points for this paper.

1.2 Aim of paper

The purpose of this report is to critically analyse Smarta Kartan from a participation perspective. This is important because the direction that a city takes in its development should not be decided upon by a select few experts. Instead the people who live in the places that are being changed should be able to participate in the decision making process and development. This report then has the potential to shed light on what is and is not going well in terms of participation for projects like Smarta Kartan. It can also be of use for bettering the degree of participation in the development of Malmö and its Smart City developments. First, we need to define what we mean with participation. Thereafter, this is used in order to analyse the concept in the case of Smarta Kartan, where much attention is paid to Open Source and how this is related to participation within the project.

1.3 Research questions

- How does the vision of participation match the practice of participation for Smarta Kartan?
- How have residents of Malmö participated in the development of Smarta Kartan?

2 Relevant work

A study by Maria E. Cortés-Cediel, Iván Cantador and Manuel Pedro Rodriguez Bolivar (2021) addresses the lack of research on citizen participation in the Smart City arena. To fill this gap, the authors studied research literature on 149 smart cities initiatives in Europe and how participation is used within these initiatives, to increase knowledge about participative models of governance. For their study, they base the analysis on five variables introduced in the methodology, in summary these variables are: the time context, the six dimensions of smart cities defined by Giffinger, Fertner, Kramar, and Meijers (2007), the level of participation, the role of the stakeholders (mostly citizens) and participative tools. They differentiate creative and non-creative cities and bring this aspect through the analysis and conclusion, as well as the six dimensions. The dimensions by Giffinger et al. are smart mobility, smart economy, smart environment, smart governance, smart people and smart living. The article is interesting for our report to get better insight into participative models and how citizens have been engaged in other projects in smart cities. The article is also helpful in understanding different components of participation. The authors state that participation in smart cities is attracting more and more attention (Cortés-Cediel et al., 2021).

The level of participation within smart cities has been further studied by Paolo Cardullo and Rob Kitchin (2017). They developed the participation ladder by Sherry Arnstein into a scaffold, a useful conceptual framework that can be used to analyse different aspects of smart citizen participation along four core themes; Non-participation, Consumerism, Tokenism, and Citizen power. This scaffold can give insights for our case study, as a helpful tool to examine to what extent participation has taken place for the case.

It was difficult to find a literature on the role that specifically Open Source plays in Smart City developments, however, a paper covers this topic in the context of Hämeenlinna, Finland. A paper by Jari Jussila et al. (2019) conducted a case study on the city of Hämeenlinna. It focused on a Smart City app which included local events, traffic information, library cards, local news and other local services. It was created and is operating using an open API[1] where anyone could have live access and connection to the data and people could input data about local happenings as well. Experiences with this project and the results achieved in this project found that it had a positive impact on developments towards a smarter and more open region. This project is relevant to our project because the local events section of the app was successful in improving the region with an Open Source system that allowed open access to the code and data, as well as allowing for public participation in what should be included in the app as well as contributing to the data (Jussila et al., 2019).

3 Theory

3.1 The Smart City

The Smart City is discussed in the covered literature via paradigms that see smart cities as having potential for optimising various dimensions of cities. It is also discussed via critical perspectives that highlight the potential of Smart City developments to further the development of cities into neoliberal spaces for accumulation, and the potential to undermine city residents rights to privacy and freedom.

3.1.1 *Smart City Definitions*

When defining the Smart City, we find it useful to briefly define the city. The city is a complex web of relationships between people, their environment, and the past and present means/modes of production/reproduction of economic and social life. From here we can introduce some examples of definitions for smart cities. The city is thus far more than the concrete and roads. The following statements are then a selection of Smart City definitions:

"A city can be defined as "smart" when investments in human and social capital and modern transport and communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance." - (Arroub, Zahi, Sabir & Sadik, 2016, p. 2) "A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens." - (Arroub et al., 2016, p. 2) "Rios's approach is based on an architectural lens. He sees Smart City as a city that

[1] Application Programming Interface = a software interface that offers services to other software

gives inspiration, shares culture, knowledge, and life, and motivates its inhabitants to create and flourish in their own lives." - (Nam & Pardo, 2011, p. 284)

3.1.2 *Smart City Discourse*

The Smart City is often conceived of simply in terms of the technology being applied to an urban space (Zubizarreta, Seravalli & Arrizabalaga, 2016). We find it useful to briefly introduce the various topics discussed in the normative literature for developing a broader understanding of the Smart City paradigm (its critics) and models. Arroub, et al. (2016) explains the way that smart cities, in the city development context, have the three dimensions of technology, people, and community. Shelton, et al. (2015) did an exhaustive quantitative literature review of 200 texts in the Smart City literature and found that "smart infrastructure", "smart economy & policy", "smart technology", "smart sustainability", and "smart health" were the most relevant streams of discussion. These topics could also be understood as some of the most topical components/dimensions in the smart cities literature. Zubizarreta, et al. (2016) instead discuss four dimensions of the Smart City. The first being "economy" and it is discussed in terms of its relationship to competitiveness. Next they discuss "people", and the way that this dimension relates to social and human capital. "Living" is the next dimension, it is discussed in relation to the life quality of its citizens. Lastly, "governance" is discussed as a dimension of the Smart City, and it is discussed in terms of the participation of its citizens.

