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# Report from participation in ACM SIGCHI Conference on Designing Interactive Systems (DIS2017)

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# 1 ABSTRACT

DiversIoT ….

# 2 EXECUTIVE SUMMARY

DiversIoT document ….

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# 3 ABOUT CONFERENCE

DIS is owned by the ACM Special Interest Group on Computer-Human Interaction (SIGCHI). The conference creates an international arena where designers, artists, psychologists, user experience researchers, systems engineers, and many more, come together to debate and shape the future of interactive systems design and practice.

## Motivation for participating in this conference

The theme of this year's conference was: **Space, Place and Interface – Bridging Knowledge, connecting people**. Having as its main focus to bridge and connect people – across disciplines, practices, places and understandings, the conference fits very well with the aim of our project. The participation in this large event was also meant to broaden the ethnographic representation of the research in IoT. Such an approach to IoT we see as emergent as advancements in interactive technology continue to blur the demarcations between people and data, and between things and software. Our purpose was to establish connections with interaction designers, HCI researchers, and researchers from social sciences, so to get informed about research conducted by these in the field of IoT and the new human interaction paradigm it brings. These diverse forms of interaction also bring new security concerns since humans are known to be highly unpredictable.

## Knowledge gathered during the conference

Generally throughout the conference the purpose, as a participant was to get a glimpse of how technologies involved in IoT, with its social challenges like privacy and security, are perceived by the researchers in HCI. The report will show which aspects of these technologies are of most interest for the HCI researchers and how these are impacting the life of the users, as it comes out of the research work presented at this conference.

# 4 PARTICIPATION IN WORKSHOPS

The most relevant workshop that we attended was: **People, Personal Data and the Built Environment.** This was of special interested as it considers regulations regarding the gathering and manipulation of the users' personal data. The IoT considered here is the one embedded in the buildings environment of the users, and it covers both the public and private space.

## The purpose of the workshop

This workshop brought together a community of researchers and practitioners interested in personal informatics and the design of interactive buildings and environments to foster critical discussion on the future role of personal data in interactions with the built environment.

Several of the participants have a background in architecture, as the case of the Holger Schnadelbach, one of the organizer of the workshop. Dr Holger Schnädelbach is a Senior Research Fellow in the Mixed Reality Lab (MRL), Computer Science, University of Nottingham. He received a Diploma in Architecture (DipArch) from the University of Nottingham in 1998, which was followed by a Masters in Architecture (MArch) in 1999. He was awarded a PhD by the Bartlett School of Architecture (University College London) in 2007, which was concerned with the spatial aspects of the relationship between physical and virtual environments, leading to the prototypical Mixed Reality Architecture.

His work at the Mixed Reality Lab concerned the design, implementation and evaluation of interactive systems, ranging from devices to environment.

Personal data and buildings seen as sites for capturing of personal data, are the two main topics explored by the workshop and the research presented during this workshop.

The motivation of choosing this topic is that personal data is increasingly important in our lives. We use personal data to quantify our behaviour, through health apps or for 'personal branding' and we are also increasingly forced to part with our data to access services. With a proliferation of embedded sensors, the built environment is playing a key role in this developing use of data, even though this remains relatively hidden. Buildings are sites for the capture of personal data, such as ID card gateways or wifi hotspots. This data is used to adapt buildings to people's behaviour, and increasingly, organisations use this data to understand how buildings are occupied and how communities develop.

*Illustration 1*

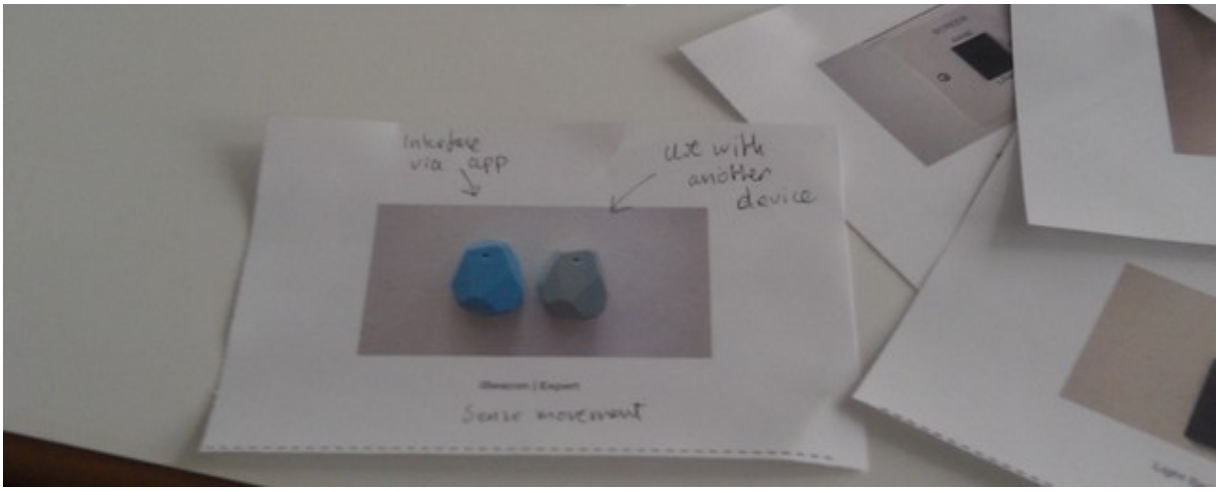
## Activities during the workshop

The workshop started with the researchers presenting themselves and the research submitted to the workshop. This was followed by activities where the researchers worked together on a shared design exploration. Thus the workshop has created a good arena where one could get in contact directly with researchers interested in the social, personal and technical consequences of integrating IoT in the build environment.

In the part one of the design activities, we were given some card packs with images depicting different interfaces (*Illustration 1*). We were asked to discuss and annotate the functionality of the interfaces.

Things to consider when doing this, were: inputs, outputs, addressed to / meant to be used by, other potential users, how do the contribute to personal data?

Some outcomes of the work in this first part of the workshop is illustrated bellow.




