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Employing smart phones as a planning tool: The Vollsmose case

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Introduction

The paper investigates how place-based experience can be assembled and employed in the planning process. As Rantanen and Kahila (2008) point to, local knowledge has often been dismissed in planning processes on the grounds of being “soft” and “subjective” and priority has been given to “hard” data. They also suggest that the local knowledge deficit stems from methodological shortcomings; there is a lack of tools that deal with and capture local knowledge in appropriate ways. It is this methodological challenge the paper seeks to address by investigating the potentials of applying smart phones as a participatory planning tool.

With the influx of smart phones which incorporate GPS technology, mapping human spatial behavior has become both accessible and inexpensive. The ubiquitous nature of this type of computing allows for a dynamic and interactive engagement between user, place and digital networks. From a planning perspective, this location awareness, entrenched in mobile communication technologies, holds a somewhat unexplored potential of engaging citizens and communities in the planning process and the co-production of our cities and thus address the methodological challenge outlined above.

The paper reports on an ongoing research project in Vollsmose in Odense, Denmark; a multi ethnic modernist housing estate, which is currently in the process of developing a new master plan. In order to qualify the master plan, GPS-based mapping has been employed as a participatory planning tool. GPS-tracks of residents are collected as a tool to include new perspectives on the potentials and uses of the neighbourhood. The purpose of the research project is thus three-fold: to assemble spatial information about how young people use the infrastructure of Vollsmose, to create increased awareness and reflections amongst residents regarding qualities of living in Vollsmose and finally to diversify the public image of Vollsmose.

By drawing on experiences and methodological deliberations from the research project, the paper will address methodological potentials and constraints of applying smart phones and GPS-tracking as a tool to collect place-based everyday perspectives on the urban environment.

Location aware technologies- a renaissance of place

In a Danish context relatively few research projects have been carried out on the methodological potentials of employing GPS-technology as a tool to collect information about spatial behavior -and subsequently, as a planning tool. In this specific context smart phones and GPS-technologies are applied as a tool to capture and mediate, residents everyday uses and perspectives on the urban environment. The results are part of the wider research project "Diverse Urban Spaces", based at the Department of Architecture, Design and Media Technology, Aalborg University, Denmark. The research group investigates GPS-technology in the context of urban planning (Henrik Harder Thomas Alexander Sick Nielsen Peter Bro Nerius Tradisaukas Henrik Skov Anders Knørr Lyseen 2008, Harder, Bro & Knudsen 2010). This section takes a look at what location-aware technologies might contribute to the field of urban planning and design.

In 1996, Manuel Castells predicted the supremacy of spaces of flows over spaces of places: *Individuals and spaces make up networks, but the primary organizing function of networks remains the relation between the nodes that populate them* (Gordon, Koo 2008). However, this relation is changing, partly due to some very distinctive changes in how computing and communications technologies are done, which fundamentally changes the way we engage with the physical environment and digital networks. What has happened is that we have moved from an abstract, universal cyberspace to embodied and situated technologies (McCullough 2005). Or to put it differently, computers are not only found on desktops in our offices, they are everywhere, embedded in the environment and in our pockets and handbags and thus the internet no longer resides in an abstract cyberspace- it is present in every little nook and cranny of our everyday lives and everyday places. This shift, or way of computing, is often referred to as pervasive computing. Where cyberspace got us out of place, pervasive computing- potentially- gets us back into place:

"Instead of pulling us through the looking glass into some sterile, luminous world, digital technology now pours out beyond the screen, into our messy places, under our laws of physics; it is built into our rooms, embedded in our props and devices-everywhere" (McCullough 2005)

What has happened is that networks have become localized; spaces of flows have become grounded. Along the lines of McCullough, Gordon and de Souza e Silva argue that, quite literally, the distinction between bits and atoms no longer applies (Gordon, e Silva 2011). The two have merged as computing has become embodied and ubiquitous. When we carry location aware technologies with us, like a smart phone, information become localized, mobile AND networked . Everything, as Gordon and de Souza e Silva, argue, has become located or locatedable . One could add to this that there's nothing new in everything being locateable, geography never ceased to exist as Manuel Catells predicted. However, location has become networked and mediated in ways that are new and with implications that we are still trying to get our heads around. This sea change is termed networked locality, or net locality, by Gordon and de Souza e Silva.