3.1.3 *Smart City Perspectives*

To understand Smart City perspectives, it is useful to situate them in the problems that they are reacting to. Humanity is becoming more and more urbanised, the United Nations Population Fund estimates that by the year 2030 the global urban population will reach 5 billion, with 50 percent of us living in cities since 2008 (Nam & Pardo, 2011). This meaning, that more and more consumption, production and living is being done in cities. It is also useful to consider that city planners and engineers have been working to employ scientific (and often grandiose) methods to increase the efficiency of urban spaces for well over a century (Kitchin, Cardullo & Di Feliciantonio, 2019; Shelton et al., 2015). The contemporary and normative Smart City perspective then sees digital tools of connectivity, optimisation and decision making as a leap forward that can tackle the many risks and challenges associated with 21st century urbanisation (Kitchin et al., 2019; Arroub et al., 2016). This normative paradigm has attracted criticism for numerous reasons. Kitchin, et al. (2019) summarise these critiques eloquently; the critiques are then related to how the normative Smart City perspective often: "frames the city as systems rather than places; takes a technological solutionist approach; enacts technocratic forms of governance and reshapes governmentality; promotes privatisation of city services; prioritises the values and investments of vested interests; reinforces inequalities; produces a number of ethical concerns relating to surveillance, predictive profiling, social sorting and behavioural nudging; and potentially creates security vulnerabilities across critical infrastructures" - (Kitchin et al., 2019, p. 3) Such critiques have then received feedback. In one part, by those operationalising smart cities as they have worked to frame the Smart City as being citizen or community centred (Cardullo & Kitchin, 2017). They have also been critiqued based on the generalisation/assumption of; capitals influence over city governance, the entangling of neoliberal ideologies with technocratic governance, and its emphasis on dystopian mass surveillance systems (Shelton et al., 2015).

3.1.4 *Fairness, Accountability and Transparency*

With technology being applied to an urban space in the Smart City, this means that algorithmic systems are a part of the Smart City. With algorithmic systems, fairness, accountability and transparency are important aspects to deal with. These aspects are observed and will be the topic in the ACM Conference on Fairness, Accountability and Transparency (ACM FAccT)[2]. This conference will gather researchers and practitioners to discuss these things in socio-technical systems. Furthermore, the High-Level Expert group on Artificial Intelligence, set up by the European Commission, has outlined guidelines for AI being trustworthy. These guidelines say that an AI system should be lawful, ethical and robust to be trustworthy (High Level Expert Group on AI, n.d.). In the guidelines, both fairness, accountability and transparency are mentioned as some of the seven key requirements for AI systems being trustworthy. Although Smarta Kartan is not an AI system, these issues can still be important to have in mind, as it is a socio-technical system.

[2]See the conference website: ACM FAccT (facctconference.org)

But the issues around these concepts are mainly connected to the algorithms behind the systems in artificial intelligence, which make these concepts not directly relevant to Smarta Kartan, and thus will not be focused on in this report. Furthermore, it is an Open Source project, the code is out there for everyone to see, this is then a high degree of transparency.

3.1.5 *Data Protection*

Privacy and data protection are important issues to handle within the Smart City. In the European Union (EU), the European General Data Protection Regulation (GDPR) must be taken into account by every organisation that handles and collects data. Data protection must be considered for everything an organisation does "by design and by default" according to article 25 (European Parliament, 2016). Processing of data is only allowed if it can be justified through article 6, where consent is essential (European Parliament, 2016). For any non-essential data to be collected the data collector must obtain informed and active consent from the data subject (Planet49, 2019), and any non-essential data storage and processing should be done within the EU, or in a country offering equally good data protection. As of 2020 the US is not considered to offer adequate data protection (*Facebook Ireland Ltd and Schrems*, 2020).

3.2 Participation

In the previous subsection (3.1) participation is brought up and named as an important concept within the Smart City context. Sherry Arnstein wrote in 1969 an article in Journal of American Institute of Planners about citizen participation. According to her, participation is the cornerstone of democracy (Arnstein, 2019). In the article, Arnstein presents a ladder of participation. The ladder describes the typology of citizen participation and categorises different forms of participation into levels, illustrated on the different rungs of the ladder. The ladder is a useful tool to analyse the nature and extent of participation. According to Arnstein, there are eight levels of participation; manipulation, therapy, informing, consultation, placation, partnership, delegated power and citizen control (Arnstein, 2019). The levels of participation is divided into three groups, which is non-participation, tokenism and citizen power (Arnstein, 2019).

The Scaffold of Smart Citizen Participation updated by Cardullo P. and Kitchin R. (2017) is an extension of Arnstein's ladder adapted to the 'Smart City' . The authors adds 'consumerism' to Arnstein's three forms of participation and one more level of participation, referred to as 'choice'. Further, they re-structure the ladder into a scaffold by adding columns, since they argue that the ladder lacks dimensions of "the type, role, function, political discourse/framing, and modality of citizen participation in the neoliberal, entrepreneurial city" (Cardullo & Kitchin, 2017, p. 4), see figure 1.

Much of the contemporary critical literature can be linked to the idea of the right to the city, e.g. Cardullo and Kitchin (2017), and Kitchin et al. (2019). The right to the Smart City is an extension of this concept of the right to the city. The right to the Smart City is useful for highlighting issues of participation related to changes to the city aligned with the Smart City paradigm (Kitchin et al., 2019).

3.3 Open Source

Open Source software is software that, in addition to having published source code, is allowed to be downloaded, edited and redistributed by anyone[3]. The foundational idea of Open Source is to release code to be freely used, improved and developed in collaboration, making use of everyone's competence rather than just the single developer. Contributions to an Open Source project can be paid for, but some projects can also be sustained purely on programmers' will to improve them (Bonaccorsi & Rossi, 2003).