Part two followed with the requirement of sketching a system. The requirements were the following:

- Pick 10-15 cards
- Sketch and describe a system using the interface pack
- Use a target sheet to pin interfaces down, makes links and illustrate
- Multi-user application

Context: The offices of a city council

Pick 1

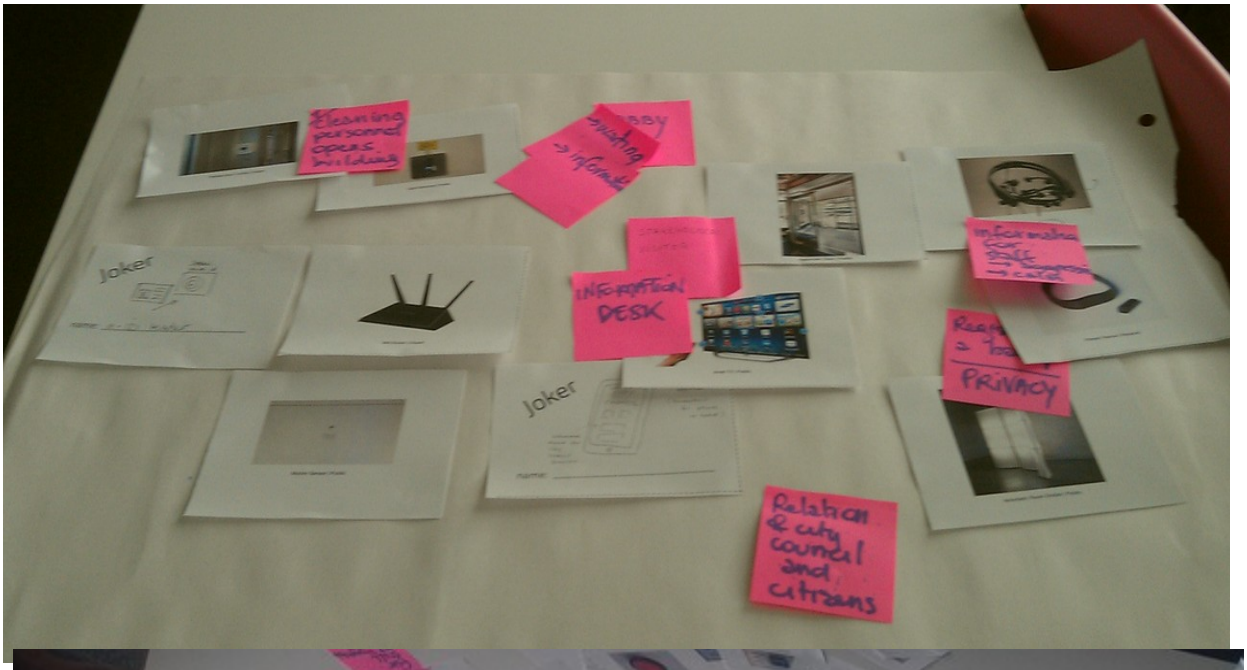
A- The lobby (public / private interface)

- B- Circulation (corridors, stairs, lifts, escalators)
- C – Communal staff kitchen

Things to consider

- The proprieties of the space
- The system functionality
- Personal data flows
- Stakeholders

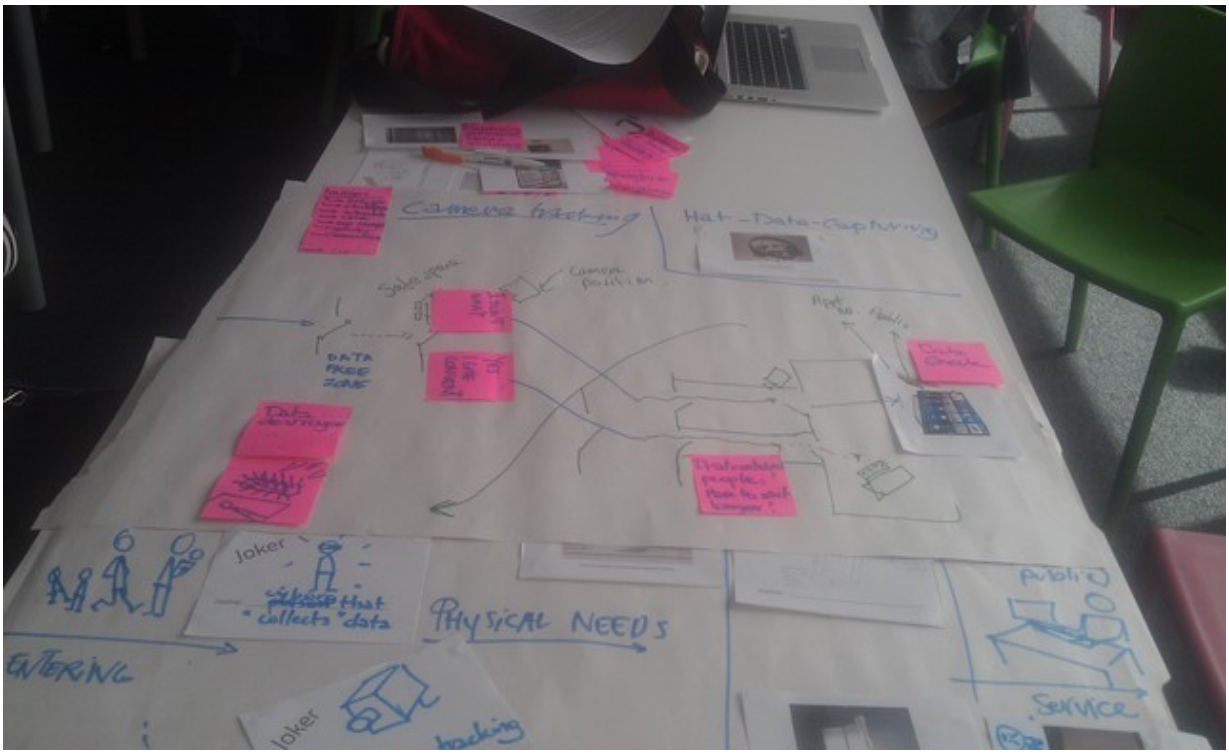
The results are illustrated bellow.




In the third part, more requirements were added for the systems. The system should be redesigned and adapted to be fit for the following user groups: children and elderly. The design should consider the regulations from the European General Data Protection Regulation (GDPR): End user rights, Data protection & consent (see *Illustration 2* for the cards created to support us, by informing us about these regulations).


*Illustration 2*

The process and the results are illustrated bellow:

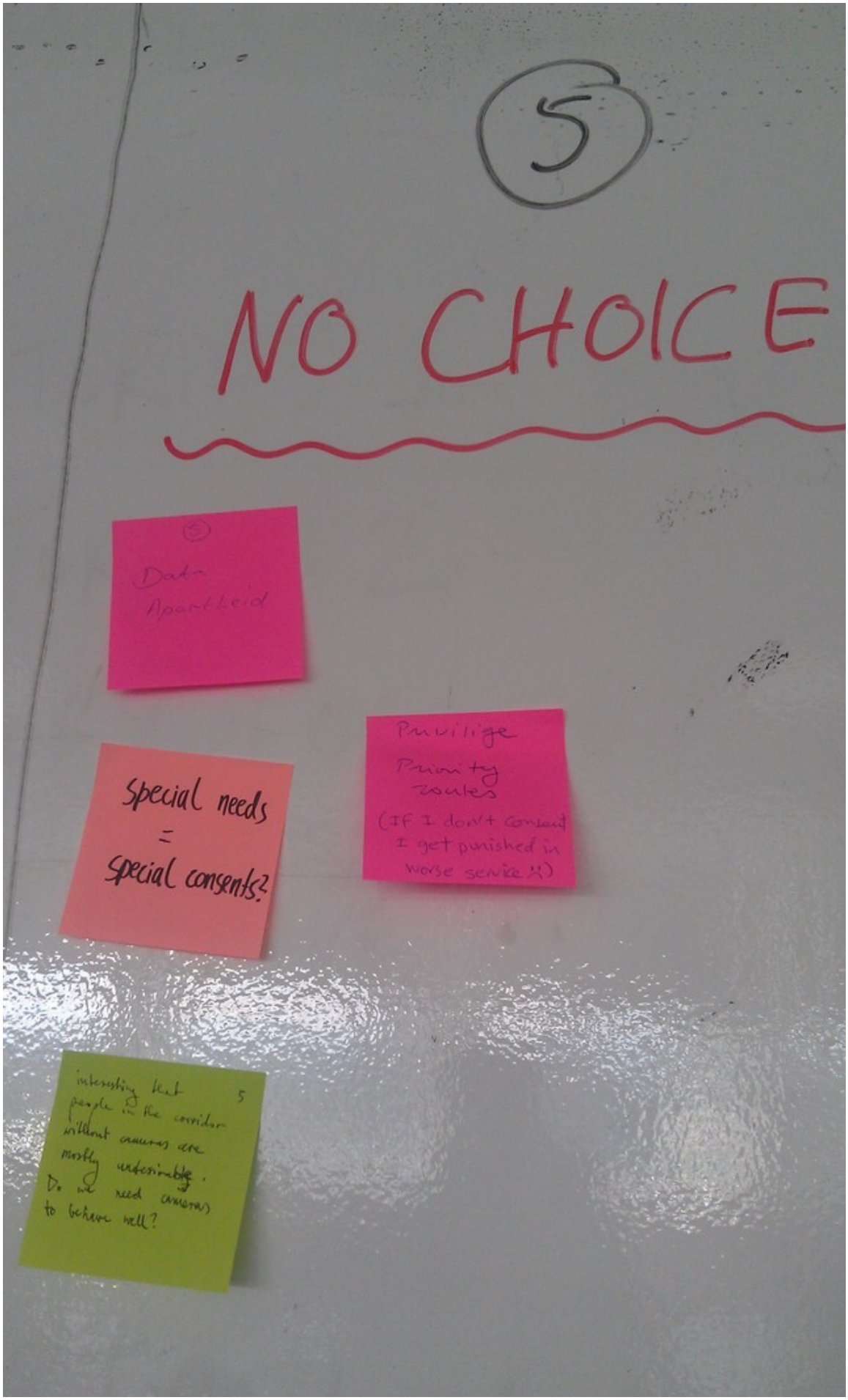



The last part of the workshop required us to create a “Design fiction” for our envisioned system. The text that the group I was part of was entitle “No choice” and can be read bellow.

“In the newly digitalized world, Sarah has been member of the “My privacy matters” action group, battling the right for being anonymous. Public transportation requires personal data access like position, address and traveling history. Therefore, she was designated to travel by foot. Unfortunately, while crossing a street, a speeding self-driving car did not recognize her as a human subject and drove over her foot, after which she was condemned using a wheelchair. She had to move from her

apartment on the third floor to a more adapted room on the first floor. As she did not want to register this change of address through digital city services, she needed to go to city hall in person. After the great third world war, not many historic buildings had survived in the city, except for the 17th century old castle, up on a mountain peak. Here, the city council decided to install the city hall services as it gave a great view over the city. The city council also found it important that they create a nice and comfortable atmosphere in the city hall, as it is good promotion for the city and its residents. By recognizing wheel chair users, they redesigned adaptive architecture ramps to help less mobile persons into the city hall. However, users have to video tracked in order for them to be recognized as wheel chair users. They can give their consent by choosing the “YES, YOU CAN PROCESS MY DATA” entrance. Sarah, however, is still passionate as activist for “My privacy matters”, thereby still refusing to reveal her digital identity. So she takes the “NO, I DON’T WANT TO GIVE CONSENT” entrance, leading her into a separate corridor without video camera’s. Here, mostly illegal residents are waiting for their turn. One of them is lying on the ground, singing drinking songs, while occasionally taking a sip of a brown bag. Another one keeps giving her compliments, whistling, coming closer which makes her uncomfortable. In order to motivate herself, she takes a flyer of “My privacy matters” from her bag. Suddenly, a noise starts: BEEP BEEP BEEP!! The door opens. ”

The feedback form the audience is illustrated bellow.


5
NO CHOICE
Data Apartheid
Special needs = Special consents?
Privilige
Priority routes
(IF I don't Consent I get punished in worse service :)
interesting that 5 people in the corridor without cameras are mostly understandable. Do we need cameras to behave well?

The workshop was a good arena for experiencing interdisciplinary collaboration and getting in contact with HCI researchers from different European institutions like:

- Mixed Reality Lab (MRL), University of Nottingham;
- KTH Royal Institute of Tecnology;
- Center for Participatory Information Technology at Aarhus University;
- University of Cambridge, Faculty of Education;
- Universidade da Madeira,
- Funchal etc.

At the same time this workshop created the right environment for getting to experience participating in the process of designing an IoT system meant to support the users and their needs for privacy.

# 5 RESEARCH PRESENTATIONS

## First day

In this report we chose to present research that covers diverse contexts of the IoT use. From the first day of the conference we chose some papers that are studying the use of IoT systems in different environments (home, office, public) and social contexts (shared and private).

- ✔ "Reef: Exploring the Design Opportunity of Comfort-Aware Eco-Coaching Thermostats" is concerned with designing smart thermostats that are comfort-aware and provide eco-coaching for the users.
- ✔ "Prototyping Ubiquitous Imaging Surfaces", explores the possibilities of embedding imaging technologies in flat surfaces like tables or kitchen counter tops.
- ✔ "Evaluating Interface Characteristics for Shared Lighting Systems in the Office Environment", presents the results of studying three different interfaces for shared lighting systems in a shared office environment.
- ✔ "Control and Being Controlled: Exploring the use Technology in an Immersive Theater Performance" is one of the papers that explore new areas, like theater entertainment, that could benefit from the use of IoT. The paper also reveals that the issue of guidance versus instruction, in the context of using navigation systems, is central, as is the question about who is in control: the user or the technology?

All these papers reveal different user needs (e.g. comfort, being in control) and concerns that one should consider when designing IoT systems and products to be integrated in personal homes or public spaces. They are also exploring new areas and spaces where IoT system could advantageous be introduced in the future.

