

The International Series on Information Systems and Management in Creative eMedia is advancing the knowledge of the use of information systems and management in the wider field of creative eMedia industries. The series covers a wide range of media, such as television, publishing, digital games, radio, ubiquitous/ambient media, advertising, social media, motion pictures, online video, eHealth, eLearning, and other eMedia industries.



Artur Lugmayr describes himself as a creative thinker and his scientific work is situated between art and science. Starting from July 2009 he is full-professor for entertainment and media production management at the Department of Business Information Management and Logistics at the Tampere University of Technology (TUT): EMMi – Entertainment and Media Production Management (<http://www.tut.fi/emmi/www/>). His vision can be expressed as to create media experiences on future emerging media technology platforms. He is holding a Dr.-Techn. degree from the Tampere University of Technology (TUT, Finland), and is currently engaged in Dr.-Arts studies at the School of Motion Pictures, TV and Production Design (UIAH, Helsinki). His passion in private life is to be a notorious digital film-maker. He is founder of the production company LugYmedia Inc. (<http://www.lugymedia.com>). More about him on <http://www.tut.fi/emmi>



Jaz Hee-jeogn Choi is an ARC Australian Postdoctoral Fellow (Industry) at the Institute for Creative Industries and Innovation, QUT. Her research interests are in playful technology, particularly the ways in which various forms of playful interaction are designed, developed, and integrated in different cultural contexts. In her recently completed doctoral research, she developed a new conceptual approach to urban sustainability that recognises 'play' as the core of transformative interactions in cities as ubiquitous technosocial networks. Her current research explores designing and developing playful ubiquitous technologies to cultivate sustainable food culture in urban environments. She has collaborated with leading international researchers and published in books and journals across various disciplines. Her website is at www.nicemustard.com



Kirralie Houghton received her PhD recently (awarded an APA scholarship) and is part of the Urban Informatics Research Group within the School of Design at QUT Brisbane. Kirralie's research is focused on 'Understanding the Implications of Networked Social Interactions for the Design of Public Urban Spaces'. The research is built on the use of libraries as the case study as they provide a unique mix of social and learning spaces, then applies the concepts of networked interaction and intervention in the built design more broadly to public spaces across the urban environment. Holding an Honours Degree from UNSW in Town Planning this research crosses the disciplines of built environment and technology. Formerly Kirralie was working as a consultant urban planner and has extensive experience focused on strategic or policy planning work in Australia and Canada.

Artur Lugmayr, Jaz Hee-Jeogn Choi, and Kirralie Houghton

Proceedings of the 2nd International workshop on (Re) Creating Lively Cities through Ambient Technologies: Arts, Culture, and Gastronomic Experiences

In conjunction with INTERACT 2013, Cape Town, South Afrika

2nd-6th September 2013



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Artur Lugmayr, Jaz Hee-Jeong Choi, and Kirralie Houghton (eds.)

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Cities Through Ambient Technology in Arts, Culture and
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Number 2013/3

Cape Town, South Africa, 2nd-6th September 2013

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for Ambient Media Association (AMEA),
published by lugYmedia Inc.

Tampere, Finland 2013

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Preface

Digital and interactive technologies are becoming increasingly embedded in everyday lives of people around the world. Application of technologies such as real-time, context-aware, and interactive technologies; augmented and immersive realities; social media; and location-based services has been particularly evident in urban environments where technological and sociocultural infrastructures enable easier deployment and adoption as compared to non-urban areas. There has been growing consumer demand for new forms of experiences and services enabled through these emerging technologies. We call this ambient media, as the media is embedded in the natural human living environment. This workshop focuses on ambient media services, applications, and technologies that promote people's engagement in creating and re-creating liveliness in urban environments, particularly through arts, culture, and gastronomic experiences.

The RelCi workshop series is organized in cooperation with the Queensland University of Technology (QUT), in particular the Urban Informatics Lab and the Tampere University of Technology (TUT), in particular the Entertainment and Media Management (EMMi) Lab. The workshop runs under the umbrella of the International Ambient Media Association (AMEA) (<http://www.ambientmediaassociation.org>), which is hosting the international open access journal entitled "International Journal on Information Systems and Management in Creative eMedia", and the international open access series "International Series on Information Systems and Management in Creative eMedia" (see <http://www.tut.fi/emmi/Journal>).

The RelCi workshop took place for the first time in 2012 in conjunction with ICME 2012 in Melbourne, Australia; and this year's edition took place in conjunction with INTERACT 2013 in Cape Town, South Africa. Besides, the International Ambient Media Association (AMEA) organizes the Semantic Ambient Media (SAME) workshop series, which took place in 2008 in conjunction with ACM Multimedia 2008 in Vancouver, Canada; in 2009 in conjunction with Aml 2009 in Salzburg, Austria; in 2010 in conjunction with Aml 2010 in Malaga, Spain; in 2011 in conjunction with Communities and Technologies 2011 in Brisbane, Australia; in 2012 in conjunction with Pervasive 2012 in Newcastle, UK; and in 2013 in conjunction with C&T 2013 in Munich, Germany.

The workshop organizers present you a fascinating crossover of latest cutting edge views on the topic of ambient media, and hope you will be enjoying the reading. We also would like to thank all the contributors, as only with their enthusiasm the workshop can become a success. At least we would like to thank the lovely organizing team of INTERACT 2013 for the help in the organizational aspects of the workshop.

Artur Lugmayr
Jaz Hee-Jeogn Choi
Kirrorlie Houghton

Tampere, Finland, 2013

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List of Contributors

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Majdi Faleh
Nikola Georgiev
Sasko Gramatnikovski
Antti Pirhonen
Thomas Laureyssens
Artur Lugmayr
Timothy Merritt
Vladimir Trajkovic
Thomas Wagner
Robert Praxmarer

Call for Papers

CALL FOR PAPERS, DEMONSTRATIONS, AND POSTERS
IN CONJUNCTION WITH INTERACT 2013, CAPE TOWN, SOUTH AFRICA - 6th-9th September 2013
2ND INTERNATIONAL WORKSHOP ON (RE)CREATING LIVELY CITIES THROUGH AMBIENT
TECHNOLOGIES:

ARTS, CULTURE AND GASTRONOMIC EXPERIENCES (CLCAT)

<http://www.tut.fi/emmi/WWW/ameamain/relci2013>

Deadline for 2-5 pages position papers: 12th May 2013 (strict deadline)