3.3.1 Open Source in practice and best practices

In practice, Open Source projects are made accessible on a code-hosting website based on a version-control system, such as the website GitHub which is built on Git[4]. Websites such as GitHub offer tools to facilitate sharing and contributing to code. When publishing an Open Source repository[5] on GitHub there are practices referred to as *best practices*. Including *Contribution Guidelines*, *README* and an appropriate *Licence* for the code are considered *best practice*.

[3]See: https://opensource.org/docs/osd
[4]https://git-scm.com/
[5]repository = storage location for software files including code, text files and metadata

Form and Level of Participation		Role	Citizen Involvement	Political discourse/ framing	Modality	Dublin Examples
Citizen Power	Citizen Control	Leader, Member	Ideas, Vision, Leadership, Ownership, Create	Rights, Social/Political Citizenship, Commons	Inclusive, Bottom-up, Collective, Autonomy, Experimental	Code for Ireland, Tog
	Delegated Power	Decision-maker, Maker				Civic Hacking, Hackathons, Living Labs, Dublin Beta
	Partnership	Co-creator	Negotiate, Produce	Participation, Co-creation		
Tokenism	Placation	Proposer	Suggest		Top-down, Civic Paternalism, Stewardship, Bound-to-succeed	Fix-Your-Street, Smart Dublin Advisory Network
	Consultation	Participant, Tester, Player	Feedback	Civic Engagement		CIVIQ, Smart Stadium
	Information	Recipient	Browse, Consume, Act			Dublinked, Dublin Dashboard, RTPI
Consumerism	Choice	Resident, Consumer		Capitalism, Market		Smart building/ Smart district
						Smart meters, Mobile/locative media
Non-Participation	Therapy	Patient, Learner, User, Product, Data-point	Steered, Nudged, Controlled	Stewardship, Technocracy, Paternalism		Dublin Bikes, Smart Dublin
	Manipulation					Traffic control

Figure 1: The Scaffold of smart citizen participation (Cardullo & Kitchin, 2017)

The *README* file is the first file that is displayed of your project, and while there are no rules as to what it should contain, it is customary for it to act as an introduction to your project aimed at someone seeing it for the first time. The *README* often states the goal of the project, a summary of the file structure and points you in the direction of the *Contribution Guidelines* (Prana, Treude, Thung, Atapattu & Lo, 2018). *Contribution Guidelines* are as the name implies, instructions for how to get involved with the project. A project following *best practices* will have something called an *issue tracker* where all the current issues are displayed. Standard *Contribution Guidelines* will direct the user to the issue tracker where they can pick a problem they think would be nice to solve, and instruct them to create a *fork*[6] where they can start to write their solution. As a general rule, projects will encourage developers to work on one small issue at a time rather than changing a lot of code at once. The instructions will then continue to guide the user through the process of creating a *pull request*[7] and clarify what the process is for *reviewing*[8] and *merging*[9] that *pull request*. Projects adhering to these practices signal that they are serious, and are more open to contribution (Qiu, Li, Padala, Sarma & Vasilescu, 2019).

In order for a project to be considered legitimate Open Source its licence needs to be approved by `opensource.org` (Open Source Initiative, n.d.-a). Examples of approved licences, listed from least to most permissive are GNU General Public License (GPL), Mozilla Public License (MPL), MIT License and MIT No Attribution License (MIT-0). Releasing code under MIT-0 is comparable to a public domain dedication and is recommended over Creative Commons Zero (CC0) licence (commonly used for film, music and data) due to concerns over possible conflicts with patent rights which could backfire against developers using Open Source components in their programs (Open Source Initiative, n.d.-b). If you still wish to use CC0 for software it is recommended to add a notice in each file of the project detailing the code author, their email address and a description of the file as well as a note that the developers dedicate as much copyright and warranty as legally possible to the public domain (Creative Commons, 2016).

3.3.2 Community smells

Community smells are a sign that a project is lacking something on an organisational level, and often lowers the quality of the code and quality of the community. Open Source projects are at risk of three smells in particular (Tamburri, Palomba & Kazman, 2019)

[6] fork = clone of the code

[7] pull request = requesting for the owner of the "real" project to look at the solution in the clone and add it to the "real" project

[8] reviewing = ensuring that the solution is correct and compatible with the "real" project

[9] merge = add the change to the code

1. **Black cloud effect**: Lack of structured cooperation and communication leads to information overload.
2. **Organisational silo effect**: Shut off areas of the developer community who do not communicate except through one of their members.
3. **Lone wolf effect**: One member of the developer community going rogue and implementing features without consideration for other developers.

A project with these smells will deter new developers from joining, which in turn reinforces the smells (Tamburri, Kruchten, Lago & Vliet, 2015).

4 Methodology

The study will employ a critical realist methodology which utilises a mixture of qualitative information. Critical realism in social science generally prefers qualitative methods which focus on case studies (Bagley, Sawyerr & Abubaker, 2016). For this purpose, a qualitative case study on the project of Smarta Kartan is conducted. To get better insight on the work of Smarta Kartan, a smaller document analysis is done. For a deeper understanding of the project, different actors are also interviewed; both a representative from the project in the municipality of Malmö, and Kollaborativ Ekonomi Sverige. Critical realism is a useful epistemology to support our work as it recognises the validity of the information sources used in this study. The qualitative information we employ can then be conceived of as being important sources of knowledge, insofar as they portray the conceptions of the practice and visions of the Smarta Kartan Project that the participants/writers communicate.