*Reef: Exploring the Design Opportunity of Comfort-Aware Eco-Coaching Thermostats*, Chuan-Che (Jeff) Huang, Sheng-Yuan Liang, Bing-Hsun Wu, Mark W. Newman

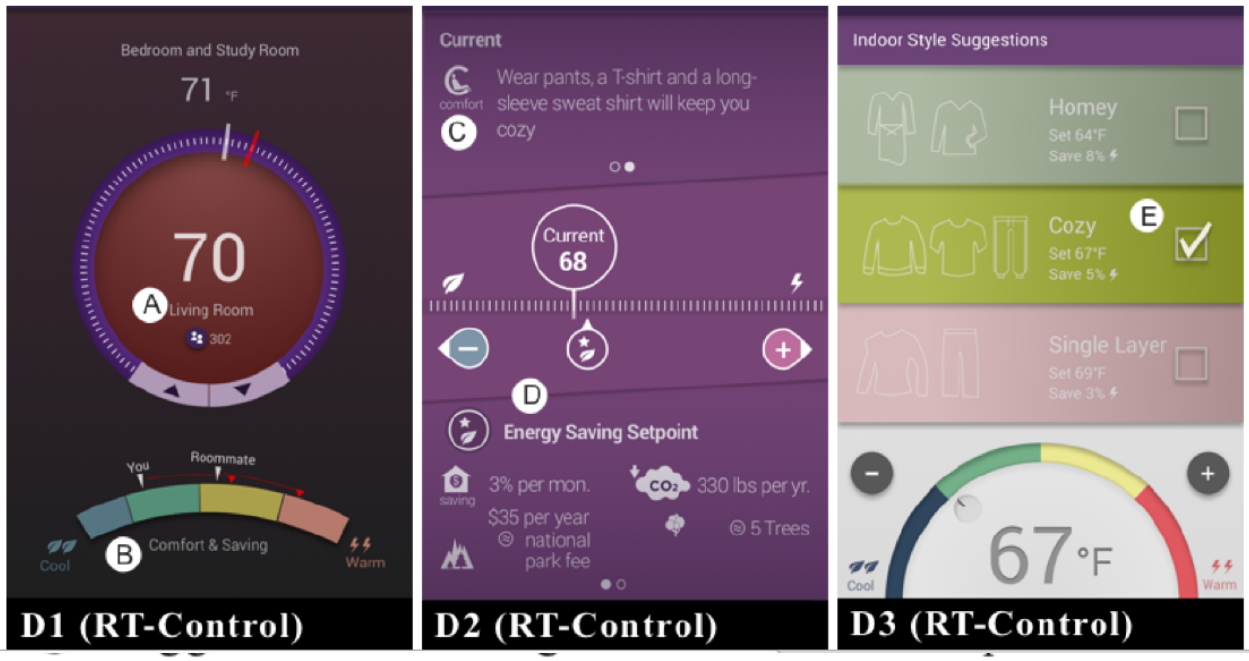
The paper investigates the design space of *comfort-aware eco-coaching thermostats*. Smart thermostats have been proposed as a way to reduce energy consumption in the home. While

occupancy-based thermostat control and scheduling has been shown to provide energy savings, more recent work in comfort-aware thermostats promises to provide even greater savings. Comfort awareness and adaptive thermal comfort models, combined with the mixed-initiative eco-coaching approach to thermostat control, offer a promising approach to optimizing savings by offering both schedule and setpoint recommendations and actionable plans.

The authors uncover insights on how to design such thermostats in a way that respect people's values relating to comfort, sustainability, control, convenience, and allocation of agency while also encouraging more energy efficient behaviors.

**Reef thermostat**

With this purpose, Reef was created. Reef is a hypothetical thermostat that can predict people's comfort, react, and encourage energy savings. First, it was assumed that Reef employs a sensing approach relying on wearable devices that detect activity level and near body temperature, as well as in-home sensors that capture humidity and temperature. Second, it was assumed that Reef is able to detect and predict people's house occupancy status, room-level location and sleep status, which have been demonstrated feasible in prior research. Therefore, Reef can use its users' status to determine whether to trigger an Away, Asleep or Awake mode (i.e., users are at home but not sleeping). Third, Reef can learn personalized comfort preferences by soliciting feedback from users, ultimately generating comfort predictions on a five-level scale ranging from uncomfortably cold to uncomfortably warm. Fourth, due to limited sensing and inference capabilities, Reef will sometimes make mis-predictions (e.g., predicting occupants are comfortable while they are slightly cold). Finally, as the smart phone-based control has emerged as a common approach for interacting with smart thermostats, we expected users to interact with Reef through a smart phone application. The interfaces are therefore all designed for mobile screens.




set at 68°F.

Ⓓ Suggest a personalized energy saving setpoint, 70°F, with benefits as well as recommended clothing in the next card.

Ⓔ Provide three options of clothing with the corresponding setpoints and benefits. Users can click on one option to change the setpoint.

Eco-coaching style refers to the approach Reef takes to communicate with users. At one end of the spectrum, Reef seeks to be informative by showing useful eco-feedback to help decision-making, letting users remain in control. This information might include comfort level prediction, estimated financial savings, and environmental impact. While respecting users' agency was one reason that the authors explored such a hands-off approach, this approach also handles inaccuracy. Due to the inevitability of imperfect prediction, it may not be most favorable for Reef to automatically change the temperature according to its comfort prediction.

Prototyping Ubiquitous Imaging Surfaces, Kyle Montague1, Daniel Jackson, Tobias Brühwiler, Tom Bartindale, Gerard Wilkinson, Patrick Olivier, Otmar Hilliges, Thomas Ploetz

The paper reveals that the vast majority of surface area in the IoT spaces are being overlooked and under-utilized in today's research. In consequence, the authors propose IRIS, a modular surface imaging prototype capable of providing scalable, low-cost, high-resolution surface imaging. They describe a real-world case study where IRIS is used to identify and track fresh fruit produce being prepared – a task that is typical infeasible with existing technologies.

IRIS is modular imaging surface prototype, made with off-the-shelf components. The modular design enables multiple units to be connected together, supporting the creation and reconfiguration of arbitrary-shaped imaging surfaces, to accommodate a diverse range of surface imaging scenarios.

IRIS is a practical implementation of ubiquitous imaging surfaces – using cheap, readily-available components. The hardware designs and software are Open Source and have been made available as a platform to support other designers and researchers exploring ubiquitous imaging environments. Finally, through a case study, the authors explore the potential application of IRIS for food identification without RFID markers.

**Figure 1. The modular design of an IRIS surface showing the interlocking, tessellating units.**

**Hardware Components**

Each IRIS unit is an identical, self-contained imaging surface. A unit is compact (160 × 105 × 73 mm) and designed to be connected to form a larger surface, supported by power and data coupling along each edge. A camera (Raspberry Pi Camera 2) with a wide field of view (5MP 160o FOV) is used to obtain a high pixel density image of the local surface (1944 × 1458 pixel colour, after correcting for distortion yields 170–300 dpi). The image is processed locally by the embedded computer (Raspberry Pi 3 Model B). A four-channel UART (FT4232H mini module) provides bi-directional serial communication with adjacent boards via sprung pogo pins and contact pads mounted on the sides of the unit, which also distribute power. Optional LED rear-illumination to improve colour and contrast is switched through a Darlington array (ULN2803). Finally, a battery allows the devices to continue to operate and maintain state during brief periods of disconnection (e.g. rearrangement of devices). The unit enclosure is an inter-locking, tessellating design made from laser-cut acrylic sheets with an acrylic top surface and plywood base. This configuration allows the units to quickly be snapped together or extended to create larger surfaces. Power transfer and local communication is achieved via the physical contact made by units when connected together. IRIS units determine their local topology and are hot-swappable, allowing imaging surfaces to be reconfigured and individual units to be replaced as required.

