

## INTRODUCING DIGITAL METHODS FOR ON-GOING CIVIC ENGAGEMENT FOR DESIGN IN PUBLIC SPACE

How mining and mapping social media data can help inform spatial designers about a local context

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**Keywords:** social media data, embedded geo-location, on-going participation

### [Abstract]

*The study of social media data is increasingly used in new media research but is still quite novel for the design discipline, especially in participatory design. Over the last years there has been a growing emphasis on participatory design in public space, and designers have started to explore digital media tools for many different purposes. Participatory GIS and online urban games for example are used to enable (civic) participation in collecting data, mapping and decision making processes, while social media is often used to sustain participation, where designers actively take part in building and broadening networks around a design project. For this paper however, we are interested in a different use of digital media. This paper explores the value of social media data in informing designers about the social layer of a local context before they enter the design stage (whether that is a game, an intervention, a service or any other type of design) and even before they enter the participatory design process. The motivation for this approach stems from our critique on a current trend in participatory design, where designers increasingly transform into social workers by staying involved in the local context for too long in order to sustain civic engagement in their projects. In this paper we aim to uncover the potentials of mining and mapping social media data for the design profession, with a particular focus on designs that aim for on-going community participation in public space. Therefore we propose an approach for analysing social media data to explore potential user groups which can act as local agents in appropriating and prolonging the life of the design project, and which will therefore allow designers to re-engage with their design profession. We will do this by first deconstructing an existing example where digital media was used as a tool for different purposes in the design project. Then, by introducing case studies, we aim to illustrate and elaborate on potentially valuable resources for designers. The aim of this method is to allow designers to gain insight into the different users in public space and define the user group(s) that they want to direct their design at. The desired outcome is that the design (whether that is a product, programme, service, etc.) is appropriated and used by these local communities with which they will contribute to making the design more sustainable.*

### [Introduction]

Different from other design disciplines such as service or product design, the ‘users’ in public space design are not clearly outlined. While there are spatial design practices that increasingly use social media data to inform their design decisions through users’ input, for this paper we are interested in a specific use for this digital data. Instead of focusing on the input generated by individual users through such channels, we are interested in exploring social media data to learn about user groups or local communities. In this paper we propose that through the mining and mapping of social media data it is possible to get insight in (active) local communities in physical (public) spaces and the network(s) they are part of. We believe that approaching these local user groups is key to sustaining engagement in design projects, for it enables designers to build upon existing structures rather than introduce new ones. Therefore we propose that studying social media data with this approach can be a valuable instrument for designers who aim for their projects to be used or appropriated by users on the long run.

Our research is based on case studies that range from design projects to research projects from different fields. Many examples of civic engagement and public participation can be found in participatory GIS, online gaming and a wide range of civic applications. However, due to our interest in the pre-participation phase, the focus of our paper does not lie on the participatory qualities of

newly created platforms. Instead we focus on exploring established social media channels, which are common to a wide public in their everyday use (e.g. *Facebook*, *Twitter*, *Foursquare*, *Flickr*, etc.). By exploring case studies, which all work with social media data in some form, we aim to answer the following research question: How can mining and mapping social media data inform public space designers, in the pre-design and pre-participation phase, about the local social context they are entering, with the goal to tap into existing local user groups, who can potentially appropriate and prolong the life of a design?

Over the last years, there has been a growth in geo-located social network data, through social networking services such as *Facebook*, *Twitter*, *Foursquare*, etc. These location-based social networking tools allow users to “check in” at physical locations and share their whereabouts with their online contacts (Gao and Lui, 2014). With this, online social network platforms are increasingly using location-based services to assist in physical social encounters and in the discovery of new places in the city. One of the case studies that we participated in and that we elaborate on in this paper is from the Digital Methods Initiative (DMI). In this study we mined and mapped geo-social media data from services such as *Pinterest*, *Meetup* and *Twitter* to learn about local communities and their respective use of public space in the city of Amsterdam. In this paper we examine whether the use of these networking services is a valuable resource for the method we propose to inform designers on their approach to enable on-going civic engagement in their projects.

We will conclude the paper by re-evaluating these case studies; how is the data analysed and what can we learn from this? How could this be used for spatial designers working in a public space context? Through a taxonomy we aim to provide the reader with an overview of the different social networking services and their respective value for the design profession. Finally, we provide insight in the potentials and problems of this method and introduce directions for further research.

### **[Exploring existing communities]**

Belotti (2015), a social scientist specialised in social network theory, poses that in order to sustain any social initiative, a local network is needed. In this line of thought we aim to explore how data from different social media channels can be mined and mapped in order to discover these potential local networks. In the field of social sciences, social networking services have become tremendous data sources for analysing social networks within communities. In the field of art and design however, analysing social networks within communities is still a novel practice. While the value of working with communities on a local scale is recognised, there is not much research conducted in learning about existing communities, especially not through geo-social media platforms. A clear example of the limited research in communities that come about via these channels, is to be found in Mariska van den Berg’s book ‘Citizens change the city; about new collectives, public domain and transition’, which describes the emerging trend of community practices and artists, designers and city-planners that engage with it. In the eighteen examples of community related art and design projects that are described in her book, not a single one taps into the potentials of digital methods that the designers involved in community practices could benefit from.

