

A Networked Communal Plant Watering System

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INTRODUCTION

The Common Roots project is a networked communal plant watering system situated throughout the homes of a residential block of flats, in part installed in a communal garden area, and in part installed within a private apartment. Plants are paired via wifi, and in watering one in the communal area a plant is automatically watered in a private home, and visa versa. It aims to connect people with each other, whilst bringing plant life into their 'region of concern' [7].

The field of public health is beginning to understand the implications of the complex interrelated system of health and environment. Research shows that perceptions of being disconnected from ourselves, each other and the environment contributes to poor physical and mental well-being [8]. In her review of the field Nurse proposes a Public Health Framework for well-being based on principles of ecological health. Thomas Boleyn & Morteza Honari [1] argue that the world is a 'highly interactive, dynamic, non-linear adaptive system', and a transdisciplinary, multi-dimensional and holistic approach to human health, culture and environment is a requirement of our time, 'Such factors, whether of a global or individual nature, impinge upon the health and environment of individuals, communities and the globe'. In his 'Integrative Ecological Framework' Phil Hanlon argues we need "radically different ways of being and doing" [5], and goes on to suggest combining art, science and ethics fields in order to address "the cultural traits that work to undermine individual and social levels of health and well-being: excessive materialism, individualism and consumerism" that underpin the most intractable contemporary health problems we face today; obesity, addiction, and depression anxiety[5]. Stevens[10] argues that our concepts of self and other, health and disease, and all the relationships between them are based on our physical interactions with the world around us. He argues that if the environment changes then these interactions change, but that our concepts often remain the same. He "offers an alternative view of well-being, shifting the emphasis away from the individual and his/her illness and instead inviting consideration of the more dynamic relationships between people and place" [10].

These sentiments echo Marxist materialist philosophy, that argues humans create the world around them, and in-turn are created by it. For Guy Debord, founder of the art movement Situationists International, 1957, and for Henri Lefebvre, the late 20th century Marxist geography philosopher, this simple concept had profound

implications. The Situationists concerned themselves with art in, and of, everyday space. They explored the perceived social, political and environmental narratives that make up the city, and through subversions and interventions within the city and it's inhabitants they asked, what is everyday space, and what makes a city? Through practices such as psychogeography, they devised alternative ways of experiencing the city such as the Derive [3], provoking alternative and radically new ways of understanding and acting out 'everyday life' in everyday space, unpicking how we exist and experience the city, how the city shapes us, and how we can reshape the city in order to transform society.

"The kind of city that we want cannot be divorced from the kind of people we want to be" David Harvey (Harvey, n.d.)

We design spaces, and behave in them accordingly. We inhabit a feedback loop of our own making. This feedback loop can be self-reaffirming, giving validation to dominant narratives of culture and politics. David Harvey uses the term 'Geographical Unconscious' to describe "the way in which we think about space and time as if it is natural, when it has been constructed around us" he goes on to say that "if it has been constructed around us, it can be reconstructed".

Social networking sites provide opportunities for people to connect and belong to communities, but are often self-selected, and algorithms selecting content individuals can see, such as Facebooks Edgerank [4], mean that debate stays within limited social circles, often of people with the same opinion. As such, debate and discussion remain comfortable and unchallenged, limiting understanding and social progress. Furthermore there is building evidence that social media platforms such as Facebook and are having a detrimental effect on the development of healthy social connections. The trend in more recent times on the individual to survive and "succeed" in isolation exacerbates this. The development of Smart Homes and Cities sees our everyday activities, in which we would normally be out interacting with fellow citizens, being streamlined for efficiency. Yet studies show that people that feel a strong sense of belonging also have a greater feeling of well-being, compared with those that do not. Local networks differ to online communities in that they can offer shared local resources, build social capital that leads to better living conditions, and individuals are more likely to help each other without the need for return [9]. What's more is that a group of people with a strong sense of local community are more likely to mobilize themselves in issues of security and justice.

The impacts of modernity on society are emerging, as trends of poor mental health and well-being begin to take hold on epidemic scales. Urban communities in large cities such as London are being put under stress due to the gentrification of estates, and increasingly transient populations. But, evidence shows that in reconnecting with nature we can address some of these issues in several ways, from attention restoration [6] in individuals, to adopting a more sustainable way of life.

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PDC 2018, August 2018, Hasselt and GenK, BE

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It is not yet possible to know how the coming smart cities shaped by technology will shape their citizens, but we are on the cusp of a potentially profound change to the way we organise ourselves in the developed world. It is imperative we find ways of applying the unique opportunities technology affords us in connectivity, amateur and DIY technologies, openness and accessibility, to create methods for the production of creative, novel and inspiring spaces that can accommodate the complex interconnected socio-political and environmental ecologies within everyday spaces, in order to cultivate healthy, happy and sociable citizens, that are not in conflict with the natural environment.