These networked, mobile interactions add a complexity to place rather than making it redundant. The enrichment of location mediated through an entanglement of information and situated computing, suddenly turn a seemingly neutral set of geographical coordinates into *place*, imbued with experience, emotion, memory etc. This happens every time we check into a location on Foursquare or we post a picture

on Facebook with a smart phone. As Jones et al show with the Rescue geography project (Jones et al. 2008), spaces and places that on the surface seem bland and without a meaning, become alive once memories and emotions are captured in a spatial context through GPS-positioning. This embodied interaction, enabled by location aware technology, between the physical environment, the social context and the user, makes for a fruitful nexus where knowledge and information about how we use and perceive the urban environment emerge:

“Mobile digital devices, accompanying individuals as they move through space collecting embedded situated information, open up opportunities for people to restructure space effectively and to initiate more fluid and serendipitous activities and interactions in any place(Paay, Dave & Howard 2007)”

Manovich (Manovich 2006) equally looks at this interplay between (urban) space and information, enabled by locative media and works around the concept of augmented space:

“Augmented space is the physical space overlaid with dynamically changing information. This information is likely to be in multimedia form and is often localized for each user.”

Layers of metadata surround our physical environment and thus augments space-and place we would argue. Consequently, as Mitchell notes (Mitchell 2000)visible landmarks and edges have, to some extent, been replaced by a digital layer which helps us navigate through the city. This poses an interesting perspective on the way we perceive and design urban spaces. However, as Thomsen and Jensen argue (Thomsen, Jensen 2008)

“ the politics of visibility is about using the new performative urban architectures as windows into a discussion and awareness about the opportunities and threats that cities face. The technologies themselves need to become visible to the communities for them to realize the field of action they offer.”

It is exactly this visibility that this research project seeks to tap into and explore in relation to planning processes. By employing GPS-technology to track everyday movements, tacit knowledge becomes both visible and tangible and thus, as Thomsen and Jensen argue, potentially become a tool to realize the potentials embedded in the urban environment. Viewed from this perspective GPS mappings of peoples movements represent the city as *becoming*, as assembled through local, embodied knowledge. The mapping thus becomes a collaborative act of weaving the city through ones foot-steps and the mobile technologies enable a location-based narrative.

In the following section we look at how we can merge the notion of net locality with participatory planning approaches and how we, by employing location-aware technologies, can identify local and embodied knowledge.

The role of local, embodied knowledge

Drawing on participatory and communicative planning approaches, the paper seeks to explore novel ways of developing appropriate methods to enhance participation and capture and include local knowledge in the planning process .

Communicative planning can be seen as a response and a challenge to a rational-comprehensive planning approach. The type of knowledge that feeds into RCP planning process has tended to give privilege to formal written language and quantitative methods, leaving out local, experimental and “irrational” knowledge (Rantanen, Kahila 2009). Communicative planning thus critically scrutinize the knowledge that feeds into the planning process and by insisting on a deliberative, process-orientated approach unpacks the “black box” which the technocratic modernist planning regime created. Consequently, the communicative approach on is based on the idea that there are knowledges, in plural. Knowledge is not only to be found in the planner’s office, but knowledge can also be local and experimental- meaning that information can take many qualitative shapes also (Innes 1998). Planning thus becomes about *communication* between the stakeholders involved (or excluded) in the planning process. People ‘make sense together’ through communicative action. Dialogue, listening and learning can add up to consensus about knowledge of a given, contextualized situation. The emphasis is therefore on problem-definition rather than problem-solving.

Opposing theoretical approaches question the stance that consensus is possible and even desirable in a world of conflicting and opposing interests- the critiques are that communicative/collaborative approaches tend to exclude the issue of power or address it as a negative force. We will not explore the inherent tension and debates on the issue of power in planning theory. However, it should be noted that the power to decide what counts as knowledge still to some extent defines the reality (Flyvbjerg 2003) That is not to say that power-relations cannot be challenged or overcome, but they must be taken into account when talking about knowledge and information. Power-relations are fundamental to how people enter the communicative arena and ultimately how they embark on their strategy-making. Healey (Healey 1997) emphasizes the ‘making sense together’, but she also point out that it is by ‘reading the cracks’ in power-relations that communicative action can change how dominant perceptions of reality are (in)formed.