Kollaborativ Ekonomi Sverige is the initiator of the map. They are a civic association who want to promote and facilitate a collaborative economy, and they believe in asset before ownership regarding both consumption, production, knowledge and finance[10].

4.1 Document analysis

4.1.1 Steering documents

The documents are sourced from the Municipality of Gothenburg, who were involved in the creation of the map together with Kollaborativ Ekonomi Sverige. The document analysis method was relatively simple, considering that the volume of text analysed this is seen as appropriate. The analysis then consisted of reading the texts and extracting information which was seen as being relevant to the research questions.

4.1.2 The website

In order to investigate how smartakartan.se uses cookies we opened the website in a cleared browser[11] and looked at *Inspect>Application>Storage>Cookies* and compared this to Smarta Kartan's cookie policy[12].

4.1.3 Smarta Kartan Code

We also analysed the code available on GitHub, both the current version 3.0[13] and the previous (version 2.0)[14]. Information deemed relevant to the research questions was then extracted from this source.

4.2 Interviews

Three semi-structured interviews were conducted. One person from the municipality of Malmö, named as Participant 1 in this report and two persons from the association Kollaborativ Ekonomi Sverige, named as Participant 2, are interviewed to get a deeper understanding of the project. Dr. Johan Linåker, a Postdoctoral researcher at Lund University and a Senior Researcher at RISE Research Institutes of Sweden, is also interviewed as an expert in the areas of Open Source

[10] see the association's website: https://kollaborativekonomi.se/
[11] chromium
[12] https://www.smartakartan.se/cookies
[13] https://github.com/GoteborgsStad/smartakartan3.0
[14] https://github.com/GoteborgsStad/smartakartan/tree/d341c79d7619150ae9358aed12bec7d7908c7b9d

Software and Open Data. This was done to better understand the meaning of Open Source within the concept of participation.

4.3 Limitations

The interviews and document analysis methods have some limitations. In regards to the interviews, it would have been preferable to interview more people for this study, but due to the limit of time this was not possible. The interviews were also conducted in Swedish, and are not translated into English, this will result in minor miss-translations as this report is in English.

In terms of the document analysis, the steering documents are in Swedish, this will also result in minor mistranslations. However, translation issues have not raised any serious concerns. The analysis of the code is limited in that the version of the code on github does not appear to be used for the website (see subsection 5.2.2). In general, it is important to note that dealing with qualitative sources, that the analysis is subject to the belief's, worldviews and theoretical perspectives of the researchers.

5 Findings

In this section, we will present our findings from the case study. Both the document analysis and interviews have contributed to insights into the project and how participation has been practised. This section is then divided into three subsections. The first subsection is focused on the core value of participation based on the vision and perspective of Kollaborativ Ekonomi Sverige, the association that initiated the map and is leading the development of it. The first section also focuses on non-technical participation. Here the vision and general aim for the work with the map is presented, with findings from the documents and interview with the association. The next subsection focuses on technical participation via Open Source. These findings are based on both interviews with the association but also from the actual repository, namely by looking at the licence, code and structure of it. The last subsection presents findings about Smarta Kartan specifically in Malmö, and is mostly based on the interview with Participant 1.

5.1 Map Jams

According to the core values of Smarta Kartan, participation is important for the project. The association's aim according to the 'Cooperation' document, is to have a democratic structure on all levels for the association around 'Smarta Kartan' and to employ co-creative methods. The Cooperation document mentions the so-called "map jams" as one way that they work with co-creative methods. The map jams are not described in detail in the document. However, it is said that map jams are a method from an American association called Sharable, which the association behind Smarta Kartan (Kollaborativ Ekonomi Sverige) have adapted to their project. Map jams are conducted when the map is entering a new geographical area. Each project has a local project leader. Anyone from the geographical area is invited to the map jams. The map jams were further described in the interview with one of the board members from Kollaborativ Ekonomi Sverige, Participant 2. He said that the map jams usually are very appreciated by the participants. Usually they have about five map jams. The first event of a map jam is an introduction and presentation of Smarta Kartan. Thereafter, they divide the participants in different groups and place the groups at different tables. On the tables is a note with a category on. Each group is given time to brainstorm, research and talk about places that should be visible on the map for the geographical area related to the category. The groups gather their result and create a gross list each. After the session, the project leader collect all gross lists to go through them and begins thinning the suggestions made by the participants, based on the selection criteria, which is described in the document Selection Criteria. Participant 2 made clear that it is important that the map jam is held at the right time for as many as possible to be able to participate. He also stated that they want participants from all parts of the city.

5.2 Open Source

The Smarta Kartan Open Source community, in its current state, does not exist. Based on the interview with Participant 2 this is not due to a negative attitude towards Open Source, but rather a lack of resources and technical knowledge in the project development group. No one in the association has much knowledge in code, so when the code has been developed, they have hired

a freelancer/consultant. The source code for Smarta Kartan v 3.0 is available on GitHub[15] under a CC0[16] licence. The repository has not had any activity since autumn 2020 and the only code committed comes from developers hired by Smarta Kartan. According to Participant 2, they have realised that the code is very complex which is a problem since only their developers are familiar with it.