For this reason we see the need to introduce this kind of research in the art and design field. However, instead of adapting social network analysis as a research method for in depth exploration of community structures, this paper focuses on an earlier stage of exploring communities; ‘discovering’ active networks (or user groups) in local contexts through social media data.

### **[Evaluating the use of digital methods in current participatory art and design practices]**

In our search for case studies we found very few community-driven projects that adapted and embedded digital media in their research with the aim to strive for a long-term citizen engaging approach. In our observation, a large number of art and design practices that aim to develop projects for on-going participation are either projects initiated by professional’s own interests or preconceived ideas about the needs of a community, or by projects that emphasise on long term physical engagement with the community within a specific context. Examples are to be found in many contemporary art and design projects, such as the community-gardening projects described in Mariska

van den Berg's book or Residency BijlmAIR<sup>1</sup>, an artist and residency in a "problem neighbourhood" in Amsterdam that aims to put the neighbourhood and its community practices on the map as a cultural hotspot, or the many "incubator" projects that are to be found in Amsterdam<sup>2</sup>. Although a lot of the examples we looked at might be relevant for raising environmental or societal awareness, the projects often fail to become rooted in the community where they are implemented. The design interventions, programmes or services are hardly ever sustained by the local community and they rarely trigger any kind of civic self-organisation. This raises questions as to how sustainable these projects can actually be. Why do they fail to initiate on-going civic action or sustained civic self-organisation? Could this be caused by the project's design, or is it dependent on who initiates the project and to what end? Failing in achieving sustained action seems to re-occur in many community-related projects, of which a clear symptom can be seen in the large amount of inactive hyperlinks a couple of years after the project has finished (for example: koppelkiek.nl and citizensensing.org). There are very few design practices that do focus on creating an on-going engagement of locals in their projects, and use digital tools to provide this sustainment. An example of such a practice is 596 Acres.

### 596 Acres as example

596 Acres is a non-profit organisation that seeks for community empowerment and sustained local action. A team of design, law and information technology professionals aims to help citizens transform vacant public land in the city of New York into community resources (596 Acres Recap, 2012). 596 Acres began by analysing open data on vacant land provided by the city, after which they developed online tools that transformed city data into 'readable' information for citizens. This was done by mapping all publicly owned, vacant pieces of land in the city of New York (fig.1) and by designing a physical intervention; posters were put up (fig. 2) on the fences surrounding the vacant lots containing provocative texts (e.g. 'This Land Is Your Land'), basic information about the city agency owning the lot and their contact number. These posters, in combination with digital information (numbers, figures and maps on the 596 Acres website), triggered local neighbourhood inhabitants to contact the organisation or the local council and take action.

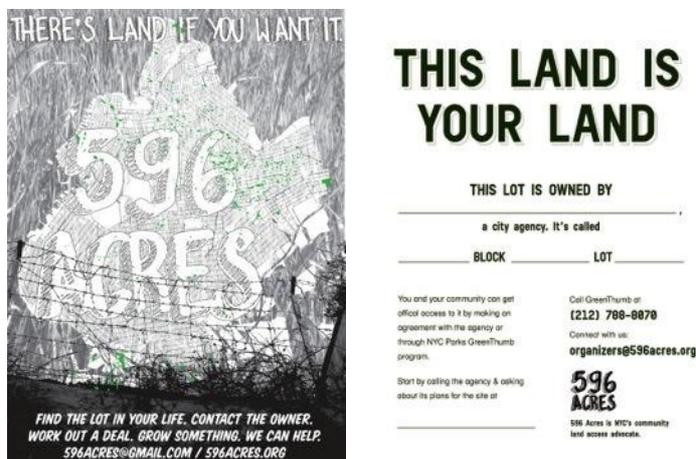


Fig 1 - 596 acres of vacant land in Brooklyn (left). Fig 2 - Poster as physical intervention (right) (596acres.org)

Over the last three years they have helped twenty-two groups obtain official permission to access the lots and supported 143 local campaigns to transform vacant lots into gardens, farms and playgrounds (Segal, 2014). 596 Acres acknowledge the importance of making information available to the community 'on the ground' by using both physical (offline) as well as digital (online) tools for showing the municipal information. The next step in 596 Acres' practice is guiding interested