Insurgent planners such as Sandercock (Sandercock, Lysiottis 1998) and Holston (Holston 1998) acknowledge and actively work with notions of diversity and conflict. But more importantly, power and knowledge it is also understood as spatial and embodied. This allows for a deeper engagement with *ways of being and ways of knowing* (Sandercock, Lysiottis 1998). Understanding planning not just as a detached process but also as a spatial, embodied practice, opens up for subversive aspects. Following the emphasis on *local, experimental knowledge* it would seem relevant to engage with peoples relationships with places. This relates back to the context of the research project: there is a lack of appropriate methods geared towards collecting and representing local place-based knowledge. Manzo and Perkins point to this lack of engagement with “place” within communicative planning and suggest that marrying the two can provide for a more grounded and ecological approach to planning (Manzo, Perkins 2006). By connecting place-based knowledge to the knowledge production in the communicative planning process, an embodied way of knowing is embraced. This way of framing knowledge draws on a phenomenological tradition which precisely sprung out of a critique of the modernist movements’ annihilation of place. However, this type of embodied, place-based knowledge needn’t be rooted and sedentary, on the contrary it might challenge introvert notions of for example community and neighborhood- notions which are not necessarily defined just by geographical propinquity but also by networks and cognition. Therefore it is essential to investigate local accounts of what constitutes a neighborhood or a community in order to create relevant and meaningful urban interventions. As Cecatto and Snickars (2000:928) put it:

(...)the concept of neighbourhood implies the concept of place which is richer than location (around which all GIS are built) and often much more important to people who live in there.(Ceccato, Snickars 2000)

Within the planning literature there is an emerging field exploring how location-aware technologies can be utilized to collect place-based knowledge about the urban environment and thus address the above issue (Gordon, Koo 2008, Evans-Cowley, Hollander 2010, Gordon, Manosevitch 2011). Particularly interesting is the notion of placeworlds, coined by Gordon and Koo, drawing on Habermas notion of lifeworld:

“Places become placeworlds when their inhabitants imbue them with meaning through communicative action—the reasoned deliberation, with the goal of mutual understanding, that animates all lifeworlds”

The idea of a place-world as something emerging through shared responses and deliberations over urban space is promising when looking at not only the participatory, but also the deliberative aspects, of knowledge production through location aware technologies. Furthermore, as Gordon and de Souza e Silva argue:

“[Net localities] are social spaces filled with digital information. But they are more interesting than that. Net localities include remote users as well. Users connected to each other and to localities via mobile devices are altering the conditions of physical space. *To be local means to be engaged with the local conditions of physical spaces, whether the user is physically proximate or not.* This is a remarkable shift in how we understand urban space and one that becomes more remarkable when we confront the issue of co-presence. (Gordon, e Silva 2011)

In the following the case study will be presented and we will discuss the preliminary results and the potential of location aware technologies to create the deliberative, transcendent place-worlds described above.

The case study

The empirical backdrop of the paper is the housing estate Vollsmose, which stands as a typical example of the Danish welfare city. Postwar urban planning and architecture in Denmark was nested in the emergent welfare state, based on principles of equal access to housing, education, health care, jobs etc and the suburban modernist housing estate tapped in on the architectural ideals of the CIAM movement, creating machines for living. Even if the modernist movement has been criticized widely for its monotonous, universal and homogenous design and planning solutions, it is fair to keep in mind the context and values from which it took form, providing vastly improved living conditions for a large number of people (Niels Bjørn (eds.) 2008, Bech-Danielsen 2004, Vagnby, Jensen 2002). Meanwhile, society has changed dramatically since the heydays of the welfare city in the 1960's- and so has the resident base of the suburban modernist housing estate. Reflecting societal changes, the suburban modernist housing estate has in many instances become a multi-ethnic neighbourhood and consequently the expectations and experiences of the residents have changed over the years.