Artur Lugmayr (Tampere Univ. of Technology), Tampere, Finland, lartur@acm.org

Jaz Hee-jeong Choi, Urban Informatics Research Lab, QUT, Brisbane Australia,

h.choi@qut.edu.au

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Digital and interactive technologies are becoming increasingly embedded in everyday lives of people around the world. Application of technologies such as real-time, context-aware, and interactive technologies; augmented and immersive realities; social media; and location-based services has been particularly evident in urban environments where technological and sociocultural infrastructures enable easier deployment and adoption as compared to non-urban areas. There has been growing consumer demand for new forms of experiences and services enabled through these emerging technologies. We call this ambient media, as the media is embedded in the natural human living environment. This workshop focuses on ambient media services, applications, and technologies that promote people's engagement in creating and re-creating liveliness in urban environments, particularly through arts, culture, and gastronomic experiences. The workshop takes a multidisciplinary and future oriented approach, and welcomes participants from diverse disciplinary domains for open discussions about technological, sociocultural, and content-related aspects of ambient media services that support people's engagement in (re)creating their urban environments into a livelier place through art, cultural, and gastronomic experiences. Within this context, we welcome submissions relating to (but not limited to) the following:

- case-studies (successful, and especially unsuccessful ones);
- speculative and innovative concepts or design;
- demonstrations of services and applications;
- user-experience studies and evaluations;
- artistic installations and contents;
- social and/or economic studies, businesses models, and marketing
- technological novelties, evaluations, and solutions;

The following topics fit within the scope of the workshop:

- Analysis of videos related to art, culture, and gastronomy
- Ubiquitous environments and interfaces in lively city environments
- Intelligent appliances and gadgets supporting art, culture and gastronomy
- Multimedia learning for activities around smart city environments
- Locative media and context sensor technologies
- Artistic, cultural, and gastronomic services and applications;
- Socio-economic studies, business models, advertising, and marketing;
- Applied ambient media technologies in city environments (e.g. P2P, 3D, augmented reality, QoE, protocols, networks, security, and privacy);
- Engagement and persuasion in smart environments;
- QoE and for ambient urban city applications.

PUBLICATIONS

- Submit your contribution by using the INTERACT template:

[-->

<http://www.interact2013.org/Interact2013/media/Store/documents/Paper%20formats/Word-2007-2010-Technical-Instructions.zip>

- To the following submission system:

[--> <http://webhotel2.tut.fi/emmi/Conferences/2012same/>

(!!!) NOTE (!!!): PLEASE DON'T FORGET TO TICK RELCI 2013 AS SUBMISSION TYPE!!!

SUBMISSION DEADLINE 12th May 2013

MORE INFORMATION

<http://www.ambientmediaassociation.org/relci2012>

Workshop Programme and Description

Workshop Format & Participation

This is a full-day workshop. In order to keep the workshop interactive, space will be limited to about 20 participants. Interested participants should submit one-page position papers outlining their work, brief biographies, and what they would like to gain from the workshop. Each submission will undergo a double-blind review process. Participants will be selected based on their expertise and to ensure overall disciplinary and geo-cultural diversity. The participants will have opportunities to present their work or cases of their interest, and participate in a series of collective workshop activities and discussions...

Pre-Workshop Organization and Review Process

Before the workshop, an online forum will be created to introduce participants for one another; circulate position papers; and foster active discussions among the participants, some of which can be further extended during the workshop.

Schedule

The workshop will be organized as “Design Thinking” workshop. Design Thinking is a method for fostering creative thinking and the development of new ideas

09:00-10:30 Workshop Opening and Keynote Lecture

10:30-11:00 Morning Tea

11:00-12:00 Paper Presentations and Discussions

12:00-13:00 Lunch

13:00-14:15 Design Thinking Part I: “Lively Cities through Ambient Media Evaluation”

Group activities, development of the ‘lively city’ concept based on ideas emerged from workshop papers, design thinking, problem definition, challenge development, and problem framing;

14:15-15:30 Design Thinking Part II: “Lively Cities through Ambient Media Development”

Group activities, creative processes, idea finding, paper prototype building, constraints development, technical challenges;

15:30-16:00 Afternoon Tea

16:00-17:30 Evaluation & Roundup

Presentation of each group’s work, evaluation, discussion for further collaborations;

19:00-23:00 Dinner

Post-Workshop Organization

The results of the workshop will be compiled in a special issue of a journal or an edited book. Publishers under consideration are Springer-Verlag, IGI Global, or Inderscience.

2ND INTERNATIONAL WORKSHOP ON (RE)CREATING LIVELY CITIES THROUGH AMBIENT TECHNOLOGIES: ARTS, CULTURE, AND GASTRONOMIC EXPERIENCES

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Kiralie Houghton, Urban Informatics Research Lab, QUT, Brisbane Australia, kiralie.houghton@qut.edu.au