<sup>1</sup> <http://www.cbkzuidoost.nl/kunst/residency-bijlmair/>

<sup>2</sup> [https://www.amsterdam.nl/kunstencultuur/werkplekken/broedplaatsen/projectenlijst/?pager\\_page=1](https://www.amsterdam.nl/kunstencultuur/werkplekken/broedplaatsen/projectenlijst/?pager_page=1)

participants in the process of appropriation. For instance, they provide education to locals about how to participate in decision-making processes by the city government that affect their neighbourhood; they assist communities with legal support on land use issues; they work with the community after they get access to the land in order to build a durable local governance; and they argue for municipal agencies to allow more community participation concerning public resources. Furthermore, 596 Acres uses social media to support and grow a larger community around the projects and to maintain a network among communities in order to share knowledge and ties with decision-makers. Their practice clearly focuses on a long process of counselling and cooperation in order to create a civic self-organisation around these publicly owned lots. As previously mentioned, we take a critical position towards this development, which is increasingly common in participatory design practices that aim for long-term civic engagement. Such projects are centred around creating, maintaining and educating communities, but is this the direction that designers should be heading to be able to prolong the life of a design? And is this the only use for social media as a tool in design for participation? In the 596 Acres example, the project was not imposed on a community; instead the strategically placed posters awaited participants to contact the NGO. This project shows that there can be an on-going community engagement, even when a project is initiated by professionals. By understanding the needs of the community in this specific socio-economical context (there is a lot of competition for land in Brooklyn and communities benefit economically from growing their own produce), the project was appreciated and appropriated by the community. Although this project was successful in terms of the longevity of community participation, it also illustrates that we need to be aware of the fact that in these kinds of projects the role of the designer can easily transform into one of a social worker. This paper counters this emerging trend and explores opportunities for designers to re-engage in design. We argue that in order to avoid becoming social workers, designers should not aim to create new communities around their projects, but instead investigate into existing communities, which designers can enter and, after developing embedded projects, can exit, while the community appropriates and prolongs the life of the project.

In the next section we will introduce examples of studies conducted on social media data, and assess how these examples can inform our proposed approach for design for sustained participation.

### [Case studies]

#### **DMI Summer School - exploring different behaviours on social media networks**

The first case study stems from the 2014 Digital Methods Initiative Summer School in which Bueno de Mesquita participated. DMI is a collaboration initiated in 2007 between the New Media TEMPLab, University of Amsterdam and the Govcom.org Foundation Amsterdam and aims at reworking methods for Internet research. The DMI Summer School takes place every year and is hosted by the University of Amsterdam. It is an intensive two-week programme where PhD researchers test and develop digital methods for societal research. During the DMI Summer School participants actively engage in empirical research projects, employing Web-specific software tools such as scrapers and crawlers. In this paper we will elaborate on a case study that Bueno de Mesquita participated in with the subject 'on geo-location', where different geo-social media platforms were analysed and compared to find out about the kind of (discourse about) Amsterdam that is put forward by communities that use social networking services.

The data for this study was produced and published by Amsterdam based users, and subtracted from the networking services *Twitter*, *Meetup*, *Pinterest* and *Geocaching*. Through applying digital methods, the geo-located embedded links, tags, threads and pin-boards were mapped (fig. 3), demonstrating the places in the city where the different virtual communities talk about or 'hang out'. For the *Twitter* dataset the keyword 'Amsterdam' was retrieved over a ten-day period (June 13th-22nd 2014). As for the datasets of *Pinterest*, the term 'Amsterdam' was searched for in 'place' boards. The dataset of *Meetup* gave 489 events over a four-month period in this city. And for *Geocaching* all the existing caches (718, of which 39 temporarily inactive) placed in Amsterdam were collected.



Fig 3 - Virtual communities formed on *Twitter*, *Geocaching*, *Meetup* and *Pinterest* in Amsterdam. This map forms part of the Digital Methods Summer School at the University of Amsterdam of June 2014 (Credits: Michele Mauri - participant of the summer school)

As for the localisation of the communities of these social networking services, the map reveals that *Twitter*, *Meetup* and *Pinterest* are located in or around the city centre; *Pinterest* clearly represents the boutique view of Amsterdam (outlining the nine-streets, Haarlemmerdijk and Haarlemmerstraat), while the virtually constructed communities of *Meetup* consist of people with a common interest (for instance in technology, fitness or fine arts) who temporarily gather in bars (with a high concentration around the square of Nieuwmarkt). Of these four (social) networking services, only the users of *Geocaching* are likely to engage with places that are harder to get to, e.g. the city's periphery. *Geocaching* is therefore the most widely spread community (of the ones that we studied) in Amsterdam in terms of physical range, which can be explained by the nature of the game and purpose of the service (elaborated on later in this paper).