Today over 70 nationalities are represented in Vollsmose. Roughly 10.000 people live in Vollsmose, allocated on 3500 households and almost 40 percent of its residents are under the age of 18. Planned according to modernist planning ideals, the housing estate has a predominantly residential character. The housing stock consists of social housing accomodation, owned and managed by three different housing

associations. When Vollsmose was planned and developed in the 1960's it represented the modernist "machine for living", providing modern flats of a comparatively high standard, social services such as schools and nurseries and vast green recreational areas. Accordingly, the infrastructure within the area is geared towards to pedestrians and cyclists and there is a sheer absence of access roads for cars. Motor traffic is directed around Vollsmose and in effect the area is bordered by large roads. Hence Vollsmose also has become known as "the square".



Fig 1. Aerial photo of Vollsmose

As a part of a revitalization-process, Odense Council is currently developing a new master plan, which aims at transforming Vollsmose from a mono- to a multifunctional neighbourhood.. In order to include residents, and in particular young peoples', perspectives on the neighbourhood, a methodological set-up, using GPS-tracking in an on-line environment, has been developed . The set-up will be explained in a subsequent section. The initial idea behind employing GPS-technology was that it enables residents "to draw Vollsmose with their own feet". This was, from the councils perspective, seen as a positive starting point for a dialogue between planners and residents about how to develop

Vollsmose. By enabling residents to create their spatial narratives about how they use and value Vollsmose, the knowledge-base, from where the neighbourhood will be further developed, will have an extended ownership. Thereby, the idea and hope is, to also extend the sense of ownership to the future master plan for Vollsmose.

The aim of the Vollsmose survey is three-fold: to assemble spatial information about how young people use the infrastructure of the neighborhood, to create increased awareness and reflections amongst residents regarding qualities of living in Vollsmose and finally to diversify the public image of Vollsmose. The knowledge gathered throughout the survey will thus feed into the on-going process of assembling a new master plan, but it will also serve to create collective reflections and deliberations regarding how to shape Vollsmose in the future and the place-specific qualities regarding Vollsmose, not only as a residential area, but as a multifunctional neighborhood.

As the research project is still in progress, the paper mainly reports on the methodological aspects of the project: how did the smart phones work as a tool to engage residents in collecting local place-based knowledge about spatial behavior and uses of Vollsmose.

The respondents

As noted above, almost 40 percent of the residents in Vollsmose are under the age of 18. Therefore the survey focuses on including their perspectives on their neighbourhood. 20 young people from the

community group Unge2Unge between the age of 16 and 21 volunteered to participate in the survey. All participants reside in Vollsmose and have different ethnic backgrounds.

A number of reasons speak for voicing young people in the context of the research project. It is widely recognised that young people are often over-looked in design and planning processes as well as they often become marginalized (and paradoxically very visible) in the actual urban environment (Driskell 2002, Børresen, Schytte 2008). Travlou identifies two major gaps in the research on teenagers and their use of urban public spaces (Travlou 2003). Firstly, research on “older” teenagers (the age of 15-18) studies tend to focus on teenage *delinquency* rather than their everyday experiences and practices of the urban environment, thus generating an image of teenagers being trouble-makers rather fellow-citizens going about their everyday business, or as a resource to the planning process. Schytte and Børresen (2008) research on young peoples’ use of outdoor public spaces in social housing estates confirms this tendency. They note that the media often focus on criminal and violent behavior and thus draw a picture of housing estates as problematic when in practice these issues are not a main concern teenagers’ everyday life. Secondly, Travlou identifies a need to create more in-depth research on teenagers’ everyday life experiences in order to inform public policies that address and include the need of young people. Schytte and Børresen (2008) also note that it is worthwhile investing in meaningful open public spaces for young people. However, their needs have to be identified and addressed in policymaking and in the design-process. On the other hand, because children and young people often have a close bond to the “home base” it also means they have a more detailed and nuanced perception of their neighbourhood (Rasmussen 2004, Loebach, Gilliland 2010) Such insights are valuable when challenging and nuancing dominant views on planning and urban design processes and outcomes.

The methodological set-up

As a novel approach to GPS-tracking the research team, in collaboration with Odense Council, decided to try out smart phones as a GPS mapping-device for the survey. The reasons for using smart phones rather than the GPS-device (Lommy Phoenix) previously used by the Diverse Spaces research team were multiple: 1) the smart phone allows for a more dynamic engagement with locality as the participant can describe the urban environment using text and image 2) it was assumed that the participants would find it easier to remember to bring along a mobile phone rather than an external GPS-device during their daily routines 3) finally, smart phones allow for undertaking GPS-tracking without having to invest in expensive tracking equipment; a perspective that potentially makes the methodology much more accessible in future research and assessments of the urban environment.