The top surface can be diffused so that objects away from the surface are blurred. This configuration offers better privacy for people otherwise within the camera's field of view, without impairing the high-resolution imaging of objects placed directly on the unit. An additional benefit is that the diffusion allows for more robust image segmentation. Furthermore, we ensure that objects remain visible when the unit has little or no ambient light by using a back light diffuser with white LEDs to illuminate the subjects from below.

**Figure 3. A coffee table created from 16 IRIS units.**

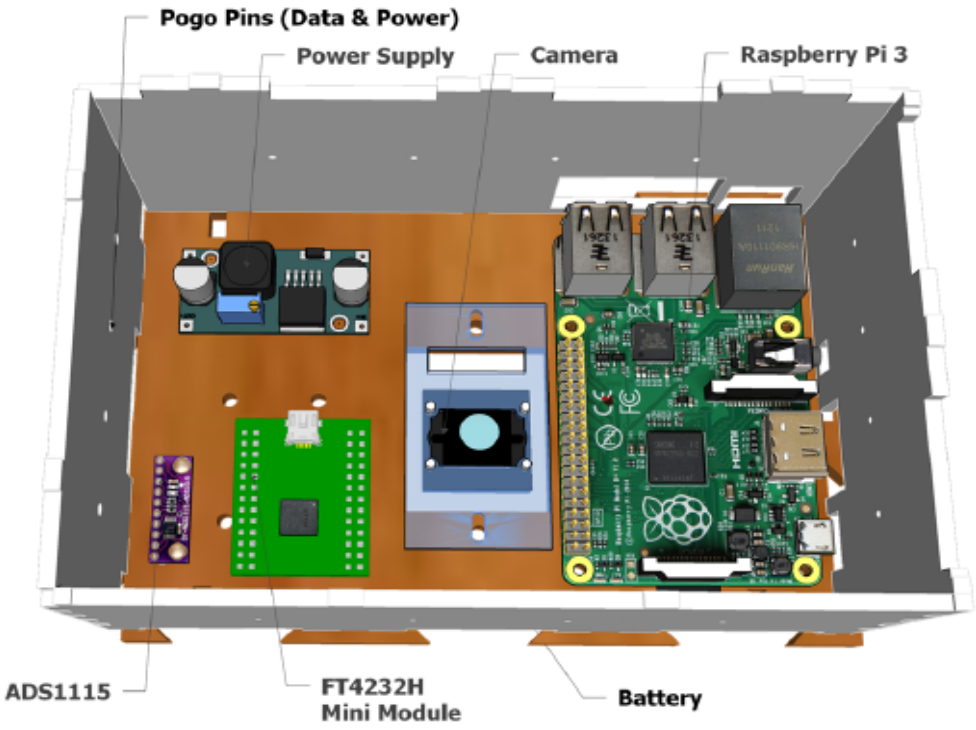



**Figure 2. The internal layout of a single IRIS unit with components labelled.**

Evaluating Interface Characteristics for Shared Lighting Systems in the Office Environment, Thomas van de Werff, Karin Niemantsverdriet, Harm van Essen, Berry Eggen Department of Industrial Design

The authors are taking advantage in their research of the fact that the IoT developments make shared systems, such as lighting systems, increasingly connected. From an interaction perspective, this offers opportunities for personal control and personalization of an environment. Previous research underlines the benefits of personal control, especially for lighting. The paper explores an area that is less investigated, the design of interfaces that realize these potential benefits. It presents a long-term qualitative study in which three interfaces for a shared lighting system are evaluated by 17 people working in an open plan office.

The study has two main aims: to investigate (1) how different user interface characteristics influence use and experience with lighting systems and (2) how a representation of social information in the interfaces can help people to take each other into account while interacting with the lighting system.

The paper evaluates systematically how variations of five interface characteristics – ownership and distribution, interaction modality, sequence of interaction, representation of light, social information – influence the use of a shared lighting system in a living lab office environment.

**Figure 1. Photos of the interfaces: (A) the Floorplan interface displays a map of the space were light can be adjusted; (B) the Pointer as remote control for the light; and (C) the Canvas interface with tokens that can be moved around to change the light.**

The interfaces, are three in number and combine variations of the characteristics: The Floorplan, Pointer, and Canvas interface. They vary on their designed characteristics, not on the level of control they offer. Therefore, all three interfaces can be used to control intensity (0 to 3800 lm) and colour temperature (1700- 8000K) of four clusters of lamps. While the interfaces are one-off prototypes, they are robust and fully functional.

## Control and Being Controlled: Exploring the use Technology in an Immersive Theatre Performance, Sarah Wiseman, Janet van der Linden, Ad Spiers, Maria Oshodi

The paper evaluates the use of interactive *haptic technology* in an immersive theatre setting. The performance was set in complete darkness and centred around a play, based on the 1884 novella Flatland, about an imaginary world where hearing and feeling are the dominant senses. Alongside other interactive technologies, a *hand-held shape-changing device* was developed to be part of this performance, in order to guide the audience through the dark performance space, allowing them to find various places and objects of interest. The only human actors in the play were involved at the start and finish of the performance; for the majority of the time the audience were able to move around the open, dark space and find different "scenes" comprised of scenery and props which they could feel and listen to.

**Guidance and control**

The technology device used in the Flatland performance presented here was designed to support people navigating in a dark space. The issue of guidance versus instruction is central in the context of using navigation systems, as is the question about who is in control: the user or the technology?

**The technology**

Technology was required for three distinct roles within this piece: to guide the participants around the space performance, to provide audio narrative and ambient sounds, and to provide interactive haptic feedback when the participants began to explore the area around them.

**Navigation technology: Animotus**

During the performance, participants walked between locations in pitch black. This difficult task would be aided by a small piece of hand-held technology designed specifically for the performance. The "**Animotus**" device, a cube with dimensions 60x60x40mm, used novel shape-changing technology to guide its user on where to move. The top half of the device could protrude (indicating the user should move forward) or rotate (indicating a move to the left or right was required). Combined with positioning technology, which used small radio tags to determine the user's location in

the space, the Animotus was able to guide users to particular locations simply by changing shape. This location was determined by a technician controlling the destinations for all four participants during the performances.

**Audio Technology**

During the performance, participants would be able to hear the narration of the play through bone-conducting headphones. These headphones sit just in front of the ear and allow the user to hear audio via facial bone vibration. In using this technology, the participants would be able to hear audio intended solely for them (through bone conduction) whilst keeping the ears free to listen to the ambient sounds in the performance space.

**Interactive Technology**

At various points of the performance the participants would be asked to explore the area around them. To make this experience richer, several haptic and audio technologies were introduced into the piece. In one instance, a stretchy piece of fabric with small, capacitive embroidered dots on it responded to touch by gently buzzing. This represented the women of Flatland moving to make themselves seen. In the University scene, elastic ropes stretched from ceiling to floor would cause small snippets of subversive conversation to play when touched and pulled. Finally, in the church scene, a piece of velvet curtain would, when stroked, cause the sound of sharpening metal to play. The dissonance between the soft touch of velvet and grating noise of sharpening metal was intended to create an uneasy feeling for the participants. Each of these elements used technology to reward exploration – making elements of the performance world react to the participants' touch.