As for comparing the activities on the different social networking services: *Twitter* is more subject to change when events take place in the city. In the research that we performed during the DMI Summer School clear examples were to be found in changing intensity of use and content in the data sets when certain events took place, such as a concert, a football match or a strike. For instance, when the garbage strike took place in Amsterdam in June 2014, the hash tag 'Zwerfie' (taking a 'selfie' while picking up trash) became a hit in Amsterdam West. #Zwerfie was introduced in February 2014 by a Dutch entrepreneur, which led to a national campaign that encourages people to pick up one piece of litter a day, make a 'Zwerfie' and post the photo on *Twitter* with #zwerfie. In the diagram below a peak is to be seen in the tweets in Amsterdam, related to picking up garbage as a consequence of the garbage strike that started on the 16th of June 2014 and which lasted for two days.

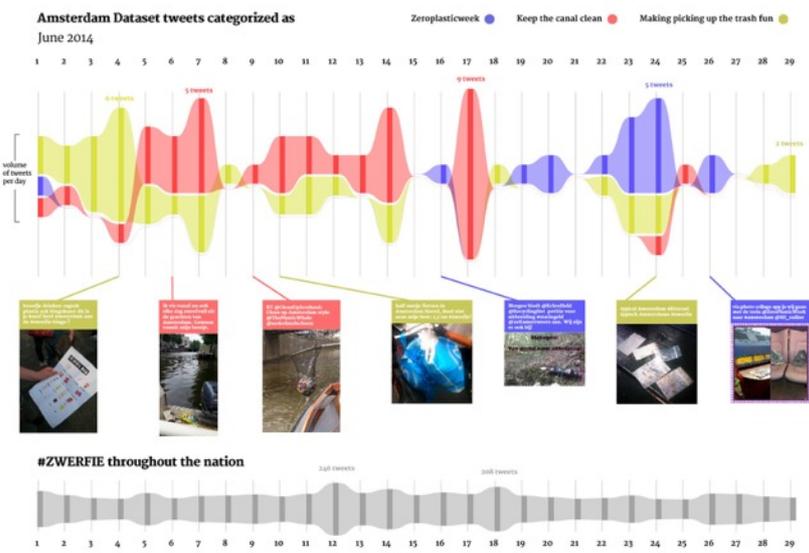


Fig 4 - Diagram from DMI Summer Schools' project The City Speaks <https://wiki.digitalmethods.net/Dmi/DmiSummer2014Amsterdam>

Designers who are interested in groups that are formed around a local event could embark their research by exploring (its discourse) on *Twitter*. The research on activities on the social networking services furthermore revealed that *Pinterest* is more of a profiling platform where user activity is less subject to change when certain events take place. Locations are rather used to put forward a certain identity or association with a group and are often linked to other personal profiling sites, such as *Facebook*. From this study we also found that the communities on *Meetup* and *Pinterest* focus primarily on the strengthening of a their personal identity linked to commercial places, therefore mostly informing us about users as consumers of places. Countering that, the *Geocaching* community, is keen on exploring a wide range of locations that are not limited by commercial use, or the city's borders (fig. 3). However, since *Geocaching* is less of a widespread social media platform (it rather focuses on a specific community of users that share a common hobby), this example does not comply with our main research goal for this paper where we focus on exploring communities through mainstream social networking services. Therefore this example is excluded from our study of social media data. Later in this paper, however, we will return to this example to illustrate how such networking services with a clearer focal point, in terms of user groups, could also form insightful resources of data for designers who are aiming for sustained participation in their projects.

### Eric Fischer - exploring cultures through language-use

Other examples of digital methods that are utilised to demonstrate (virtual) communities and their respective use of different locations in the city can be found in Eric Fischer's studies *Geotaggers' World Atlas* (fig. 5) and *Twitter Tongues* (fig. 6). Although his research is not directly aimed at long-term participation it does illustrate an interesting point of departure for designers. The first study, *Geotaggers' World Atlas*, maps traces of geo-tagged photos in fifty different cities from the platforms *Flickr* and *Picasa*, documenting the city from either the locals' or the tourists' perspective. The second study, *Twitter Tongues*, visualises the multilingual social city of London by highlighting areas where different languages are spoken. In the map coloured clusters emerge, demonstrating dominant language use in different areas. However, what this second map doesn't differentiate in are locals' and visitors' tweets. In *Geotaggers' World Atlas* the distinction between tourists and locals is made by the speed at which the photographers travelled (by analysing the timestamps and geo-tags of the photos). The blue dots on the map represent locals (users taking pictures in the same city for over a month), the red dots represent tourists (users taking pictures for a period that is less than one month) and the yellow ones remain uncategorised.