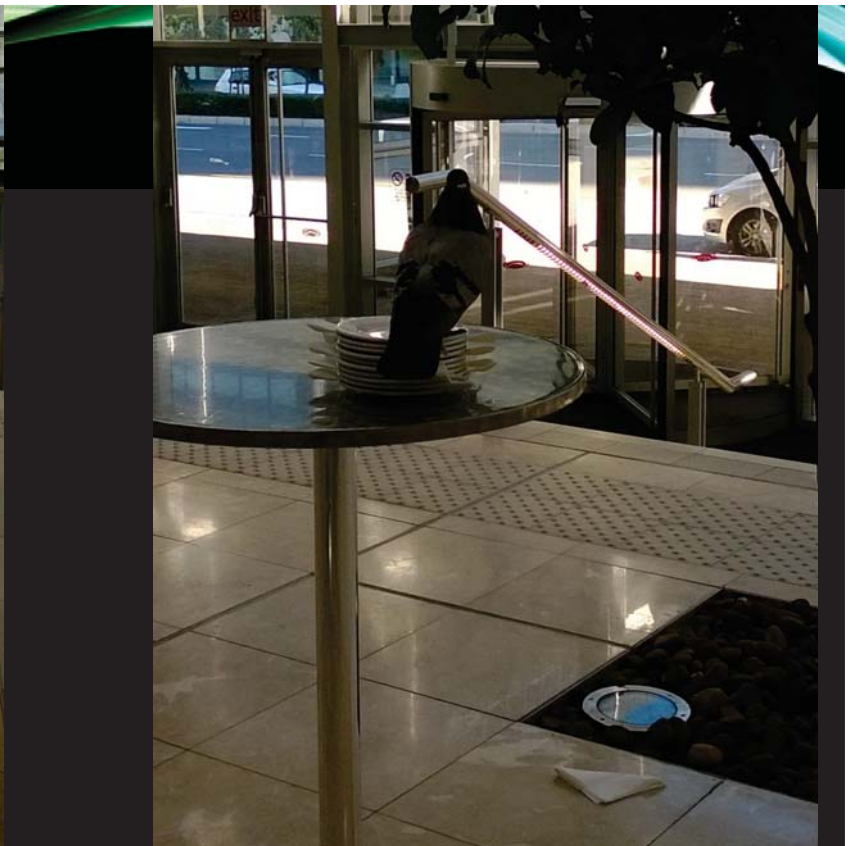
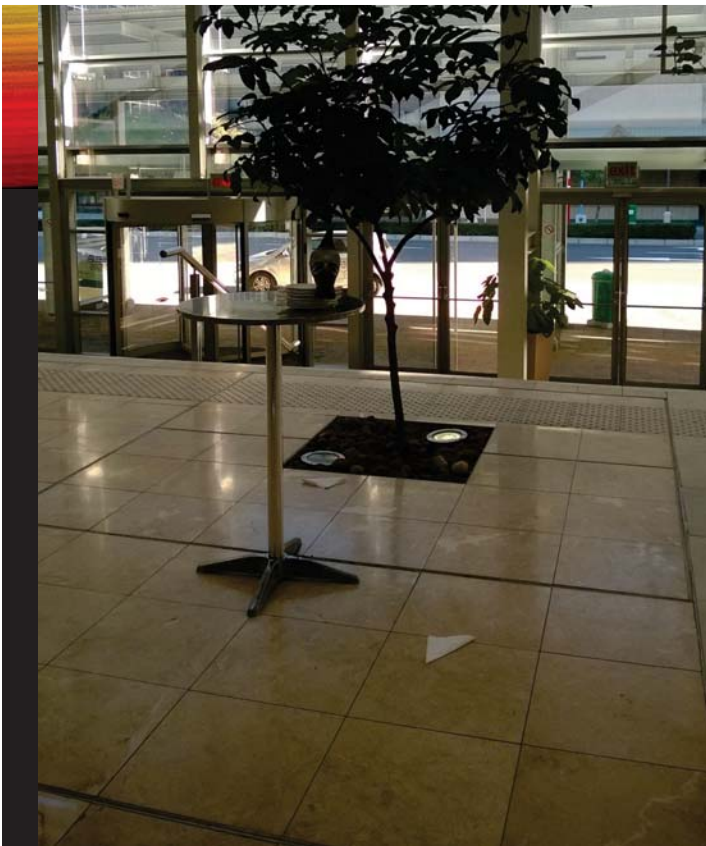
www.tut.fi/emmi

www.ambientmediaassociation.org

SIG-eMedia/AIS (new)

Facebook: <https://www.facebook.com/groups/sameworkshop/>

Email List: <https://listmail.tut.fi/mailman/listinfo/amea>



ABOUT THE WORKSHOP

The workshop takes a multidisciplinary and future oriented approach, and welcomes participants from diverse disciplinary domains for open discussions about technological, sociocultural, and content-related aspects of ambient media services that support people's engagement in (re)creating their urban environments into a livelier place through art, cultural, and gastronomic experiences

Vision: a NEW 'ambient' Cape Town

Challenge: (Re)Creating Lively Cape Town through Ambient Technologies

Deadline: Tonight at 17:00

Creative Media Industry Segments

Broadcasting	Newspapers & Magazines	Production Industries	Advertising & Ad Agencies	Print Publishing	Internet & New Media	Ambient Media	Digital Games	eMedia (eBusiness, eHealth, eXXX)
Crossing Industries in Living Contexts: Food, Art, Daily Activities, Lively Cities, Culture....								

Business Activities & Functions

Sales & Marketing	Finance	Media Supply Chain	Digital Rights Management and Royalties	Workflow and Asset Management	Human Resource Management	Product Life Cycle Management	Customer Relationship Management	Supplier Relationship Management
Additional Functions and Business Activities related to Daily Living Experiences								

Technologies & Systems

Digital Production Technologies	Big Data	Service Eco-Systems	Application Oriented Technologies	Network Technologies	E2E Content Chain	Content Technologies	Quality of Experience (QoE)	Enabling Technologies
Technologies Applied in Ambient Contexts								

Human & People Factors

Audience & Consumer	Society	Public Policy & Regulation	Labor Unions	Stakeholders and Interest Groups	Media Studies & Culture	Media Management and Human	Organization & Company	Domain Specific Requirements
Much, Much, Much, More Consumer Experience Orientation								

- Proceedings & Publication
 - International Series on Information Systems and Management in Creative eMedia Industries (ISSN: 2341-5576, ISBN 978-952-7023-04-4 (PDF), ISBN 978-952-7023-05-1 (Print))
 - Published by the International Ambient Media Association Ry as open access
 - <http://www.tut.fi/emmi/Journal/index.php/series/issue/view/relci2013>
 - <http://www.ambientmediaassociation.org>
- Special Issue
 - Simple: International Journal on Information Systems and Management in Creative eMedia Industries (International Ambient Media Association Ry) as open access
 - CHI, Springer, IEEE, ACM, ...
- Deadlines
 - final papers + copyrights (grrrrrr was already a few months back...)
 - journal – Nov./Dec.

ACCEPTED PAPERS

1. **[OK] Social Movements within Interfaces in Urban Environments: Flash Mobs as Kinesthetic Marketing and Political Campaigns**
Jaana Parviainen (University of Tampere, Finland), Antti Pirhonen (University of Jyväskylä, Finland)
2. **[Online | PDF] A multidisciplinary case study in practice: a flock of sparrows in the city of Ghent**
Johan Criel (Alcatel-Lucent Bell Labs, Belgium), Tanguy Coenen (iMinds, Vrije Universiteit Brussel, Belgium),
Thomas Laureyssens (MAD-faculty (LUCA arts, KU Leuven), Belgium)
Laurence Claeys (Alcatel-Lucent Bell Labs, Belgium)
3. **[PAPER/COPYRIGHT] Personalized fruition of cultural heritage in a city environment**
Andrea Bernardini (Fondazione Ugo Bordonini, Italy)
4. **[OK] Urban Playfulness: Fostering Social Interaction In Public Space**
Thomas Wagner (University of Applied Sciences Salzburg, Austria), Robert Praxmarer (University of Applied Sciences Salzburg, Austria),
5. **[NOT REG] [PAPER/COPYRIGHT] City hospitality concept built around a localized app store - the case of the City of Skopje**
Nikola Georgiev (University Ss. Cyril & Methodius, Macedonia),
Sasko Gramatinovski (University of Tourism and Management, Macedonia),
Vladimir Trajkovic (University Ss. Cyril & Methodius, Faculty of Computer Science and Engineering, Macedonia),
Danco Dacev (University Ss. Cyril & Methodius, Faculty of Computer Science and Engineering, Macedonia)
6. **[OK] Public ParticYpation**
Maria Androulaki (University of Edinburgh, United Kingdom), Maria Androulaki (University of Edinburgh, UK)
7. **[NOT PRES] [OK] [Online | PDF] (Re)Creating Lively Cities through Ambient Technologies: Arts, Culture, and Gastronomic Experiences**
Majdi Faleh (MWBM architects, Tunisia), Caitlin Wall Debrigny (The University of Sydney, Australia)
8. **[OK] [PAPER/COPYRIGHT] Recognizing Cultural differences on food**
Junia Anacleto (Federal University of Sao Carlos, Brazil)
9. **[OK] [PAPER/COPYRIGHT] Information Management and Systems Supporting Lively Cities through Ambient Technologies: Arts, Culture, and Gastronomic Experiences**
Artur Lugmayr (EMMi Lab., Tampere Univ. of Technology (TUT), Finland)