It was decided to use the android platform as it enables open source development and alteration of applications. HTC Wildfire smart phones with an Android 2.1 platform were chosen as its functionality and price-level (approximately 2000 Danish kroner) met the requirements of the survey. A main concern regarding the use of smart phones was the durability of the battery when the GPS is active. Tests showed that the battery last about 6-7 hours while the GPS is running and therefore it is essential that participants charge their phone frequently-when at work, school or at home.

The open-source tracking application Open GPS tracker (downloadable for free from the Android Market) was used as it allows for easy export of tracks in a KMZ-format and the application furthermore enables the participant to include text and image to their tracks in a straight-forward fashion. It was

decided to create a web interface which allows for an online visualization of the tracks collected by the participants with the Open GPS tracker application: <http://aod-dus.cs.aau.dk/vollsmose2011/index.html>.

Before commencing on the survey, the participants register a user-profile on the website and sign a terms and conditions-form, including an ethical statement regarding their privacy and protection of data. The information gathered through the user-profiles is stored in a MySQL-database along with the tracks that participants also upload through the website. This will allow for further GIS-analysis of the collected data. The set-up of the database and web interface is sketched in the flow diagram below:

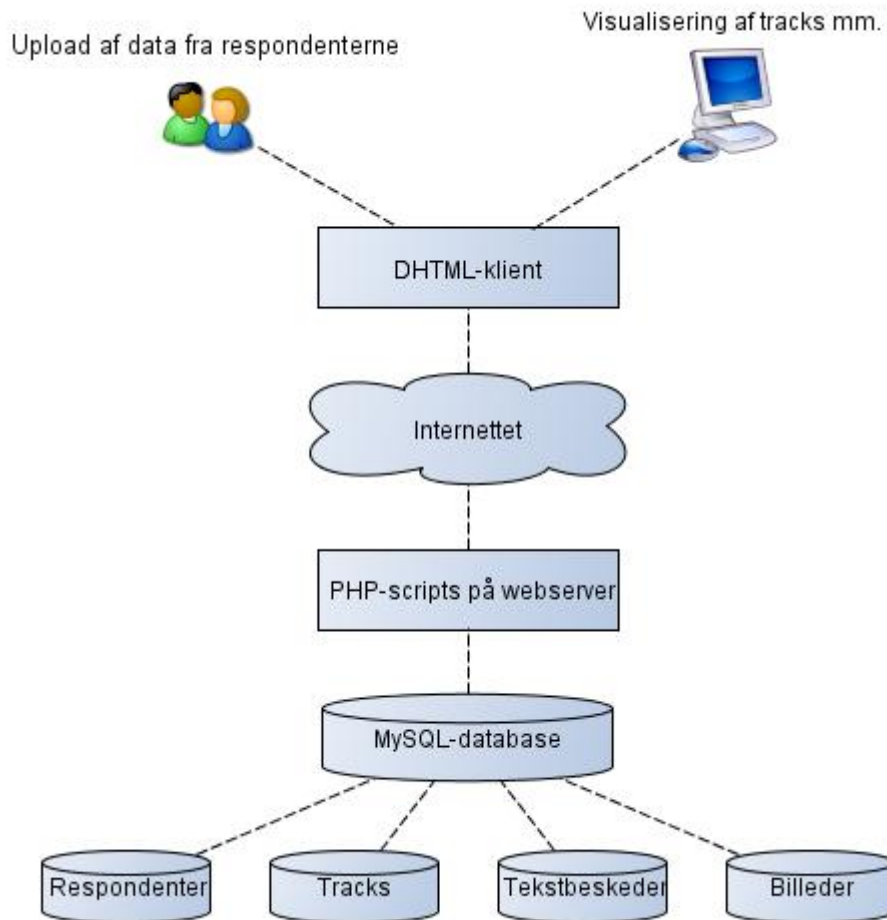


Fig 2. Set-up of web interface and database

In order to protect the privacy of the participants, their home address was blurred in a rectangle of 50x50 meters on the on-line visualization of their tracks. As Vollsmose consists mostly of multistory housing blocks this method was deemed efficient to distort information about the participants' home address. Secondly, only information about user-alias, age and gender were made publicly accessible, thirdly the web interface only showed tracks from the last 48 hours. That way long sequences of location data, which could be sensitive to make display, were not shown. Also, participants only upload finished tracks and thereby real-time tracking was never an option. Finally, the Open GPS tracker only timestamps intervals and not single sets of coordinates, which means that the visualization of a track will only show *where* a