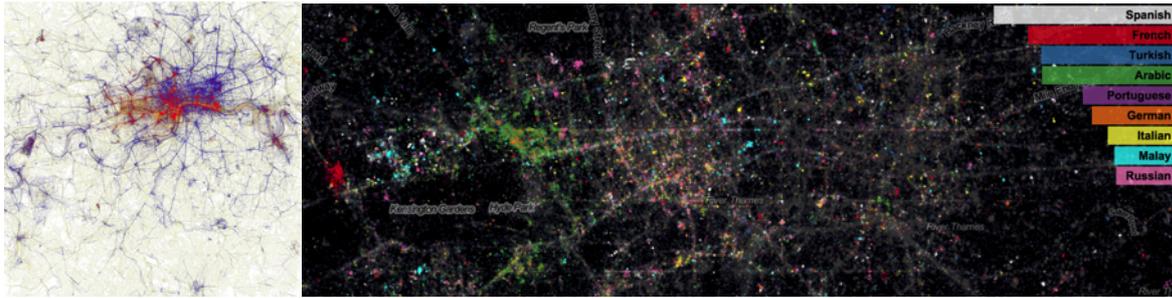


Fig 5 - Fischer's map: Geotaggers' World Atlas (left) (flickr.com)

Fig 6 - Fischer's map: Twitter Tongues (right) (twitter.mappinglondon.co.uk)

Mining and mapping this kind of social data can be valuable for designers to understand the cultural background of a place where a design is planned, or to attract a certain cultural community for their design; in that case the findings can inform designers on how and where to best place their project. Combining the analytical approaches of the two maps could embark an exploration into local cultures or multi-cultures in a certain area. These findings can inform designers on how to develop projects that consider the cultural dimension in the area. With this a designer can work with and/or focus on one established community or cultural group, therewith allowing the appropriation of the design (project) by a specific local community.

An example that is experienced as successful in terms of long-term appropriation and community engagement in public space is described in Eizenberg's research (2011). In her study on community gardens in New York City, where she explored different cultures on a neighbourhood scale, she learned that due to ethnically segregated neighbourhoods and building blocks many of the gardens existed of mono-ethnic spaces. This cultural clustering allowed for a spatial expression of these specific cultures, which increased the appeal of use and appropriation of the space by that specific cultural community. Since most of the gardeners in Eizenberg's research were immigrants, the gardens were used as spaces for symbolic re-enactment of their childhood landscapes. The gardens allowed them to identify with the space while in turn, giving these local communities the chance to develop a sense of ownership and control over the gardens. This way the community gardens received a symbolic role as carriers of, and windows to, different cultures within the city. This example of diverse cultural use and its implications on appropriation of public spaces, illustrates possible applications for studies such as Fischer's language map in design for sustained civic engagement.

### **Location specific data in design for regeneration**

A different example stems from a research and design practice in the Netherlands. For the renewal of the old energy plant 'Strijp-S' in Eindhoven, architecture and research office Space and Matter were invited to conduct a conceptual study on the transformation of some spaces of the building. Prior to developing a design, the office investigated the current users of these spaces and its immediate surroundings. In this way, they aimed at developing a design proposal that would be appreciated and appropriated by the existing users. In order to find the current users of the space, the office mined location specific data from social media platforms. The benefit of mining this data (over visiting the location) is the possibility to gain insight on the location's use and appropriation at different times of the day and over a longer period of time (weeks, months, years). From this analysis they found that there were two existing communities: a group of skaters and BMX bikers, and a group of climbers (De Waal and De Lange, 2013). Following these findings, the office contacted and interviewed these communities in order to discover their specific programmatic and spatial needs. With this input, the office designed a conceptual plan for a hybrid space (spaceandmatter.nl) that both communities could use.

Although the firm's design was never implemented, with the help of the municipality of Eindhoven the two communities were allowed to take over spaces in the old energy plant; in 2008 the climbing facility 'Monk Boulder Gym' was established here, and in 2010 '040 BMX Park' moved into the building (monkeindhoven.nl; 040bmxpark.nl). Especially the relocation of the skate and BMX communities has triggered a larger community of hip-hop artists to establish their studios in this building. Break-dancers, rappers, and others were attracted by the location, which is now

transforming into a larger entity (offering thirty workplaces) that is increasingly appropriated by related communities of artists and sub-cultures within the local hip-hop scene (Eindhoven's Dagblad, 2014)

### **Location Based Social Networks (LBSNs) Data in marketing and computer science research**

As mentioned previously, the examples of design practices working with digital methods that succeed in sustaining community participation are scarce. Furthermore, we found that existing information of research in this field was very hard to trace back, such as the Eindhoven example. The meagre results in this field can be explained by the novelty of working with digital social data, which means that there is still a lot to be explored in terms of their possibilities for the design profession. Therefore, instead of being restricted by the art and design fields, we look at the field of marketing, which has been leading in exploring new uses and approaches for Big Data analysis as it has proven to be exceedingly successful for many businesses (such as *Amazon*, *Google*, *Facebook*, and so on). We believe that a lot can be learned from these marketing approaches in regards to the design profession in exploring sustained civic engagement. This section will elaborate on one of these approaches.