PROGRAM

- 09:00-09:15 – Opening and Introduction of Participants
- 09:15-09:45 – Keynote: Timothy Merritt
- 09:45-11:00 – paper presentations I:
 - No 1 (social movements/Antti), No 2 (sparrows/Johan), No 3 (heritage/Andrea), No 7 (cities/Fajdi)
- BREAK
- 11:00-12:15 – paper presentations II
 - No 4 (Urban/Thomas), No 5 (City/?), No 9 (IS&M/Artur), No 6 (participation/Maria), No 8 (food/Junia)
- 12:15-12:30
 - Forming of 4 groups, 5 people each
- SEPARATE LUNCH 'WALK' + **active** user study
- 14:00-15:30
- 14:00-15:00 **Empathize**: compilation of the field study + presentation of each group
- 15:00-15:30 **Define**: define, frame, and focus the problem to be addressed + presentation of each group
- BREAK
- 16:00-17:00
 - 16:00-16:30 Ideate: creating creative ideas that solve the problem
 - 16:30-17:00 Prototype: prototype the solution of the problem + presentation of each group
- 17:00-17:30
 - Roundup
 - Travel to South Cape
 - Dinner?

GOAL 1: GIVE PAPER FEEDBACK

1. Analyze the Entries
2. Give Feedback
3. Cluster Topics
4. Defined Theories
5. Application Contexts
6. Technologies
7. ...

Problem: sufficient water supply worldwide

Goals: affordable water for everyone with the sub-goals: good income, water treatment, new techniques

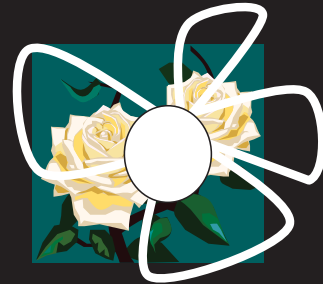
Objectives: no more people are dying due to water shortage leading to less diseases, ...

- Defining the core problems that papers address
- Defining the effects and consequences of these
- Step 1: Defining the Problems and Goals that Research Works Address and by Which Means they Solve these Problems
- Step 2: Defining the Effects, Objectives, and Resulting Outcomes of the Available Means and Inputs

GOAL 1: GIVE PAPER FEEDBACK

• THE Questions

- Business
 - How can ambient media be applied in business processes?
 - How do ambient media create value and business?
 - Business opportunities and strategic issues of ambient media?
- Content & the Media
 - What is 'content' and how can it be presented in the age of 'ubiquitous' and 'pervasive'?
 - How to select, compose and generate ambient content?
 - How to manage and re-use ambient content in specific application scenarios (e.g. e-learning)?
- Interactive Design & Experience
 - What is interactivity between the single consumers and consumer groups in the ambient context?
 - How can collaborative or audience participatory content be supported?
- Models, Methods, Concepts & Frameworks
 - Which methods for experience design, prototyping, and business models exist?
 - How can sensor data be interpreted and intelligently mined?
 - How can existing media such as TV, home entertainment, cinema extended by ambient media?



GOAL 2: FIELD STUDY – EMPATHIZE

- What do people enjoy in places'?
- What could be improved in these places?
- Which activities do they do at these places
- What do consumers want & desire?
- What do owners of places desire?
- How can this be matched up with the technologies described in the papers?
- ...

→ TAKE PICTURES, MAKE INTERVIEWS, MAKE NOTES,...

DESIGN THINKING

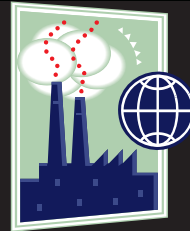
(SOURCE: D.SCHOOL BOOTCAMP BOOTLEG, HASSO PLATTNER, INSTITUTE OF DESIGN STANFORD)



Human values



Show, don't tell



From complexity to simplicity



Mindful in process



Collaborate



Bias towards action

This presentation is based on: d.school bootcamp bootleg, Hasso Plattner, Institute of Design Stanford

"DESIGN THINKING" PROCESS

Empathize

Define

Ideate

Prototype

Test

LINKS

- www.tut.fi/emmi
- www.ambientmediaassociation.org
- SIG-eMedia/AIS (new)
- Facebook: <https://www.facebook.com/groups/sameworkshop/>
- Email List: <https://listmail.tut.fi/mailman/listinfo/amea>
- Call for Book Chapters (Abstracts): Managing and Leading Creative Universities - Foundations of Successful Science Management, Springer-Verlag, Artur Lugmayr and Doug Vogel (Eds.)
- Participate.....

A FEW PUBLICATIONS

- A. Lugmayr, E. Serral, A. Scherp, B. Pogorelc, and M. Mustaquim, "Ambient media today and tomorrow," *Multimedia Tools and Applications*, 2013, pp. 1–31 Available: <http://dx.doi.org/10.1007/s11042-012-1346-z>.
- A. Lugmayr, B. Stockleben, Y. Zou, S. Anzenhofer, and M. Jalonen, "Applying Design Thinking in the context of media management education," *Multimedia Tools and Applications*, 2013, pp. 1–39 Available: <http://dx.doi.org/10.1007/s11042-013-1361-8>.
- A. Lugmayr, Y. Zou, B. Stockleben, K. Lindfors, and C. Melakoski, "Categorization of ambient media projects on their business models, innovativeness, and characteristics—evaluation of Nokia Ubimedia MindTrek Award Projects of 2010," *Multimedia Tools and Applications*, vol. 66, 2013, pp. 33–57 Available: <http://dx.doi.org/10.1007/s11042-012-1143-8>.
- Lugmayr, Y. Zou, B. Stockleben, K. Lindfors, and C. Melakoski, "Categorization of ambient media projects on their business models, innovativeness, and characteristics - evaluation of Nokia ubimedia mindtrek award projects of 2010," *Multimedia Tools and Applications*, pp. 1-25, 2012, 10.1007/s11042-012-1143-8. [Online]. Available: <http://dx.doi.org/10.1007/s11042-012-1143-8>
- Lugmayr, "Connecting the real world with the digital overlay with smart ambient media—applying peirce's categories in the context of ambient media," *Multimedia Tools and Applications*, vol. 58, pp. 385–398, 2012. [Online]. Available: <http://dx.doi.org/10.1007/s11042-010-0671-3>
- Lugmayr, C. D. Zotto, and G. Loewe, Eds., "Convergent Divergence?" - Challenges for Media Convergence for Management and Technology Developer. Springer-Verlag, 2013, to be published.
- Lugmayr, "Ambient Media," *Novatica*, vol. 33, pp. 35-39, July-August 2007 http://www.ati.es/novatica/infonovatica_eng.html.