given participant was, not when. This feature, on the other, hand puts a constraint on a further GIS-analysis of movement and stays (Jensen et al.).

The survey ran between the 2nd of May and the 16th of May 2011 and the participants were asked to track their movements and geo-tag images and texts over a period of 7 days. The participants get to keep the smart phones once the survey is completed. When all tracks are collected, the data will be analyzed for a more in-depth investigation of the flow through the infrastructures of Vollsmose. Furthermore, a series of walk-along interviews will be carried out using the participants' tracks as the starting point for the interview (Jones et al. 2008, Kusenbach 2003). The walk-along interviews will help shed light on the more qualitative aspects of the GPS-mapping, looking at the participants actual uses of the urban environment: what are their favourite and least favourite places- and why. Special attention will be given to the participants uses of front- and backstage strategies when appropriating the urban environment, drawing on Goffman(Goffman 1966) and Clark and Uzzells' (Clark, Uzzell 2002) research on which environments afford teenagers' social interaction and retreat.

Preliminary Results

Even if the data collection is not yet finalized at the time of writing this draft paper, it is still meaningful to look at the preliminary results of GPS-mapping and review the appropriateness of the method as a tool to collect local, place-based knowledge. Below is a screen dump from the web site showing a series of tracks. Each individual track is automatically assigned a unique colour. Images and texts are symbolized by the letter and the camera icons. The information embedded in the icons will show by clicking on them.