5.2.1 Contributing to the Smarta Kartan code

The Smarta Kartan README only contains a link to the Smarta Kartan website and a brief list of the components that make up the project. The code itself is sparsely commented, and the large size of the project makes it difficult to read without a guide. Open Source projects of high structural complexity[17] such as Smarta Kartan are less likely to attract contributors than more modular[18] projects (Midha & Palvia, 2012). The lack of explanations for the code creates a barrier for contributors (Qiu et al., 2019; Prana et al., 2018). The repository also lacks Contribution Guidelines, and following the standard community practices is not an option for new developers as the Smarta Kartan repository has an empty issue tracker.

5.2.2 Openness of the Smarta Kartan code

While the code for Smarta Kartan is available for everyone to read and fork, the development of the code has not been. The code was updated from version 2.0 to version 3.0 by creating a completely new GitHub repository and uploading the finished source code to that new repository all in one go. The code being developed and updated in a private setting can also be seen through how the code on GitHub is version 3.0, while `smartakartan.se` cites the source code as being version 3.1.6 (see Figure 2), a version which is not available to the public.

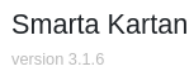

Figure 2: Screenshot smartakartan.se 2021-12-15

5.2.3 Open Source licensing

The code for Smarta Kartan is under the Creative Commons 0 licence, which puts it in public domain. Smarta Kartan has not followed the guidelines on how to adapt the licence to suit software.

5.2.4 Personal data and GDPR compliance

Smarta Kartan uses Google Analytics to gather information on how their website is used. Google Analytics uses American servers to process data, which is not GDPR compliant. Smarta Kartan states that they do not trace individual users, but upon checking the browser it appears they use *_ga* and *_gid* cookies which distinguish users and are considered personal data according to the GDPR (Google Analytics, 2021; Planet49, 2019). The cookie consent form (see Figure 3) acts as a pre-checked box by only offering an "OK" option and also website begins tracking before the option has been clicked. The consent notice does not inform the user what type of cookies are used, for what purpose or who they will be shared with. Smarta Kartan advises users to disable cookies in their browser if they wish to opt out. Due to the use of Google Analytics and lack of information and consent Smarta Kartan's cookie policy is not currently GDPR compliant (Planet49, 2019).

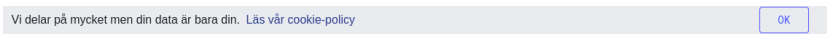

Figure 3: Screenshot smartakartan.se 2022-01-06

[15] https://github.com/GoteborgsStad/smartakartan3.0
[16] Creative Commons Zero v1.0 Universal (Public Domain)
[17] structural complexity = amount and association of files
[18] modularity = division into subsets

5.3 Smarta Kartan in Malmö

The main participation, or co-creation concept with map jams are used in all developed projects in every geographical area, so this has been carried out in Malmö as well. From what appears in the 'Cooperation' document, the development of Smarta Kartan is led by the association Kollaborativ Ekonomi Sverige together with licences of various degrees. Both according to the association written in the 'Cooperation' document and Participant 1, the cooperation and work around 'Smarta Kartan' are run in different ways depending on the geographical area. In the interview with Participant 1, it appeared that the work and cooperation in Gothenburg City have been handled differently than the cooperation in Malmö. The reason for this is according to Participant 1 that the map was originally created in cooperation with the municipality of Gothenburg, and today someone that belonged to the association is now working at the municipality, which means that someone there is familiar with, and interested in the work and development of Smarta Kartan. The impression is that the cooperation with the citizens and the continuity at this aspect has not been working as well in Malmö as in Gothenburg. Participant 1 brought up that there had been, for them, some problems with the licence between them and the association, and that there was administrative reasons for the situation. Malmö's intention is to eventually hand the map over, fully to the citizens. However, this has not been possible. Further, it seems, based on the interview with Participant 1, that Malmö has not had as many map jams as the vision of the association. From what Participant 1 remember they have had three. But Participant 1 mentioned that they are planning to contact the university in Malmö to cooperate with students in the future. Today there is no longer an editorial board for the project in Malmö, which they had in the beginning.

6 Discussion

6.1 Question One

The first question is: how does the vision of participation match the practices of participation of Smarta Kartan? The vision of participation is made clear in the document analysis in the sections on the vision and cooperation, and the interviews with the representative from Malmö and the association. The section of the document analysis on the vision most relevant to the question details bringing people together to facilitate a sustainable lifestyle, by increasing participation in the sharing economy. It is also relevant to note that participation, openness and inclusion are listed as some of the core values of the project. The Document analysis also detailed the vision on cooperation. The most relevant section of this part of the analysis, as pertaining to the question, envisions a democratic structure for all levels of the association around Smarta Kartan. With Participation and co-creative methods as core values. Participant 1 from Malmö Municipality mentioned that their vision has been to hand over the map fully to the citizens.

Unfortunately, these visions have not been met by results in the case of Malmö's Smarta Kartan (see section 5 for further details). The envisioned means of in-person participation and cooperation have not been fully employed. The impression from the interview with Participant 1 was that the project was handled in a participatory way in the beginning, and appreciated by the participants, but the envisioned engagement with the public has dwindled due to various organisational issues. In terms of Open Source participation, the vision's participation and cooperation have been held back most explicitly by the lack of structure and communication of the repository.

6.2 Question Two

The second question is: how have residents of Malmö participated in the development of Smarta Kartan? The first means of direct cooperation has been map jams, according to the Participant 1, this has been limited and according to the Participant 1, they only did three map jams earlier on in the project but the interviewee was unsure of the details or the exact number of map jams at the time of the interview. However, compared to other projects, it appears that Malmö's Smarta Karta has had less participation via map jams than other projects conducted under Kollaborativ Ekonomi Sverige.