Several architectural and urban design researchers are already using data from social network services to uncover, and gain insight in, the distribution and spatial patterns of social life in a city (Bawa-Cavia, 2011). In marketing and computer science studies, a different approach towards this data has been developed. Here, location-based social network data from sources such as *Foursquare* or *Facebook Places*, are analysed in order to discover user communities (Cranshaw et al, 2010; Hung et al, 2009; Ying et al, 2010). By estimating the similarity of location histories of two different users, the likelihood of these users belonging to a community is explored. This similarity represents the strength of a possible connection between the users. In this way, location-based social networking services can apply the user-similarity findings to optimise their friend recommendation or location recommendation features. Such services can for instance discover locations based on similar users that are compatible with the user's preferences, and with that develop a 'personalised location recommender system' (Zheng, 2011, p.262). While most research from a marketing perspective is aimed at finding new ways to improve such recommendation features (Wang et al, 2014; Zheng, 2011), we're interested in whether this algorithm-driven method of community discovery could be a useful tool for designers in our proposed approach. This paper will not step into detail about the specific technological advances and computational specificities of discovering such communities. Instead we focus on what these studies qualify as a community in the data analysis, and question whether this could be a potential method for designers to discover communities in the locations they plan to intervene in.

In the LBSNs research projects the common belief is that people who share similar location histories in these applications are likely to have similar interests and preferences. This idea is based on Tobler's first law of geography: 'Everything is related to everything else, but near things are more related than distant things' (Tobler, 1970, p.236). But not only the geographic space is analysed, the semantic space is an important factor that is taken into consideration as well. These researchers share a belief that a person who often visits stadiums and gyms is likely to be fond of sports. Therefore, another claim is articulated: people that access locations with similar semantic meanings have a greater likelihood of being similar, and therefore are more likely to belong to one or more of the same communities.

The LBSNs research approaches indicate that communities are not only shaped by shared geographic locations, but also by shared semantic meanings of places. This notion is reflected in Eizenberg's (2011) example, where a shared (cultural) semantic allowed communities to collectively experience and appropriate the local public space. Therefore, we argue that understanding the use and semantic meaning of the shared spaces can help designers to define a fitting program and approach for a design project. This thinking is in line with the previously introduced example in Eindhoven, where a community of skaters and BMX-bikers, and a community of climbers formed the main influence of the design of the space. As a result of the programming of these spaces, the communities were able to appropriate the space, and with that, sustained the use of and participation in the space.

## [Conclusion]

In this paper we introduced an approach to study existing communities in public space from the use of digital media (mining and mapping data from social networking services), as a way to inform designers on the local context. The need for introducing this approach comes from our observation that few design researchers use social media data prior to designing a programme, intervention, service, etc., therewith not fully benefitting from the wide range of data on use and appropriation of public space by local communities. We notice that many current design projects merely tend to focus on a physical study of public space and fail to engage with its extension in the virtual realm, therewith missing out on the potentials of learning about existing communities through their activities on social networking services.

The examples we studied in this paper illustrate that there are two important features when studying communities or user groups through geo-social media. The first is the search for commonalities in users' geographic locations through the platform. This feature is relevant because we want to address communities that are active in the physical realm, and not only in the virtual, since the physical presence is an essential aspect in the maintaining of the material (and local) engagement in the project. The second feature consists of exploring the semantics of a location and exploring whether that is a shared semantic amongst different users. In the case studies we found that not all social networking services provide insights in both of these aspects. Especially the search for a shared semantic can be a challenging query. And even if the different users share a geographic location and the semantics of a place (e.g. shopping in the 'nine-streets' of Amsterdam on *Pinterest*), it doesn't automatically imply that there exists a potential community that would sustain a physical design. An important aspect in exploring this potential lies in the nature of the shared semantics of a place. The examples of the DMI illustrated this difference, where data from *Pinterest* showed a much more commercial view of the city of Amsterdam, while *Twitter* (with its #Zwerfie) showed users that share a concern about pollution of public spaces in the city. An important aspect therefore in studying the shared semantics of a place amongst social media users is to assess whether this shared interest/event/topic/etc. belongs to a public good (such as public space or fresh air) or a private good (products of consumption such as clothes, food and beverages, etc.). Through this approach, a designer would be able to investigate whether a certain user group (sharing a geographic location) shares a public or private interest, and could therefore assess whether it is a potential group to address for appropriating and sustaining a design project in public space, which is also a public good.