APPENDIX (BASED ON DESIGN THINKING WORKS)

T. Brown, Design Thinking, Harvard Business Review, June 2008.

H. Fraser, Turning Design Thinking into Design Doing, Rotman Magazine, Spring/Summer 2006.

A. Jones, The Innovation Acid Test – Growth Through Design and Differentiation, Triarchy Press, 2008

A. Carey, Inside Project Red Stripe – Incubating Innovation and Teamwork at the Economist, Triarchy Press, 2008

d.school bootcamp bootleg, Hasso Plattner, Institute of Design Stanford (upon which this presentation is based on)

Observe
Engage

EMPATHIZE

- Understand and empathize with the consumer
- What needs and desires do users have
- Identify for whom do design for
- Which emotions to trigger and what are guiding the consumer
- What are the thoughts and values
- Which kinds of stories do they tell
- How do people act in situations that helps us to get known their manifestation of experience

- **What do people do?**
- **What do people think?**
- **What do they need?**

Actionable Problem Statement

FOCUS

DEFINE

- Provides focus and frames the problem
- General vision for the group
- Reference for evaluating ideas
- Guides the innovation efforts
- Fuels brainstorming – how can we solve....
- One solution for one group of people, rather than many solutions for everything
- Inspiring people of what you do

Flaring

Going wide for concepts/outcomes

IDEATE

- Source for prototypes
- Step beyond obvious solutions
- Team creativity
- Unexpected areas for exploration
- Wide range of innovations
- Beyond obvious solutions
- Pushing the team brain boundaries

- **Sketches, scenarios, stories, involve consumers, tell stories, powerpoint, ...**



Rapid Building Consumer Tests

PROTOTYPE

- Quick and rapid prototyping
- Learning about failures
- Conversations with a real object
- Testing and improving possibilities
- Solution based process

Reform: research and teaching group designing the shape of change

Timothy R Merritt

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Abstract

One of the challenges teaching interaction design in computer science departments is often a lack of focus on design in various contexts and across levels of scale. Our newly created research and teaching platform at the Aarhus School of Architecture provides design courses that address this challenge. This presentation reviews examples from the design courses we teach at the IT Product Design Bachelor and Master programs at the Aarhus University's Department of Computer Science. These courses focus on interaction work that takes place away from the traditional screen and keyboard, and into the lives of people interacting in the physical world. The courses highlight the focus on the physical form, social interaction, attention to various levels of scale and solution sets that may include a mix of physical form, digital tools, and/or services. In this talk, examples are provided showing how sketching and prototyping early and throughout the process can open the design space when designing for people in the contemporary urban context. More details about the research platform can be found on the platform website: <http://reform.aarch.dk>

Keywords: Reform, Urban Intervention, Shape Changing Interfaces

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Social Movements within Interfaces in Urban Environments: Flash Mobs as Kinaesthetic Marketing and Political Campaigns

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Abstract. The design of our physical and virtual environments highly rules how we act and interact in space and among other people. This paper focuses on analysing event-based campaigns and marketing, particularly, how they appeal to our kinaesthetic sense, concretely by moving our affective bodies. We introduce choreography as a theoretical concept to understand in depth the systems of social movements within devices in urban environments.

Keywords: Design, urban environment, social interaction, choreography, embodiment, sensorimotor experience.

1 Introduction

Technologically sophisticated digital interfaces are now available for designing interactive urban environments. Digital devices shrink continuously with the consequence that digital applications are no longer seen but they set invisible distributed processes. Thus, technology has become more and more an inseparable aspect of embodied experience such as bodily movements. The designers of interactive systems have increasingly come to understand that interaction is intimately connected with embodiment [1, p.19]. Wireless technologies provide unequalled opportunities to tactile-kinaesthetic interaction.

Our objective is to expand the analysis of tactile-kinaesthetic experience on the use of interactive applications by introducing choreography as a theoretical concept to understand in depth the systems of social movements within devices in urban environments. Outside theatre and dancing bodies, the notion of choreography encourages rethinking digital interfaces from the point of view of moving and moved bodies. The idea of making theoretical connections between digital interfaces and choreography has been encouraged by recent studies of devices and software design (e.g. [2, 3]). Robertson and his colleagues [2] use the term “applied choreography” to refer to technological applications in which designers use choreographic knowledge of designing movements patterns in everyday life situations outside theatre and without trained dancers.

In this study we assume that new campaign and marketing strategies have interest to appeal to our kinaesthetic sense by organising choreographies which generate new affective interactions with other people, things and surroundings through technological applications. This paper focuses on analysing event-based campaigns and marketing, particularly, how they appeal to our kinaesthetic sense, not just symbolically by visual moving images but concretely by moving our affective bodies [4]. One example of this type of kinaesthetic marketing is a flash mob [5]. Flash mobs refer to performative events organised by people with different motives and interests. The organisers of flash mobs induce people by emails or social media to assemble in a place and to perform seemingly unusual patterns of movements for a brief time and then disperse. The organisers' motives for flash mobs can be e.g. pure entertainment to astonish passers-by, product advertising, political demonstrations, strengthening political campaigns or artistic expression. The target is not necessarily instrumental only. By using here Manning's [6] term relationscape, moving together may also increase the intensity of movement and create an atmosphere which strengthens connections between people and their own motives to join the flash mob.

We present two case studies, one political campaign and one commercial advertisement, to analyse how they appeal kinaesthetically to people by creating affective movement experiences. The commercial advertising case study is the marketing campaign of T-Mobile Company at Liverpool Station in London in 2009¹. After eight weeks planning and rehearsing, 400 dancers performed a two-minute dance which was filmed by ten hidden cameras at the station. The political campaign case study is a protest campaign against nuclear electricity in Switzerland². This political initiative event was organised by a Swiss party which resisted new nuclear power plants. The party tried to convince citizens to vote against nuclear electricity by their campaign within flash mobs. The relevant questions, in analysing these case studies, are: What kind of relationships do kinaesthetic campaigns try to establish among citizens and consumers by their choreographies? What kinds of connections can be traced between the daily routines of people and the special moments of kinaesthetic campaigns? What kind of significance and impact do campaign choreographies have in the midst of their supporters or opponents?