The other means of direct participation in the project has been contributions to the code via Open Source collaboration. This means of participation has been near to non-existent. This appears to be in part due to the use of the CC0 licence, which does not align with Open Source guidelines and may deter developers (Open Source Initiative, n.d.-b). This means that while open access to the code is available, contribution to the code itself is not. As explained by Johan Linåker in his interview, in order for a project to officially be an Open Source project it should be under

an approved Open Source licence, and Creative Commons licences are normally used on data rather than software. As the CC0 licence is GPL compatible and the risk of Kollaborativ Ekonomi claiming patent in the future is low the CC0 functions as an Open Source licence in the case of Smarta Kartan (Creative Commons, 2016), but is unattractive to developers. This along with other issues, such as a lack of instructions in the README file, and a misalignment of the source code, may have contributed to a lack of contributor interest. The lack of clear instructions on how (and what) to properly add to the code makes developers less likely to join the community (Qiu et al., 2019). This lack of information exchange is related to the **black cloud effect** community smell (Tamburri et al., 2019). This method of developing code without any communication with the potential Open Source contributors disables developers from joining the project since they were never made aware of what improvements were to be implemented, and they are not able to see what code changed, or for what reason it changed. This is also related to the **black cloud effect** community smell, as well as the **lone wolf effect** (Tamburri et al., 2019). Using the Scaffold of smart citizen participation, the in person participation within Smarta Kartan might be placed in between Citizen Power and Tokenism in the initial phase, because of the co-creation at the map jams together with the citizen, but in the end, it is the association that has the control over licences and selection criteria. But lately, this co-creation is not longer the case in Malmö, and one can say that this case might have fallen down into consumerism. However, it should be noted that the kind of consumerism here is based in the sharing economy. The map is out there, created together with the citizens, but they are not engaged in the continuous development at the time. The same situation has become the case for the code; an Open Source project should, if it is done right, be on the highest level of participation. But in this case, because of the mentioned shortcomings, it can not contribute to a higher level of participation for the project.

To round off the discussion, it is useful to situate this case in terms of its relevance to the Smart City participation scaffold and the theoretical perspectives on smart cities.

This case appears to be in somewhat of a grey area between the arguments made by normative and critical scholars. This is because this case does not fit the critical descriptions of smart cities mentioned by Rob Kitchin (see section 3.1.3) (Kitchin et al., 2019, p. 3). An example of this is the way that this case does not fit into the neoliberal/capital-captured governance that the critical literature warns about, as the project focuses on the sharing economy. Another example is the way that the case does not fit neatly into conceptions of Smart City technologies as being overly technocratic, as the intention was to create a map via public engagement, and even handing over the project to the public. This then did not occur due to intentionally technocratic practices, but instead due to licensing issues, a lack of directions for code contributors and organisational issues that resulted in lacklustre in-person collaboration.

7 Conclusion

The Smarta Kartan Project, to date has not met its vision of public participation in practice. The map jams were not as numerous as was intended due to organisational issues, and the Open Source participation fell short due to issues with the CC0 licence and a lack of directions for contributors. If the smart cities participation scaffold was applied to this case, it could be said that it falls under the consumerism category, with the nuance that it is consumption in the sharing economy since public participation was limited and the map is still available for users to guide them to lesser known places where they can consume goods, services and facilities. This case then contributes to the field by showing how intention and practice do not always go hand in hand when developing Smart City projects.

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A Appendix 1

Document name	Description
Cooperation	Describes the aim of a collaborative culture and how to reach it. The birth and history of the project, financing, and the so-called map jams, inspired by a global campaign by the American association Sharable, is described. The emerging relationship with the municipality of Gothenburg, led to an Idea-driven public partnership, (IOP) to cooperate and create Smarta Kartan. Both the trademark, concept and domain of Smarta Kartan is owned by the association Kollaborativ Ekonomi Sverige. The development is led by the association, together with licences of varying degrees. The code is open through Open Source, and can be reached and developed by everyone. The idea is to have a democratic structure for all levels of the association around Smarta Kartan. Participation is one of the core values, and co-creative methods are used, e.g map jams. The content of the map is governed by selection criteria, which are based on Gothenburg but in need of adaptation for each geographic area.
Vision, mission and values	The vision is a world where we share and manage our resources. The mission is to bring people together and facilitate a sustainable lifestyle, by increasing participation in the sharing economy. The core values are: positivity, participation, sustainability, integrity, openness and inclusion.
Selection Criteria	The intention is to show the local sharing economy that most citizens do not know about. The criteria are produced by the association Kollaborativ Ekonomi Sverige, with the support of Procommons collaborative economy analytical framework. The criteria are: facilitate access before ownership, open to all, there are local participants or users, small scale and local presence and not widely known. Furthermore, there are additions, which may be fulfilled, described in the document.
Graphic profile	A document that describes the graphic profile and how to follow it.
Communication plan Sweden	Describes the communication plan to get more visitors to the website and increase awareness and participation. It is said here that Smarta Kartan is not a platform, since it does not enable direct transactions between its users. The primary target groups are students between 18-30 years and economically conscious people. The secondary target group is already active users and participating activities/companies on the map. Custom communication is described; the information should be available in English for exchange students, clear language must be used in all communication, the language of public administration must be nurtured, proper and comprehensible by law and both analogue and digital communication should be used. Further, the tonality of the communication must be positive, personal and inspiring.
Communication plan Gothenburg	These documents contain the same information as the communication plan above, but it is adapted to Gothenburg and has therefore some additions, including an ambition ladder and an activity plan
licence agreement Smarta Kartan 3.0 Vers 2.4	The licence agreement for the municipality of Gothenburg. First there is a section describing the background, followed by definitions. Thereafter is the intangible property, the scope of the licensing, governing documents, rights and obligations, licence fee and division of responsibilities described, such as other contractual content.