Based upon observations, data from participant movements and this coded interview data, the authors focussed on the area of control. Control moved between participants and the technology around them at a number of points throughout the piece – for some these moments helped immersion in the performance, yet for others it felt constricting. Others made subconscious control decisions without being aware of them.

Evaluation of three aspects of control that arose during the performance:

- Control in Navigation
- Control in Exploration
- Control in Attention

Alternating control in immersive theatre performances between the participants and the technology around them has the ability to add dramatically to the experience – leaving people feeling empowered or alone.

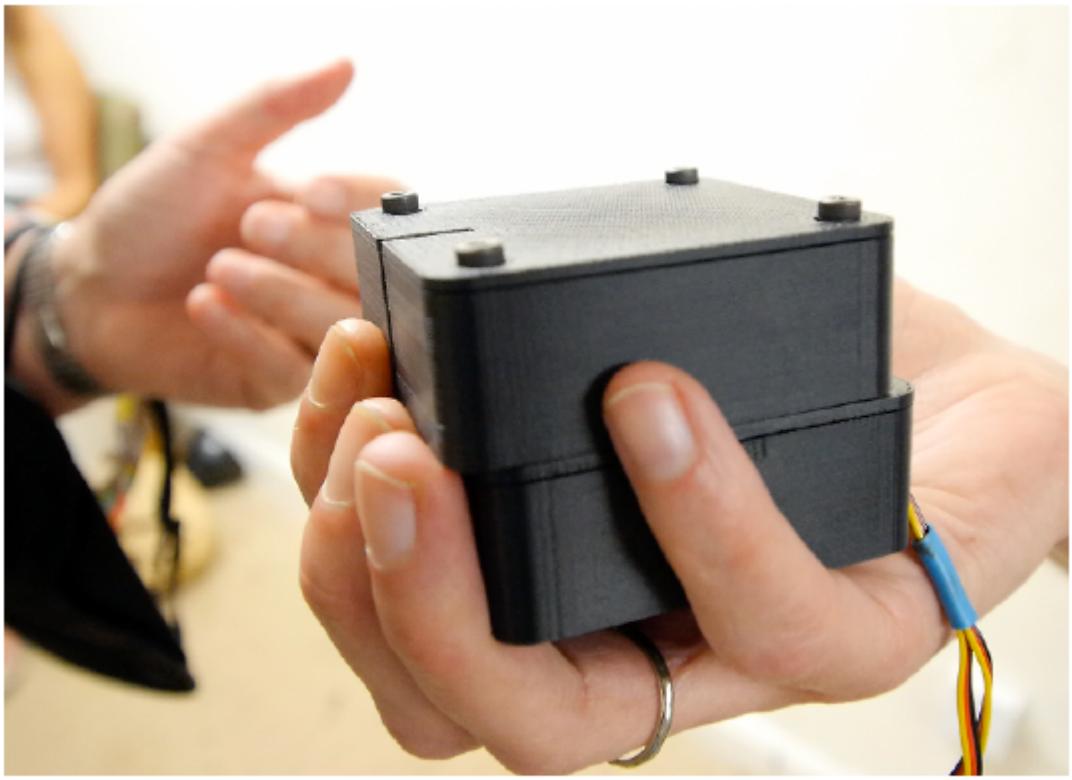


**Figure 2. The hand-held "Animotus" navigation device. The top half of the cube extends slightly, an instruction for the user to move forward.**

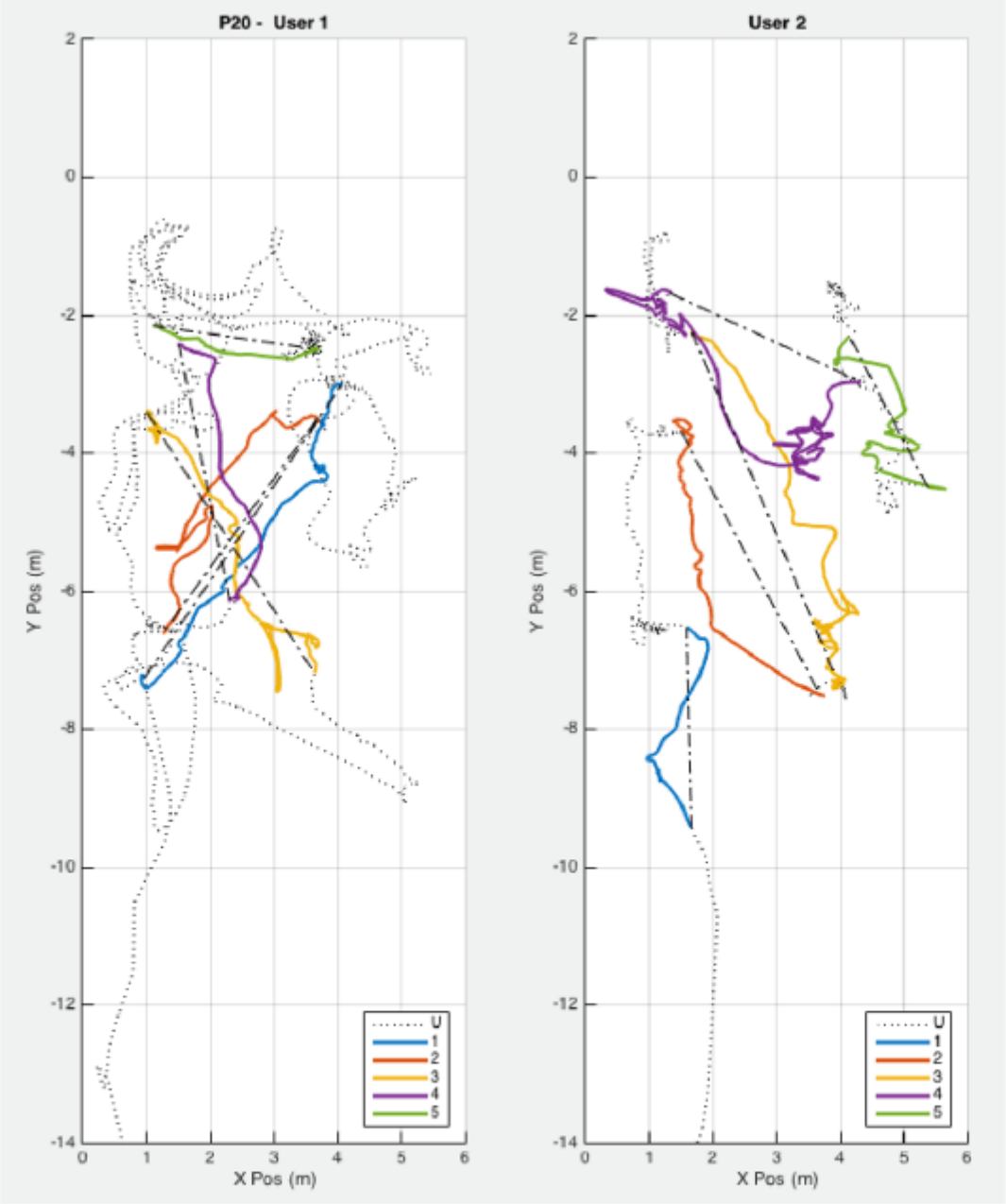



**Figure 4. Paths for P20U1 and P20U2 in the performance. Both are able to navigate successfully between the scenes (coloured lines) but they explore in different ways. U1 moves freely (dotted line) whereas U2 barely moves when reaching a scene.**