2 The pre-choreographies of urban environments

To study interaction among moving bodies, the focus is not simply on the actual form of single gestures, and posture, or not even movement patterns, but the physical locations and settings, in which these events take places. It remains to be examined more closely what kind of role urban settings, architecture and infrastructure have in creating interaction among people in public events. We argue that most movements we are doing are pre-choreographed by the physical, cultural, social, political and technical environment in which we are embedded. The design of the physical and virtual objects of our environment offers a pre-choreography for our bodily movements, provid-

¹ <http://www.youtube.com/watch?v=VQ3d3KigPQM>

² <http://www.youtube.com/watch?v=M0oe7k7M4IU>

ing or suppressing opportunities for social interaction with other people. For instance, the design of airport security is intended to limit and quite rigidly enforce the movement of its passengers. In this case instance power is disciplinary and resembles a form of domination. Pressures on security as well as the amount of passengers they process per hour are considerable; therefore, airports need passengers to be compliant in order to process them as quickly as possible [7, p.445].

What is the pre-choreography behind the T-Mobile event? By choosing to perform T-Mobile event at the hallway of the railway station, the designers make sure that passengers and passers-by cannot just pass the event without responding in a way or the other to moving bodies. The hallway offers the designers a pre-choreography which they utilise in planning interactions among people. They just did not create dance choreography to watch, but passers-by are seduced or enforced to respond kinaesthetically to movements or to join the dancing within the performers. Most passers-by seem to be kinaesthetically infected by dancing bodies and music. In the case of the flash mobs against nuclear power, e.g. a stairway provides one of the pre-choreographies. The interaction with passers-by is apparently strong due to density of people in limited space.

The other thing, which we want to focus on, is the intensity and quality of movements which performers have in moving bodies and how they draw the attention of people passing by. We mean by this quality of movement, i.e. kinaesthesia, a bodily felt sense of the direction of our movement, its speed, its range, its tension and so on [8, p. 55]. The term kinaesthesia is not interchangeable with the term proprioception [9], which mainly refers to interoceptive information of limb position, contributing to motor programming. Instead it involves exteroceptive information of moving and sensing the movements in space. Understanding movements in space more profoundly, we use the term kinaesthetic field [9, 10] which refers to the characteristic motion embedded in a certain place or location. What define the motion of the kinaesthetic fields are not simply their functional components but their expressive and affective qualities. These kinaesthetic fields ‘hold together’ or combine heterogeneous elements of the movements of people, animals and vehicles forming special kinaesthetic rhythms [11].

Considering the kinaesthetic field of the Liverpool Station hallway just before the event starts, we see people heading to their own directions by walking, waiting by leaning on the wall, checking timetables, etc. When the event starts, the whole kinaesthetic field is simultaneously transformed by people, who suddenly began to move differently they normally do at the station. In nuclear electricity flash mobs, the transformation of kinaesthetic fields are much more dramatic, since by-passers seem to be terrified in seeing other people falling down without understanding reasons for their behaviour.

3 Kinaesthetic Interaction within Devices

By choreography we do not refer to merely bodily movements in a space. We assume that flash mobs are not limited to a physical location in which bodily movements first

take place but are spread quickly as videos in the Internet and social media. Thus, devices such as smartphone cameras, which transmit these events, are an essential part of these choreographies. In fact, flash mobs would not exist without mobile technologies.

By smartphones, users can connect to the Internet anywhere and anytime. They can also use their devices to map their precise geographic coordinates – and access location-specific information like restaurant reviews, historical information, and locations of other people nearby. The proliferation of location-aware mobile technologies calls for a new understanding of how we move and dwell in public spaces, how we deal with locational privacy, and how social relations are developed [12]. The social interaction of flash mobs in public places frames their development within the context of smartphones, cameras and portable technologies. These technologies work as interfaces to public spaces. Not only they filter and provide information of these events, but they also reshape these choreographies by raising their kinaesthetic communication into a new level.

In the analysis of social movements, our interest is to understand the dynamics of kinaesthetic interaction among bodies reaching beyond our embodied limits. In our previous research [13, 14], we have distinguished three different scopes of analysis of choreography by using terms micro-, local and macro levels. In the micro-level analysis, we focus on e.g. a finger movement pushing a button when a passer-by takes a photo of the T-Mobile event. These are the movements which take place in our own kinespheres [15]. In local-level we analyse e.g. how dancing bodies create social interaction by their movements with passers-by who try to ignore them. The macro movements refer to a large-scale system that expands beyond the present situation and within its agents in social media. For instance, since 2009 the video in Youtube has been watched by over 37 million people who are all agents of this marketing choreography of the T-Mobile Company. All these different levels of movements are connected, and all of them offer different perspectives for contributing to interaction design. In the flash mobs for campaigning against nuclear electricity, besides the similar kind of dynamics as in the T-mobile case, a macro-level analysis contains the strong ethical statement against horrors of nuclear power.

We assume that kinaesthetic marketing as flash mobs are capable of appealing to customers that resist traditional marketing in print media [16]. McLuhan [17] classified media as either hot or cool. By hot media, he means a high-definition communication that demands little involvement from audience, whereas, cool media refers to media that demands active involvement from audience. By following here Birringer's [18] formulation of hot and cold interactivity, which turns upside down McLuhan's terminology of hot and cold media, Birringer [18] distinguishes cold interactivity from hot interactivity. By cold interactivity he means ubiquitous technology in our everyday life; when we use automated teller machine or hear recorded announcements in trains. This interactivity can be satisfying as well as frustrating. The operating system implies haptic, gestural and visual conventions we are supposed to know in advance or to learn by doing. Such cold interactivity entails purposive decision-making and effectiveness. The desired response is getting a result. Hot or complex interactivity draws on emotions, affections, desires and social interaction adding many layers

of human behaviour. Hot interactivity makes it difficult for one to "calm down" to analyse information properly, since it can be confusing and creating complex sensuous experiences [18, p. 238].

It seems that flash mobs and other performative acts bring hot interactivity into new level in urban environment. By digital technologies and social media, kinaesthetic marketing such as flash mobs is not limited to a physical location but spread quickly as images of social interactions in different media forms. The essence is in the affective and performative aspects of human movement and expression, focusing on recognition and simulation of the other bodies' movement.