Table 1: Summary of Sma artan steering documents

6 Smart City Development as a Pre-Socratic Dialogue

A conflicted smart city: The Helsingborg dialogue

Written by Pontus Westerholm

Representing the citizens: **Protagoras**

Representing the company: **Gorgias**

Protagoras

Gorgias! Do you take the citizens of this windy city for fools? You have used your oratory well in persuading the politicians into this project, but there are still those among us who hold doubts about your virtue as well as the purity of your intentions.

The control of the city's and citizens' information cannot be handed over to private interests lightly. Privacy and the integrity of the public system must be secured. Given the disparity in technological power and knowledge there is a clear risk that the political system do not have the capacity to see the consequences of this deal.

Gorgias

These are harsh allegation that you aim at myself and the company. It would rather be in everyone's interest to value efficiency and reliability in the public sector. That is truly in the public interest, would you not agree?

Protagoras

The money pouches being filled is yours, rather than that of the public. The contract is about to be signed but the future remains hidden. The positive effects gained, if any, is not enough to sacrifice the integrity and privacy which you wish to invade in the name of progress.

Gorgias

Is this principle you hold dear, privacy, really important enough to stop this project? The word looses more and more meaning every day. What is the information stored in city hall, on things such as water pipes and traffic, worth in contrast to the personal information happily given away to foreign companies every day?

Nobody knows who have access to the search history or digital messages, yet it is enough to ruin many peoples lives if it were to leak. The applications on phones controls every aspect of normal routine. Yet the hardware comes from the other side of the earth with unclear control of the manufacture. Why is this the hill you take your stand?

Protagoras

It is true that the private sphere is sheltered by fragile walls with many windows. Control is all to often given away freely. But it makes the boundaries in public matters all the more important to uphold.

The power to influence and dictate the lives of others comes in many forms. There is a stark risk, given a lack of balance, that unfettered power in turn develops into tyranny. But it is also a part of civilized life, that integrity is in part freely given away for private or public good.

The offer is given in good faith to those who promise to protect the information they are given. The questions worth asking is if the sacrifice is made on the basis of free choice and

individuals best interest. The political institutions are far from perfect. But in a democratic order the citizens can have their voices heard and as a collective change the path taken by public institutions. That could not be said of private companies, not even those who creates public goods.

Gorgias

But you do finally concede that the company creates positive effects for the public. It is the security and possible intentions which you are criticizing. I wonder if you ever aimed your critical eyes in the direction of the governance you hold dear. Then you would soon see the petty intentions, personal vendettas and general ineptitude which rears its head when you look beyond the facade.

Companies who succumb to such vices are doomed to fail. That too is true for matters of data and security. You said we possessed technical knowledge. The power scares you in light of what might be done with it. But put that next to the alternative, you have a choice.

Government, even more so local ones, cannot be trusted to handle the challenges put before them without our help. More must be done with less. If the bureaucrats and politicians try to meet the future by themselves, then we are truly doomed. Security do not come cheaply, and if anything is shown it is that the public institutions do not have the capacity nor the will to protect you from harm.

Protagoras

No single entity can handle the weight of the connected world. Companies might try, but do repeatedly fail just as governments do. It is rare to hear of your shortcomings, but companies are all the more meticulous in protecting their image. The security you promise extends to the very organization itself. In public life there is a need for transparency if the citizens are to know when their trust have been broken. If you should get power over our lives you need to follow that principle.

7 Appendix Syllabus

LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Den smarta stadens styrning: AI och etik i en spatial kontext
Smart City Governance: AI Ethics in a Spatial Context

VFTN75, 7,5 credits, A (Second Cycle)

Valid for: 2021/22
Faculty: Faculty of Engineering, LTH
Decided by: PLED L
Date of Decision: 2021-03-12

General Information

Elective for: A5, C5, D5-mai, L5-fr, L5-gi
Language of instruction: The course will be given in English

Aim

Artificial intelligence (AI) is increasingly being used to change our cities and manage traffic and movement, meet the needs of commerce, combat crime, monitor individuals and improve our everyday lives. At the same time, legal, democratic and ethical interests need to be balanced against technical needs for optimization. How may individuals' privacy and rights to codetermination be balanced against development and employment of learning technologies (machine learning / AI) dependent on a lot of data? What is the main legal framework and what ethical guidelines should preferrably be adhered to? What degree of explainability and transparency is reasonable towards citizens, and in what ways do expectations and perceived benefits differ in different parts of the world?

In line with the need for responsible design and ethical reflection on digitalisation, this course aims to give an understanding of the role of individuals' data and autonomous and self-learning technologies (artificial intelligence) in an urban and spatial context. By looking at concrete and mainly international cases of development and control of so-called smart cities, including applications such as facial recognition in public environments or how "the city as a platform" has had an impact in urban planning, knowledge can be gained about what interests need to be balanced and what level of governance is reasonable for managing individuals' data in an urban context.