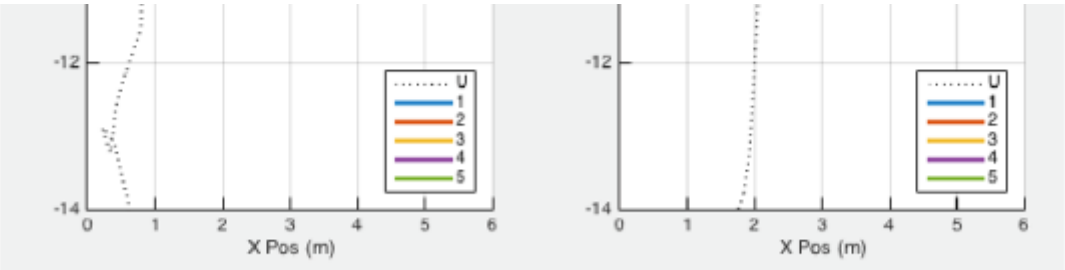


**Figure 4. Paths for P20U1 and P20U2 in the performance. Both are able to navigate successfully between the scenes (coloured lines) but they explore in different ways. U1 moves freely (dotted line) whereas U2 barely moves when reaching a scene.**

## Second day of conference

The papers that we chose for the second day explore the use of new and future IoT technologies and how these could be integrated so that they naturally can be integrated in our daily lives and be an extension of our senses. “Morse Things: A Design Inquiry into the Gap Between Things and Us” is a reflection on human-centered vs thing-centered perspectives on IoT, and how people relate to objects in their household that have human qualities. “Proof in the Pudding: Designing IoT Plants to Promote Wellbeing” is a paper that tries to explores other areas where IoT could be used, like connecting people with plants for health/wellbeing goals. Health is one of the main areas that the HCI researchers are most interested in. An this is reflected by the fact that the conference has health as the topic for one of their main tracks.

The researchers are also interested in how IoT could be used in serving the public interest, as in the case of the “Fruit Are Heavy: A Prototype Public IoT System to support Urban Foraging” paper. Environmental sensing technologies are used to support urban foraging, thus opening for new possibilities for a diverse community economies. Though the general tendency in the field is to see the IoT technologies as means to empower the users, concerns like privacy implication of sensing and tracking technologies are also raised. “Real-Fictional Entanglements: Using Science Fiction and Design Fiction to Interrogate Sensing Technologies” is one of these papers, that through design fiction aims at aims at better understanding the privacy implications of emerging and near-future sensing technologies.

Of special interest for us, in the second day was the presentation of Simone Mora from NTNU, “Tiles: A Card-based Ideation Toolkit for the Internet of Things”, that created a toolkit meant to support the design of technologies for Internet of Things. A set of 110 design cards and workshop techniques are created for allowing the involvement of non-experts in quick idea generation for augmented objects. We see two cases where such toolkit could be useful for us. One where we can bring input from the non-expert users in our research, and second to allow the researchers in computer science (with no design experience) to participate in the design process.

Morse Things: A Design Inquiry into the Gap Between Things and Us, Ron Wakkary, Doenja Oogjes, Sabrina Hauser, Henry Lin, Fu Cheng Cao, Leo Ma, Simon Fraser University; Tijs Duel, Technical University of Eindhoven.

The paper takes a thing-centered, material speculation approach. The Morse Things are created to acknowledge and inquire into the gap between things and people. These are sets of ceramic bowls and cups networked together to independently communicate through Morse code in an Internet of Things (IoT).

The paper discusses the role of the Morse Things and ultimately the gap between things and people. It is a reflection on the nature of living with IoT things. It also brings a human-centered vs thing-centered perspective to IoT.

These morse things are counter factual artifacts that have a Twitter account to communicate. They communicate with each other through morse code and sonically.

“Proof in the Pudding”: Designing IoT Plants to Promote Wellbeing, Sarah Martindale, Ben Bedwell, The University of Nottingham; Robert Phillips, Micaella Pedros, Royal College of Art.

A participatory design case study that used workshops and ideation frameworks to scaffold a conceptualization of ‘user data-actuated’ plants.

The framework combines ideation cards, worksheets and facilitated co-design, guiding non-experts to conceptually connect personal data, health/wellbeing goals, plants and people.

Linking personal data outputs with inputs to actuated growing environments, creating biofeedback.

connecting plants with personal data

use on personal and domestic scale

connecting hydroponics (the method of growing plants without soil, using mineral nutrient solutions in a water solvent.)?

representing and using personal data to connect them to plants

embedd this products in use context

ideations tools-> dack of cards to be used for a workshop -> for idetion process -> to be used at a large event with visitors at the event

One user: the plants responds to the exercise of the user, the fruit becomes sweeter

Personal goal: physical health, mental wellbeing, virtuous cycle (good behaviour on the part of the user).

Tangible feedback: sensory feedback (smell, feel)

Sharing a connected plant with other people. What meaning it will have: the plant function like a reminder for good behavior.

Appropriation of personal data -> starts from personal goal and creates the appropriate data

Reassurance -> confirmation about the health state

Sharing

Appropriate/Value/Share

The cards created can be used in other participatory design

NOTE: check out the deck of cards

Fruit Are Heavy: A Prototype Public IoT System to Support Urban Foraging

Carl DiSalvo, Tom Jenkins, Georgia Institute of Technology.

technologies and services of the Internet of Things (IoT) to serve public interest.

the use of IoT technologies—specifically environmental sensing—to support urban foraging.

a simple proof-of-concept sensing platform to monitor the relative ripeness of fruit in trees,

designing in the context of smart cities

designing to support diverse community economies.

how smart and precise technologies can support urban foraging?

foraging: collecting fruits and berries from other places than an farm or orchids

How to organize the picking and check for the fruits being ripe

How do we support the work of foraging, how can we monitor the fruit

Monitoring the ripens of fruit: try to tell when the tree branches are bending

The sensor system → mesures the bend of the branches (Arduino was draining the battery too quick and created own board), Micro SD card, how to attach them to the trees

created a backpack made from dipper material, that is water resistant and is attached to the branch

Issues: the myth of ubiquity (that the network is there) → the network is not always there, the lack of connectivity. Network is a key issues.

Are people allowed to attach this sensors everywhere the want to in the public space, because they open for security issues.

Diverse community economies → foraging is one of them

Community is in the process of gathering and distribution → is for the community a fair trade

Tried to think differently in the context of the community, and the community is putting input in this

NOTE: The Majobo organisation in Oslo picks up the apple, giving work to people with deficiencies or young people with different kind of social difficulties, and create apple juice.