Fischer's example revealed the geographic locations of users that share specific features: whether they are residents of the city or tourists, through pictures uploaded on *Flickr* and *Picasa*, and to which cultural group people belong based on the language they use to post on *Twitter*. In relation to the previous examples, these studies do not tell us anything about shared semantics of individual users. However this data can be used as a first step into a deeper exploration into shared semantics amongst cultural groups. Fischer's studies also illustrate a different approach towards mining social media data. Instead of starting out from a location, such as the DMI studies where tags of 'Amsterdam' were harvested from different social media platforms, these two examples are rather based on similarities and differences in the use of the service. The Geotaggers' World Atlas not only differentiates in the locations where pictures were uploaded, but also in speed and frequency with which different users upload their pictures. This way, the data generated by *Picasa* and *Flickr* users is used to reveal whether they are visitors or local residents. Fischer's Twitter Tongues study starts off from an idea of a feature that could indicate possible networks amongst locals, consisting of the language they share. This feature could play a role in a shared semantics of geographic locations, for it reveals where cultural groups are located in a city, which are likely to share a specific cultural relation and view towards many different things, amongst which public spaces (such as illustrated in the Eizenberg example). By further investigating into these language groups, a designer can plan their design for a specific community, allowing the community to articulate their specific use of the space. The single-ethnic gardens in New York illustrated that these unique uses shaped by a community's culture allow for different experiences of the space through its spatial arrangement, aesthetic expression, and specific use (influenced by culinary preferences, customs, rituals and so on). Through this cultural clustering, the gardeners are able to experience, celebrate and express their culture in a collective way, which allows them to contextualise their sense of attachment and belonging to the collective culture, as well as their immediate environment. Enabling on-going production and participation in the gardens allows community members to grow a sense of ownership, which leads to sustained engagement of communities in these cultural spaces.

The Eindhoven example shows that a shared semantics does not only have to restrict itself to a specific program or activity, which is the focus of the LBSNs studies. The shared semantics can also exist of a wider subculture, such as the hip-hop culture in Eindhoven. This broader encapsulation of several activities, held together by a specific lifestyle, can increase the resilience of a space in terms of sustained engagement. When one of the communities formed around a specific activity loses its interest or motivation to engage with the space, other communities can take over or can use the space in a more hybrid way, making the space more resilient when user patterns transform.

In order to summarise the lessons drawn from the different case studies, and in order to evaluate the different social media services for the purposes of our proposed approach for sustained design, we provide the following taxonomy (Table 1) of the explored examples:

Table 1. Taxonomy of case studies

<i>Case study and social media service</i>	<i>Location → User group or User group → Location?</i>	<i>Established network? (digital or physical)</i>	<i>Shared semantics? (Program? Specific use of space?)</i>
<b>DMI - Pinterest</b>	Location → user group	No (based on individual profiles)	Yes (consumerism; shopping, food & beverage, and other lifestyle aspects)
<b>DMI - Meetup</b>	User group → location	Yes (digital; users belong to digital networks/groups sharing an interest/hobby)	Yes (use for their specific hobby or commercial places such as bars to meet)
<b>DMI - Twitter</b>	User group → Location	Yes (digital; by applying same hash tag)	Yes (public space as a public good, improving the quality of it)
<b>Eindhoven - Facebook</b>	Location → User group	Yes (both digital and physical; users are members of <i>Facebook</i> group pages)	Yes (skate and BMX program and hip-hop subculture)
<b>Eric Fischer - Twitter, Flickr and Picasa</b>	User group → Location	No (based on individual's language-use)	No (however, cultural use could be derived from language, therefore language study is just a first step in the semantic exploration)
<b>LBSNs research - Foursquare and Facebook (places)</b>	Location → User group	No (research to discover possible networks/connections)	Yes (e.g. sport bars, gyms, etc. are seen as a shared semantics: sports, and are therefore used to indicate possible connections between individual users)

The taxonomy illustrates that the studied examples approach social media data in different ways. Some start off from a geographic location in order to find user groups, while others start off from a

feature that is shared by a user group (such as language-use in Fischer's example) and then explore the geographic locations related to these features. The examples also show that an exploration of these social network services does not have to restrict itself to finding established networks of users. Finding individual users that share geographic locations and similar semantics related to those locations also offer opportunities for further exploration into active local communities. Finally, we want to emphasize on the nature of the shared semantics that can inform designers on the opportunities of working with specific user groups by assessing whether they share an interest in public goods, which might indicate a shared interest in (improving) public space, or whether the user groups' interests are limited to private goods, in which case it is less likely that they are interested in long term participation in a public space project.

Instead of proposing a specific method for designers to achieve sustained civic engagement, this paper aims to provide the reader with potential approaches to existing social media services as directions for further explorations to discover the value of digital methods for the design profession. The problem of the digital divide is not elaborated on in this paper. For this reason all projects are exclusive to the extent that they don't consider people who are less active in digital social networking. Instead, the focus purely lies on the potential benefits that the study of social media data can have for design professionals working within the context of public space and we acknowledge that this method does not stand on its one when working in public space context. We see the added value of this method as one that informs a more qualitative research approach. Our believe is that the study of digital media should not be left alone to social scientists, government or marketing and computer scientists, but that design researchers should critically engage with social media data and use it to be better informed about the context they work in.