COMMON ROOTS PROJECT

The Common Roots project emerged from a two-day research think tank/hackathon, The PlantHack Symposium and Hackathon in Social Media and Interaction at Emmanuel College, Cambridge University, 2015. The design brief was to develop HCI tools that go beyond the traditional fabricated HCI hardware tools, and to design for sustainability through the use of plants. The design outcome 'Planticipation' designed by a team from Queen Mary University of London¹, sketched out a communal watering system and sound art installation aimed to promote social connections via plant life, as well as to create a space for shared responsibility and action, while improving the built living environment. The study took place in London in September 2017. Potted plants with integrated buttons and watering system were installed for 4 weeks, part installed within individuals private apartment/home (figure 1), and part in a communal garden area (figure 2). In line with community-based participatory design practices [2] the study first introduced the participants to using technology to interact with their community members a way they had not experienced before, followed by a group workshop exploring the salient topics and concerns that arose from this experience, and that could be imagined in the use of technology for community awareness and cohesion. Themed outcomes went on to influence a second iteration of the system addressing these concerns.

For plant hosts the system worked well, people enjoyed using it as a watering tool, and they enjoyed the remote interaction, feeling a sense of excitement, and of awareness of other members of their community when the system was being triggered in their homes, or when they saw evidence of it's use. However, more feedback of who was participating in the plant watering activity was needed, which must also balance the sense of privacy the current system supported. The intervention raised questions about the implications this kind of system may have on the individuals' sense of privacy and security. Discussions also began to frame the ways in which the participants as individuals would like to contribute and feel part of their community, what they can offer, don't want to offer, and how that might take form through a system like this. Ways in which the participants felt they can contribute to and build upon their community became apparent in their shared value of the communal spaces, and in feeling they would like to use the spaces to join in activities, to meet each other, and to use activities in the communal space to overcome differences. They can offer time, and participation in a community endeavors, noting however, that



Figure 1: Plant host installation in the home, showing control box, water reservoir and pump, and waterspout.

community breaks down when the effort put in becomes a chore. A discussion around a shared activity information system explored how technology could support their wishes to meeting up, share fun activities and the joint use of shared communal spaces, "even if just to read a book in the garden with someone".

The outcomes of this study and participatory design workshop were used to frame a second iteration of the study around 5 key themes:

- Provide opportunities for the community to meet.
- Provide feedback of who is participating in the activity.
- Utilize the green spaces around the block.
- Provide a commonality.
- Balance privacy and community

FUTURE WORK

The new system has been designed with all 5 themes in mind. It will be installed between private spaces only, and by watering a plant in one flat it will randomly select the recipient to the watering in another flat. As a feedback mechanism participants will see all community activity, by way of an indication of who to is watering who's plant. In addition to the watering feature, the box will also have the added feature of an invitation to tea button. This button can be used by any participating household, and will turn on an invitation light on all participants boxes. This feature aims to provide an opportunity to meet and utilise the green spaces, while providing the commonality, tea is shared across most cultures, yet steeped in historic rituals unique to each. Security and privacy features were considered in the design of the feedback configuration to protect against harassment and intrusion in that the participant watering is randomly selected, and everyone's usage behavior will be displayed to the community as a whole. As before a 'disconnect'

¹Barden P, Concannon S, Knecht K, McDonald S, Milajevs D, <http://www.planthack.org>



Figure 2: Communal garden installation, showing plant pots with buttons for watering, and waterspouts.

setting provides people the chance to leave the community if desired. The invitations to tea are anonymous, aimed at being open and inclusive to all, avoiding selective group meeting.

ACKNOWLEDGEMENTS

We'd like to thank to all participants for their time and commitment to the project. This research was supported by the EPSRC and AHRC Centre for Doctoral Training in Media and Arts Technology (EP/L01632X/1).

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Sophie is a PhD research student at Queen Mary University of London, on the Media & Arts Technology CDT. Her research explores technology to support community cohesion and promote the use of communal green spaces in local urban residential environments, and designing for communities through participatory practices. As a visiting researcher at Culture Lab, Newcastle University in 2014, she published work at Creativity and Cognition 2015 that explored remote experiences of natural environments on attention restoration, through an integrative art installation.

Sophie is an artist, techie tinkerer, developer and creative producer, who's recent interests lay in providing accessible learning opportunities for creative exploration of technology. She has been designing and delivering creative technology workshops since 2006, including video production, web development, physical computing and wearable technology and regularly produces workshops and events for clients including V&A, Barbican, Generating Genius and SPACE. She is co-founder of sketchPatch.net, an online programming playground which mapped the lineage of a collaborative piece of code art, and toured various arts and science festivals including Maker Fare and Barbican Weekenders. Sophie also co-founded MzTEK, a women's art and technology education initiative, through which she has collaborated with Guerilla Science and Kobakant to design and deliver The Hacked Human Orchestra, and co-produced the Chi-TEK tea party in partnership with the V&A Sackler Centre.

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