The Rise of Bots: A Survey of Conversational Interfaces, Patterns, and Paradigms

Lorenz Klopfenstein, Saverio Delpriori, Silvia Malatini, Alessandro Bogliolo, University of Urbino.

messaging bots: chatterbot-like agents with simple, textual interfaces that allow users to access information, make use of services, or provide entertainment through online messaging platforms.

Conversational interfaces

analyze the recent trends in chatterbots and provide a survey of major messaging platforms, reviewing their support for bots and their distinguishing features.

“Botplication”, a bot interface paradigm that makes use of context, history, and structured conversation elements for input and output in order to provide a conversational user experience while overcoming the limitations of text-only interfaces.

computer program that simulates human conversation and communicates through a textual interfaces

Eliza is a known old bot

Used for: food ordering, taxi service

Provided for the chat applications: Facebook messanger: automaticall text messages: away, Provide formatting text, preset commands that the user can user-inducedStructured menus, provide a hierarchy → to make the information more understandable for the bots.

Users started to use more the messaging services than social media.

Advantages: platform independed, instant availability, discoverability, limited data requirements, build in notifications (for programmers, you do not need to program this), payment support (transactions and payments), authentications (guarantees the identity of the user).

Bots as a transition from messaging to voice interface. The voice interface is however a different kind of interface, to be used in another context (in the household context to give orders to IoT objects)

Messaging has a smaller scope. Messaging is based on a more traditional platform than in applications.

Botplication

each thread is an separate and independent application running.

History awareness

Enhanced Ui that the messaging platform provides.

Limited use of NLP (Natural language processing) as this is verbose, while the messaging should be more concise.

Guided conversation (no ambiguity regarding the services provided by the bots)

Real-Fictional Entanglements: Using Science Fiction and Design Fiction to Interrogate Sensing Technologies

Richmond Wong, Ellen Van Wyk, James Pierce, University of California Berkeley.

http://biosense.berkeley.edu/projects/sci-fi-design-fiction/ (link to the project)

This project explores how science fiction and design fiction can be used to explore possible futures and elicit values surrounding emerging sensing technologies.

They present a set of design fiction proposals related to sensing and tracking technologies, inspired by the 2013 science fiction novel The Circle.

Explore connections between the novel's imagined world and our present and future realities.

Our work aims to better understand the privacy implications of emerging and near-future sensing technologies.

Many such technologies are developed and studied by HCI researchers, such as detecting heartbeats from a distance [1], image analysis [11,23], or wearable sensors [21,49]. Social issues (including privacy) related to these technologies are often explored through technical research or user studies. Here, however, we engage with these technologies and issues by adopting a design approach involving the creation of design fictions in order to explore near-future scenarios.

Take inspiration from the technologies depicted in the novel The Circle by Dave Eggers.

They created a set of design fictions. Design fictions are a mix between science fact, science fiction, and design.

These conceptual designs suggest speculative or alternate future worlds that imagine what the future might be like in order to help generate discussions about futures we want to see (and those that we want to avoid).

Science fiction as inspiration for design fiction to interrogate privacy implications of sensing technologies.

Between science fiction and science fact. Forging a bridge between popular speculative fiction and research.

Working with the idea of blurring the limit between reality and fiction.

The paper uses a design workbook to develop variations of visual design fiction proposals, exploring privacy and surveillance implications of sensing technologies.

A case study addressing how researchers can understand and make use of cultural representations of new and emerging technologies to interrogate their privacy implications.

Adapting The Circle book

the book as a starting point for privacy issues

Who are the people that get recorded by the camera and who gets recorded?

Live Stream Police Body Camera, by The Circle → cameras on police body

Privacy concerns (inspired by the novel and might exist in reality outside of the novel)

Work place surveillance: TruWork products

Reflections:

Analysing designs using an external privacy framework

Design fictions could be created using frameworks

Using design fiction to blur real & fictional

How privacy is situated in the present and how it will be in the future.

Conclusion

Creating a workbook of design fictions inspired by The Circle

Analysing design fictions using an privacy analytic frameworks

Using science fiction texts to inspire design fiction.

Tiles: A Card-based Ideation Toolkit for the Internet of Things

Simone Mora, Francesco Gianni, Monica Divitini, Norwegian University of Science and Technology (NTNU).

Tiles Toolkit: http://tilestoolkit.io/cards (for non-experts).

See publications and more documents here: http://tilestoolkit.io/

Tool tools to support ideation for the IoT.

Tiles Cards, a set of 110 design cards and a workshop technique to involve non-experts in quick idea generation for augmented objects.

Support exploring combinations of user interface metaphors, digital services, and physical objects. Then it supports creative thinking through provocative design goals inspired by human values and desires. Cards to generate ideas for IoT products.

Tiles Cards is a card game to inspire ideas for new IoT products by fostering collaborative and creative thinking.

It can be used as a brainstorming tool during design exercises, school courses and participatory design workshops.

The aim of our research is to investigate how to foster human-entered design of novel IoT user experiences by providing tools to engage non-experts in idea generation.

Their approach is inspired by a thing-oriented vision of the IoT and uses object augmentation as a design strategy.

Challenges:

IoT have been technology driven, without thinking much about the users and the use scenarios.

The purpose was to keep human needs at the center of IoT development by involving non-experts like kids, artists and makers into creative idea generation of novel products.

Targeting non-experts

Why cards

Research projects have found card -based tools effective in supporting idea generation in design workshops Cards are useful for presenting theoretical constructs and making the design practice more engaging and playful, thus enlarging the group of people that take part in designing new systems. They can be an effective vehicle for transferring knowledge between theory and practice, for example to convert theoretical frameworks to guidelines that can be manipulated by designers. Card-based tools help keep people at the center of the design process and facilitate creative dialogue and shared understanding. Cards can be a source of inspiration to steer a discussion when it becomes unproductive, for example by proposing provocative questions to unlock thinking. Cards can also be used to evaluate, rate or bookmark ideas generated during design sessions.

Type of cards: Missions cards, Things cards, Data channels, Human Actions and Feedbacks

The process flow:

Choose your mission (Missions cards)

Explore and compose everyday things, digital services and user interface metaphors to fulfill your mission (Things, Data channels, Human actions, Feedback)

Sketch out your idea (use paper and pen)

Reflect and improve (Criteria cards)

The cards can be combined with design artefacts such as scenarios and personas.

Prototype the ideas by the help of toolkits like Arduino or RaspberryPi, or this toolkit: http://tilestoolkit.io/

NOTE: Funny for you that works with security for IoT:

“IoT research has concentrated mainly on two ends: the technical, solving technological challenges such as connectivity and security; and the theoretical, following up on visions, e.g. of how computers integrated into the fabric of the physical world can serve human needs. Compared with these two goals, an exploration of the IoT from an HCI point of view is in its infancy.”

# 6

# 7 CONCLUSIONS

## References

# 8 REFERENCES

## Attachemnts

These can be anything, also including published papers, etc...