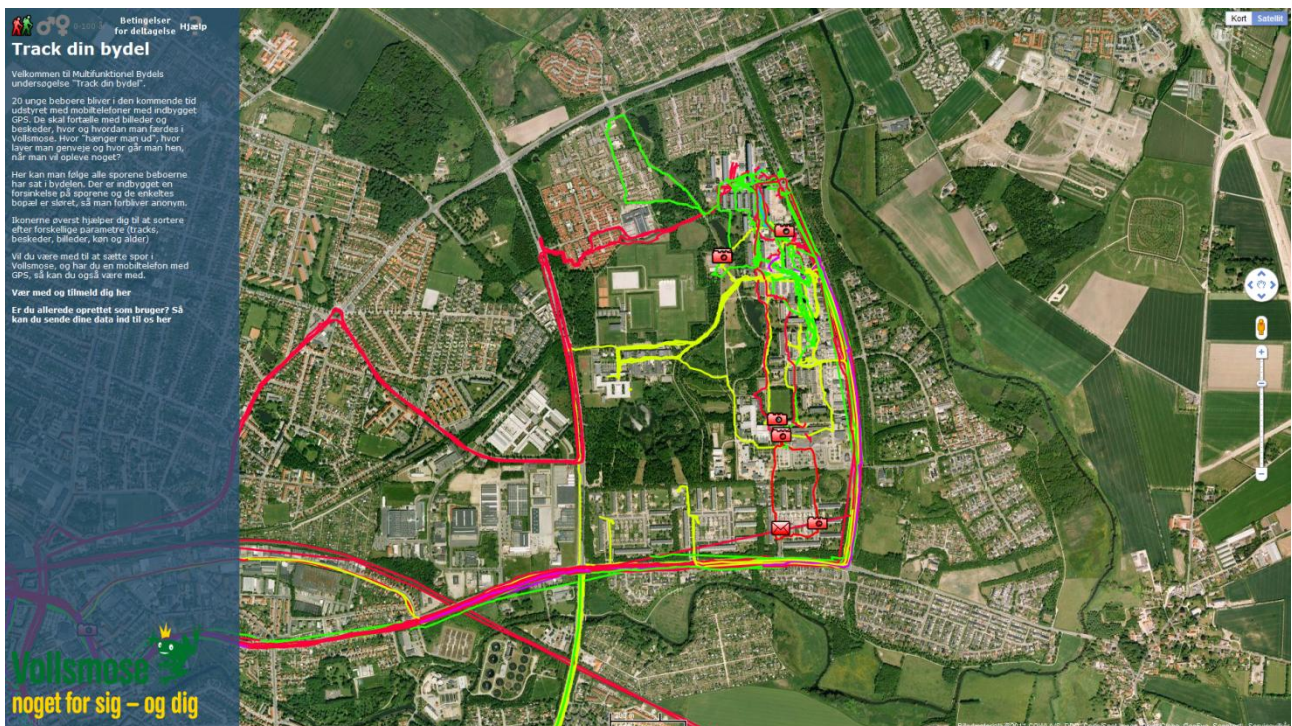


Fig. 3. Visualisation of tracks

As shown above, the visualization of the participants GPS-tracks on the web interface provides instant feedback to participants, the general public and stakeholders- in this instance the community group

Unge2Unge, Odense council and the research team. The visibility and accessibility of the tracks, we would argue, enables collective deliberation and reflection regarding the uses of Vollsmose. The place-based knowledge, instantly captured by the GPS-tracking, is supplemented by qualitative data like pictures and texts. This supplement enables a more personalized narrative of the Vollsmose which the participants “draw with their feet”. Returning to Gordon and de Souza e Silva this shows the potential of applying location aware technologies as a tool to both include and expand local place-based perspectives on the urban environment-and thereby create *placeworlds*. This particular aspect was picked up by a respondent, who was thrilled at the prospect of “showing a friend in South Africa around his neighbourhood”. The potential of the track visualizations to create collective deliberations will be explored further in relation to a series of consultations with the residents of Vollsmose in the late summer of 2011.

Furthermore the emergent nature of the GPS-map also serves to challenge dominant views on what constitutes Vollsmose as neighbourhood, both in physical and social terms. What the GPS-maps show is, that the interaction between location-aware technologies, user and the urban environment, creates a dynamic information loop which helps capture the urban as responsive and emergent phenomenon. This in turn, we would argue, can help diversify stale and rigid conceptions of how a neighbourhood is made up and thus help residents collectively pin point and identify alternative uses and planning agendas, as pointed to by Cecatto and Snickars (Cecatto, Snickars 2000). This identification is based on place-based, grounded knowledge and it is precisely this intricate relationship that GPS based mapping will help capture and make tangible; or even assemble in Latourian terms by “extending” the body and its senses through the GPS technolog: The participant becomes a ‘sensor’ creating embodied representations of place (Jensen 2010).

Finally, as a means to collect quantitative data regarding the uses of the infrastructures of Vollsmose, the smart phone has worked reasonably well. The collected tracks are generally of a good quality and it is easy for the participants to “include” the mobile phone in their daily routines. However, for very precise, “top-down” quantitative surveys there are some issues regarding the data collected with the Open GPS tracker: the application timestamps intervals, not single sets of coordinates. This restricts the type of analysis which can be performed with the data-set. Also, the participants have to actively share their tracks, either by uploading them or by emailing them. This has posed a practical challenge, many participants found this process tedious. A certain level of engagement is therefore required by participants and can pose a constraint to survey outcomes.

Concluding remarks

As this paper is written as a form of mid-way evaluation, final conclusions on the results of the survey would be premature. However, what we have found is, that a promising potential lie in employing smart phones as a tool for GPS-tracking and subsequently as a planning tool. What is particularly promising is that the technology is accessible and widespread and therefore forms a large field from where place-based knowledge can be “harvested”. However we would like to suggest that further research look at how to operationalize and structure collected data in the context of the planning practice. As indicated above, there is almost no limit to the amount of data that can be collected; however we need ways of “packaging” and processing the data.

Finally, the method allows for data collection orchestrated from a bottom-up perspective. Rather than viewing GPS-tracking as a quantitative, top-down surveillance tool, it can be employed as a tool that lets the citizen take the planners by the hand and show them *their* city. The location-awareness, implied in the technology, is vital because it allows extending the experiences of the urban environment beyond the individual and thereby creating what Gordon termed *placeworlds*. This concept calls for further exploration and elaboration, both in theoretical and practical terms.

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