The examples in this paper have introduced different possible approaches for designers to explore virtual communities or geo-social data to engage with citizens that can sustain the design interventions. We believe that, as the technology advances, the possibilities for designers to explore different digital approaches increase as well. Throughout this paper we have introduced a variety of examples of contemporary approaches, however, we believe that there is still a wide field of yet to be discovered possibilities. These opportunities should trigger and inspire designers and design researchers to explore social data and digital methods as approaches to developing designs that offer sustained participation in public space. One of these opportunities, we believe, lies in exploring different social networking platforms that are less mainstream than the ones we covered in this paper. In the following section we describe such a networking service and recommend how further exploration of such a networking service with its active physical and digital communities can inform designers for on-going engagement in their projects.

### **[Recommendation for further explorations]**

Within the context of long-term user engagement and appropriation of physical places, the earlier mentioned *Geocaching* community offers a wide range of opportunities for designers to work with in terms of programme and location for interventions. Another interesting feature of potential interest is the game element. Built in *Geocaching*, but also in other geo-social networking sites such as *Foursquare*, the game element provides a logic for user interaction and participation that designers could learn from and use to create a project that involves long-term participation and that motivates people to participate. The *Geocaching* platform is specifically of interest for our proposed approach due to the (virtual) nature of this community and their strong relation to the physical dimension.



Fig 7 - Photos from the geocaching communities' website. The map demonstrates the Geocaches that

are located in and around Amsterdam. The images demonstrate places where geocaches navigate through and how natural sites and the periphery of cities are part of the game-board (geocaching.nl).

*Geocaching* is a treasure hunt game that emerged in the year 2000 after the Global Positioning System (GPS), initially developed for and used by the U.S. army exclusively, was made available to the public. *Geocaching* exists of a game where participants hide a 'cache' somewhere in public space and provide clues to other players on its location. By following these clues the participants are 'navigated' through the city, or through a natural site. After hiding a treasure, the person who placed the cache announces the location to the other Geocachers through the Internet. Other Geocachers can exchange or add items in the cache upon discovering the treasure, after which they write about the cache in the log via the website. The exchange and logging activities illustrate how actions in *Geocaching* take place within, and alter between, the physical and the virtual realm. The premise of *Geocaching* has remained consistent since its initiation, but the infrastructure around the practice has grown substantially. With nearly 800,000 hidden objects in over 100 countries, an entire subculture is built around what would seem a simple practice of hiding and finding. Players often even plan entire vacations around finding caches - where locations become motivation for travel and where the particularities of the space are not as important as the procedure of searching. And where *Geocaching* was primarily said to be more effective in connecting people to locations rather than to each other, this has changed with the introduction of mobile devices that are used for Location Based Mobile Games (Gordon & de Souza e Silva, 2011).

The following map (fig. 8) was made during the DMI summer school. It demonstrates all the caches at the time of data collection that are placed in Amsterdam. The map visualises the amount of logged visits to a cache, which can be read in the size of the dots. It furthermore demonstrates the comments-per-visits ratio: the most intense red-coloured dots are the caches most communicated about, or where a discussion around the 'treasure' has emerged, this way demonstrating the degree to which a community is engaged in or formed around a cache. For most Geocachers the journey and the narrative around the Geocache seems to be of a similar, or even bigger, importance than finding the treasure.



Fig 8 - Geocachers logged visits and most discussed caches. This map forms part of the Digital Methods Summer School at the University of Amsterdam in June 2014 (Credits: Joe Shaw)

*Geocaching* is a phenomenon that enables discovering (re)new(ed) ways of experiencing the city. Geocache communities hold strong ties with physical locations, which are sustained by the digital exchange amongst the community members. It is furthermore interesting to notice that within the *Geocaching* community subgroups of people with a shared interest are to be found. A good example of this is the Cache In Trash Out community on this platform, which organises events for environmentally conscious people who are keen on picking up litter while trying to find a cache.

A designer that embarks on working with the Geocache community (or a subgroup within it), needs to understand the importance of engaging in both the physical and the virtual dimension in order to

generate a sustained intervention. Geocachers approach this dual engagement by creating a narrative around a cache and by directing the navigation on this narrative. In order to engage with this community, a designer could either choose to build upon an existing narrative, or he/she could create an entirely new narrative by using a similar tactic. Furthermore, due to the nature of the game, where users are keen on discovering new places, the designer is not restricted to designing interventions for known locations within the *Geocaching* community (i.e. the spots where the Geocaches are already placed), instead new places can be introduced and activated in playful ways, while respecting the navigational practice that is based on a narrative.

We believe that there are still a lot of unexplored platforms and social networking services that provide an active virtual interaction as well as strong ties with physical spaces, which offer rich potentials for designers seeking to address communities for sustained engagement in their projects. Therefore we hope this paper will motivate readers to embark on similar explorations in order to contribute to more understanding of the potentials of digital methods for the design profession.

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