The course will thus, in a general sense, provide insights into the importance of digitalisation and the societal significance of new technologies with a focus on legal and ethical challenges, with a specific focus on cities and spatial contexts. It includes phenomena such as data capture and collection of large individual-based data sets, the growth and importance of digital platforms, and autonomous and self-learning technologies in the AI ⊠field - and the forces operating therein between private and international as well as public and national actors. The course is thus intended to give technical students and engineers an in-depth knowledge of the consequences of how technology is applied in, and interacts with, society - with a focus on smart cities, governance and ethics.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- be able to explain theoretical frameworks on digital platforms and smart cities
- master basic English terminology in critical social science research on artificial intelligence, focusing on the field of Fairness, Accountability and Transparency (FAT).
- demonstrate a basic understanding of digital and data-driven business models and their significance for design and technology development
- demonstrate a basic understanding of the most central legal considerations in urban data collection and the use of AI in a spatial context

Competences and skills
For a passing grade the student must

- be able to describe the basic content and importance of European data protection regulation for a spatial context
- be able to describe key benefits, but also conflict areas that a development towards so-called smart cities brings
- understand, analyze and describe urban planning challenges in the light of ethical and legal governance of smart cities in a global context
- be able to present their project work (thesis) orally and oppose another thesis.

Judgement and approach
For a passing grade the student must

- demonstrate a critical, independent and multidisciplinary approach to data collection and automation in urban environments.
- be able to make credible balances of interest between different interests in urban implemented artificial intelligence, with a particular focus on legal and ethical approaches.

Contents

The course is designed as a lecture and seminar series, as well as independent written work in a smaller group based on concrete development projects / cases where AI and data are central to urban planning. The course offers guest lectures from multidisciplinary as well as practical fields, where eg. city ⊠representatives present their work and their challenges with digitization and the use of autonomous and self-learning technologies.

The following steps are addressed:

- AI and machine learning, what does the field(s) mean and what does the application to urban environments look like;
- The basics of trustworthy artificial intelligence - transparency, fairness, accountability and explainability: what would a trusted use entail?
- Digital platforms and platformization: what does a data-driven organizational form mean in general, and for a spatial context in particular?
- The basics of European data protection, in general, and for a spatial context in particular
- AI governance - what are the regulatory ideas for the development and application of AI, both legally but also in the form of ethical guidelines
- International cases, as well as Swedish, on so-called smart cities and their development are presented and problematised.

Examination details

Grading scale: UG - (U,G) - (Fail, Pass)
Assessment: Compulsory participation in seminars and exercise classes, including notes/reports. Final written report and presentation in group at public seminar. At the closing presentation the students are expected to oppose and critically assess another essay / presentation. At the seminar, both the course director and external lecturer attend, to the extent possible, to comment on the presentation and essay.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Admission requirements:

- ASBF10 Sustainable Urban Design or ETSF25 The Business of Software or FMIF45 Sustainability and Resource Use with Perspectives on Information and Communication Technology or VFTF10 Real Property Formation

The number of participants is limited to: 40
Selection: The course has 10 places for applicants from each of the programs A, C, D and L. Selection within each program is based on the number of higher education credits achieved within the program. In case there are places left after regular selection, these are distributed, according to the same selection principle, to the remaining applicants.

Reading list

- High-Level Expert Group on AI: Ethics Guidelines for Trustworthy AI. EU Commission, 2019. Additional course material. 2019.
- Kitchin, R., Cardullo, P., and Di Feliciantonio, C. : Citizenship, Justice, and the Right to the Smart City. 2019.
- Schwarz, J. A., & Larsson, S.: A Platform Society. Fores, 2018.
- Breslow, H.: The smart city and the containment of informality: The case of Dubai. 2020.

- Brauneis, R., & Goodman, E. P.: Algorithmic transparency for the smart city. Yale JL & Tech, 2018.
- Barns, S.: City Bricolage: Imagining the City as a Platform. 2020.
- Cardullo, P., & Kitchin, R: Being a 'citizen'in the smart city: up and down the scaffold of smart citizen participation in Dublin, Ireland. 2019.
- Goodman, E. P., & Powles, J.: Urbanism under google: Lessons from sidewalk Toronto. 2019.
- Kitchin, R., Cardullo, P., and Di Feliciantonio, C.: Citizenship, Justice, and the Right to the Smart City. 2019.
- Morozov, E., & Bria, F.: Rethinking the smart city. 2018.
- Larsson, S. & Heintz, F.: Transparency in Artificial Intelligence. Internet Policy Review, 2020.

Contact and other information

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Course homepage: http://www.lantm.lth.se

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Smart City Governance

This brief anthology presents the basics of the interdisciplinary course called "Smart City Governance – AI Ethics in a Spatial Context", given at Lund University. Furthermore, it includes three papers and a task written by students from the class of 2021/2022 in order to show examples of the topics possible to analyse when combining engineering students from programmes on data, ICT and land surveying with students from the humanities or social sciences.

Head of course is Stefan Larsson, Associate Professor at the Department of Technology and Society at LTH, Lund University. As a socio-legal scholar and lawyer at a faculty of engineering, he leads a group studying governance and issues of trust and transparency with autonomous and AI-driven technologies in domains ranging from the public sector to consumer markets, medicine and social robotics.

Laetitia Tanqueray is a Teaching Assistant on this course, and canvas coordinator. Laetitia holds bachelors' in English Law and French Law and a master's in Sociology of Law. She is a project assistant at the Department of Technology and Society at LTH, Lund University, investigating questions related to socio-legal robotics.

LUND UNIVERSITY

LTH, Lund University 2022