4 Conclusions

Flash mobs in public places do not primarily appeal to citizens' or consumers' aural or visual sensations but they have capabilities of working through consumers' affective moving bodies. Kinaesthetic campaigns attempt to create interactions between ordinary people, authorities, products, vehicles, and online media. Most of those interactions carry power relations, including strict but invisible hierarchies, social conventions and cultural habits. Kinaesthetic marketing is tacit in the sense that people easily become themselves the agents of marketing, not just the targets of marketing. Spreading videos in the Internet, they also carry the messages of the political or commercial events. The Internet and social media have facilitated the inexpensive spread of information and opportunities to influence the interaction of kinaesthetic marketing. By analysing commercial advertisement and political campaigns together, we assume that commercial advertising has moved towards the methods of political campaigns, and vice versa, that political campaigns use the marketing strategies of commercial advertising. Kinesthetic marketing as flash mobs have dynamic, organising and strategic functions in our everyday world, thus, in the design of these events, outcomes are sometimes difficult to envisage.

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Public PartYcipation

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Abstract. This paper introduces social and spatial aspects related to gastronomic experiences and issues of digital media and culture. The tools of exploration involve “Cocktail partYcipation”² a gastronomic urban intervention and 35 in depth interviews related to culinary prosuming practices. The results of this study suggest that nowadays a high awareness of the notion of a transformed citizenship is observed what it is called in this paper the notion of the private-public citizenship. This paper suggests that this ascertainment could play a vital role in constructing strategies and actions for the revitalization of public spaces.

Keywords: private-public space, prosumerism, food, social media, aethersphere

1 Introduction

The main threads of this paper are the phenomenon of prosumption (i.e. producing for one’s own consumption) as introduced in the nineteen-eighties by Alvin Toffler (1981) in the “Third Wave”, food preparation and consumption practices which today are increasingly prominent as digital prosuming practices of content on the internet and in social media and how these phenomena impact on our understanding of space.

This paper presents as one of the main reasons that affect public awareness the expansion of digital prosumerism (creating and sharing content on the web) through the daily practices on digital media and particularly through our engagement to social media practices affecting multiple issues relevant to self identification and the private-public sphere.

2 Prosumerism, Food, Social media

2.1 Prosumerism

For this research prosumerism has been the basic exploration tool for the transformation of concepts related to spatial notions. Prosuming is producing for own con-

²<https://www.facebook.com/pages/-cocktail-partYcipation-/220209401375618>

sumption. The term was coined by Toffler (1981) who defined and readdressed the concept in his book “The Third Wave”, in 1981

For all but a tiny part of our existence humans have lived in hunting and gathering societies. Hunters and gathers had little interest in possessions and material wealth beyond what was needed to cover their needs. The centrality of the sequence of the seasons and the interconnection of productivity to consuming practices, were interconnected to rituals both civil and domestics. At those times festivals were intervals of the everydayness, connected to rituals of food sacrifice and civic declarations of connection to gods and the earth that provided the wealth of produce.

2.2 Prosumption Consumption Production

In the primitive societies an abstract system of exchange based in the symbolic and sign value within the objects is of primer importance. On the contrary, in modern societies consumption involves the external manipulation of signs and it lacks the symbolic values involved in creation. (Baudrillard 1970/1998)

During the last 30 years, prosumerism was becoming dominant in many activities and ethos of everyday practices; DIY activities, self help activities, the rise of active consumer etc. (Xie, Troye, 2007; Xie, Troye, Bagozzi, 2008; Soper 2009, Campbell 2005, Trentmann 2007).

2.3 The rise of digital prosumption and the emphasis of the user

Nowadays social media introduces digital prosumerism as a daily activity, ubiquitous technology and the UGC (user generated content) empowers individuals more and more to DIY practices, do by and for themselves, what they were used to depend upon services and things provided by others and the market. (Ritzer and Jurgenson 2008; Ritzer and Jurgenson 2011)

Nowadays due to sociological and economical reasons prosuming practices on the physical domain are on rise. Agents habitually create, mix, choose and share information and content available in the web gradually establishing, often unconsciously, new powerful everyday habits. (Knott –Denegri and Molesworth 2010, Viswanathan and Wang, 2004)

2.4 Prosumerism in transformation

Diverse frames of habitual prosuming practices mingle and create the present everydayness contributing to the creation of a new ethos (ἥθος) of prosumerism and the values interrelated. We have used food prosuming practices as a base frame and tested our results in social media prosuming practices. The frame transformation of prosumerism challenges notions related to self awareness and spatial sensitivity.

2.5 Food and Social Media

Food and digital media platforms are receptors and senders of personal and social information of rituals, tendencies and culture. Food and social media are platforms that share and communicate personal and social information. Food practices unquestionably contribute to the constitution of self and to social institutions such as family, values of intimacy, the notion of home, social capital and its contribution to wellbeing and quality of life. (Barthes, R. (1961); Levi Strauss, 2007/1978; Belasco, 2008; Teffler, 1996; Pollan, 2008, Pollan, 2010). Under the same light social media practices have been acknowledged about their controversial impact on issues related to personal development and their contribution to social norms and institutions, to the wellbeing and the quality of life. (Turkle, 2011; Meyrowitz, 1986; Miller, 2011; McLough, 2005; Putnam & Goss, 2002; Burke et al., 2010; Ellison et. al. 2007) The research brought in the surface similarities and resemblances concerning the norms and values that are inherent in food prosuming activities and also in social media prosuming practices of content as experienced in contemporary everydayness. (Androulaki, Maria. (2012b))

3 Public sensitivity and public space today

In food prosumerism, it appears that there is a significant difference when practiced occasionally and/or in public and when practiced in the frame of habitual everydayness. It was found that while casual³ prosuming in the digital domain of social media involves aspects and values of the public domain, everydayness transforms these digital prosuming practices into familiar practices as they are habituated in the private domain. Schematically, this can be represented as: public → casual → private. Everyday digital prosumerism cultivates and incorporates issues of the private domain, whereas by definition it should incorporate issues of the social domain. This is what this paper refers to as issues of the public-private domain. This remark, though, affects the essence of spatial sensitivity, the understanding of the private and the social sphere and the values and tendencies involved. Everydayness in the digital domain brings to surface issues of habituation and values related to the private sphere, making the social less social and the personal more social, altering the essence of the ambience, the feeling of the space. Personal atmospheres today, or what it is called in this paper *aetherspheres*, incorporate values and issues cultivated and fed by the fused atmosphere of the physical and the digital domain, crafting new norms and forming a new ethos of public reality. (Androulaki and Lee, 2013)

4 The new notion of *Public-Private* can be seen in...

³Casual refers to the usual practices of the everydayness.

1. Teams of public awareness like team-help groups. Many examples can be seen on the web , e-teams, cooperation of citizens with institutions and the state. Countless community orientated groups on social media platforms

The main characteristics of those groups are

- (a) Goal orientated
- (b) Enhanced with notions like solidarity and compassion
- (c) Open to public
- (d) Informative about the results of their actions

2. Teams of public awareness related to public spaces in specific like p-public, parallaxi, occupy teams etc

The main characteristics of these examples

- (a) Public participation
- (b) Semi organized actions, improvisations, alternative use of public spaces
- (c) Actions of protest for the civil rights

A recent example of this nature was the protest of the team Occupy-Gezi in Turkey. The initial point of the protest that fired the situation was the protection of the public park Gezi.

