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# The use of public visualisations to encourage social connectedness in urban communities

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## **Abstract**

Visualisations have long been used to give people insight into aspects of everyday life. By using visualisations to inform people on their own behaviour, technology-mediated behaviour change tools have supported people to reflect upon their lifestyle. However, the vast majority of research has focused on creating visualisations aimed at the individual. How visualisations can be used in a public setting remains largely unknown, with only few studies evaluating outdoor interventions. This thesis is an exploratory study into how 'community visualisations' might help improve urban living, by using novel representation methods to encourage people to reflect upon social connectedness within their community.

## **Author Keywords**

Community visualisations, social connectedness, public engagement, reflection

## **ACM Classification Keywords**

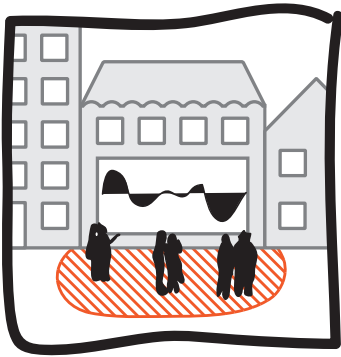
H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous.

## **General Terms**

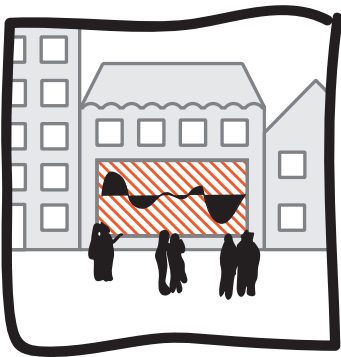
Data visualisation, public engagement, behaviour change, evaluation

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**Figure 1:** Public visualisations offer a *location*, a physical place for people to gather



**Figure 2:** Public visualisations provide a *talking point*, the visualisation and its content can function as a conversation piece

## Background

Nowadays, the use of visualisations as a means of communicating information is established as being reliable and effective, provided effective visualisation methods are applied. Not only can visual representations of data support people in obtaining insight, aesthetically appealing visualisations can also engage people in exploring the presented data. The role information visualisation can have in informing people on their behaviour, and in encouraging people to reflect upon their habits, has been studied extensively within the domain of technology-mediated behaviour change. Particularly when used to display frequent or real-time feedback and social comparisons, visualisations have proven to be successful motivators for behaviour change (see for example [2, 4]).

However, the vast majority of these studies have focused on addressing individuals. Little is yet known about how visualisations that provide information in a public setting can impact community life. The few studies that have evaluated outdoor information visualisations, including the Tidy Street Project [1] and Reveal-It! [7], revealed the potential public visualisations have for connecting people within their neighbourhoods.

Such social connectedness is found to be integral to individuals' physical as well as subjective well-being [3]. Furthermore, social connectedness increases trust amongst members of a community, which in turn is found to correlate with decreased crime [3] and increased civic engagement [5]. Despite these benefits, people are increasingly more communicating online, as opposed to in-person, giving rise to concerns about the social connectedness within physically close located communities. As Turkle [6] describes it: "[people] are connected all day, but are not sure if they have

communicated". Public visualisations have the potential to encourage in-person encounters, as they not only offer a specific *location* for people to gather, but also provide people with a *talking point*: the visualisation and its content (see Figures 1 and 2).

## Planned research contributions

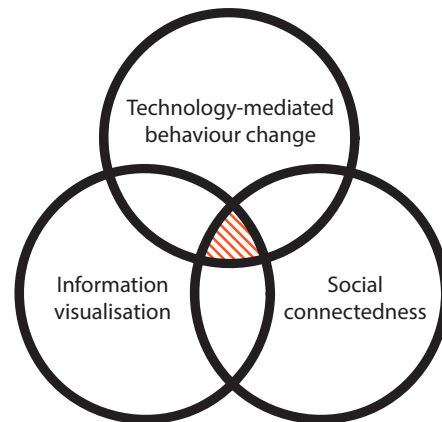
This thesis will address how urban living for communities can be improved by providing members of a community with public visualisations that encourage them to reflect upon their social connectedness. In particular, the behaviour change techniques and visualisation methods appropriate for public visualisations will be studied. By developing and evaluating a set of novel public visualisations in urban communities, research questions around the use of public visualisations in a community setting will be addressed. This will result in the following contributions:

1. **Community visualisations:** Novel public visualisations will be created, using a variety of visualisation methods that are appropriate for displaying connectedness as well as conveying information in a public setting. The focus will be on the display of relative differences and social norms, moving away from the established visualisation of precise numbers and percentages.
2. **Guidelines:** The visualisations will be empirically evaluated "in the wild", in situ in communities in London (United Kingdom). The findings from these field studies will create a new understanding of how community-based visualisations can transform community behaviour. Guidelines on the creation and evaluation of such visualisations will be developed, generalising the findings of this research to allow others to build upon this work.

3. **Theory:** The findings of the field studies will contribute to a new theory of technology enhanced engagement at the community level, using public visualisations.

### Future work

The research within this thesis will build upon previous work in the areas of technology-mediated behaviour change, general behaviour change and information visualisation. Furthermore, existing knowledge on social connectedness will inform the design of the visualisations and evaluations (see Figure 3).



**Figure 3:** Domains within which this research falls

In the past few months, I have conducted a literature review to get an understanding of these related domains. This existing work will inform my future research, as I will use previous findings relating to which behaviour change techniques have proven to be successful, and which visualisations methods can best convey information in a public setting.

To study the role community visualisations can have in encouraging social connectedness, a number of in situ empirical evaluations of public visualisations will be conducted in different neighbourhoods in London — over the course of my PhD. The first study will be relatively small scale and will focus on tracking and visualising moments of face-to-face interactions. I will compare two different visualisations, to analyse which visualisation methods are more effective in bringing people together and conveying the presented data. By starting out with a relatively simple study, I will be able to do an initial analysis of tracking and visualising connectedness.

Based on the results of this study, I will design follow-up studies. The research will adopt an iterative approach, to establish a basic framework around appropriate visualisation methods and behaviour change techniques before embarking on more comprehensive and larger outdoor community studies.

In addition, I will conduct a questionnaire on how socially connected city inhabitants feel they are within their community. The questionnaire will include questions on social isolation, community trust and volunteering. It is a follow-up study on a questionnaire I have previously conducted on urban inhabitants' 'everyday habits', and will inform the development of the public visualisations — in particular, it will help determine which data around community connectedness will be most relevant to represent.

### Objective for attending

The Doctoral School will be an excellent opportunity for me to receive feedback on the research plans I currently have, from experts outside of my own university. The different presentations and posters by attendees of the

Doctoral School will broaden my knowledge of state-of-the-art ubiquitous computing (doctoral) research.

Furthermore, meeting people who work in a range of domains and have different levels of experience, is likely to give me an idea of how others approach their research problems. Finally, I expect to make connections with fellow PhD students, which will be of use for my future academic career.

### Biography

**September 2012** PhD studentship in Computer Science, within the Intel Collaborative Research Institute on Sustainable Connected Cities (ICRI Cities) at University College London. Expected date of completion: September 2015.

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**October 2011 - September 2012** MSc Human-Centred Interactive Technologies at the University of York. Graduated with Distinction.

**September 2008 - August 2011** BSc Information Science (major: Human Centered Multimedia) at the University of Amsterdam. Graduated Cum Laude.

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