3. The success and the expansion of examples that connect e-places to physical places, like O2 priority, Groupon, Coachnet, Leaving Social Deals, Yelp etc.

Characteristics of these examples

- (a) The high importance of the contribution of the participants/citizens
- (b) The importance of the connection of the e-place and the physical place through feedback
- (c) Both profit and non-profit organizations

5 Cocktail PartYcipation

The flyer is divided into several sections:

- Top Left:** Illustration of two people holding glasses and another person behind a bar.
- Top Center:** "cocktail participation" with a date "CMA 02/10/2011 21:00".
- Top Right:** A bar menu listing drinks like Gin, Vodka, Whisky, Rum, Tequila, Mezcal, and others.
- Middle Left:** A "DIY" section with a grid of question marks and numbers (1x, 4x, 2x, 3x).
- Middle Right:** "closing event @ Η Ενεργoποίηση του δημόσιου χώρου Celebrating Public Space 02-10-2011 KAM 18:00 ΣΥΛΛΟΓΟΣ ΑΡΧΙΤΕΚΤΟΝΩΝ ΧΑΝΙΩΝ".
- Bottom Left:** A section with question marks and a martini glass icon.
- Bottom Right:** Logos of sponsors including ΠΕΡΙΦΕΡΕΙΑ ΚΡΗΤΗΣ, ΚΕΦΕΡΕΙΑΚΗ ΚΑΜ, ΤΕΛ/ΓΕΛΚ, Π.Α.Τ.Υ.Π.Α.Σ. Αρχειοθήκη, GSE T&K, ΣΕΛΛΑΝΕΣ, Σουδαίων Η. Χανιά, ΣΕΛΛΑΝΕΣ, Κρητική Γαλακτοκομία, Πούλε/Μπρεζ, and ΜΕΓΑΣ ΧΟΡΗΓΟΣ.

Fig. 1. Cocktail PartYcipation

The intervention *Cocktail PartYcipation* was a DIY activity, in a public space. It was created by the Architect's Association of Chania in order to close the conference-soiree "The activation of Public Spaces-Celebrating Public Space" The citizens-participants took part in a DIY culinary activity, in a public space.

A public space was transformed in a market place using ephemeral stands and local products. During the intervention the participants were provided with recipes and were welcomed to create three cocktails. The ingredients of the cocktails were a mixture of both traditional local products and the usual key ingredients of cocktails. They also had the opportunity to vote for their best cocktail and participate in a survey.

The intervention was accompanied by a facebook event page where visitors followed the documentation of the event, voted for their favorite cocktail and left their comments.



Fig. 2. Fb page *Cocktail PartYcipation*

In the central question of the survey if they prepared a cocktail for themselves or if they preferred to get one already made 80% of the participants answered that they preferred to do it by themselves.

During the intervention *Cocktail PartYcipation* two major features were highlighted; the use of a public space in a different way than the one they were used to and the participation of the citizens to create something themselves.

A few comments of the participants during the intervention:

Participant A:

I really enjoyed the event. I usually don't drink but I enjoyed the process a lot and now I know some very nice recipes. I followed the steps from the recipes and I asked for further explanations from the people at the bar. I will make them at home too. I am going for my third now. ...

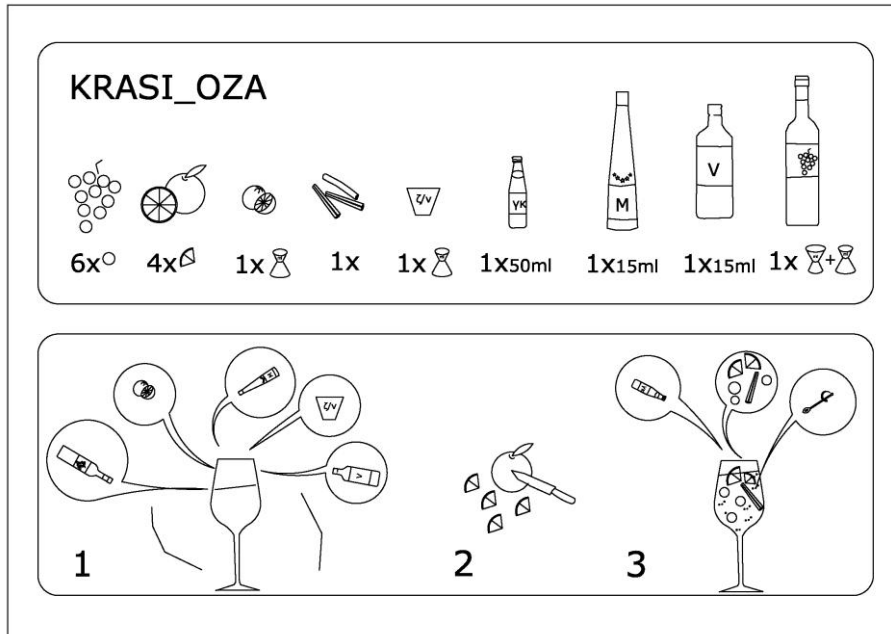


Fig. 2. The cocktail Krasi_ozá was the winning cocktail of the event during the intervention in 02-10-2011

Participant B:

Why trying my usual cocktail? I had the opportunity to learn how to do different ones!

Participant C:

Relaxed, not right or wrong, fun, nice result, doing something with friends.

Participant D:

I can't believe that I am in Chania!!! Loved it! When are you doing the next one?

6 [private-public places] and future actions

The high awareness of the private-public revealed in this research, worth's of future attention. A research aim could possibly be geared towards better understanding the consequences of this notion and its impact upon the notion of the public spaces in general and their use in specific. One example of this nature was *Cocktail Participa-*

tion. Its results supported the high awareness of the private-public and meanwhile highlighted the importance of goal orientated actions of prosumerism in public spaces. (Androulaki, Maria. (2012a))

The new notion of public-private affects the citizens⁴, the cities⁵ but also through the reflection of this concept to the city through the actions of the citizens. Based on the former two in progress changes, beyond doubt there is a fertile ground and a necessity for new ways, new strategies of approach and new directions of design in order to enhance the predefined new concepts but also to propose alternative directions.

Furthermore it is worthwhile researching the motivational mechanism of activities, starting with social media accounts and their connection to physical public places, and further researching users' engagement with physical and digital places. Can the increasing awareness of public issues of the so-called "digital-citizens" and "digital-natives" engender an interest in public matters within physical life, and what shape would this expression take? This research direction could follow and enhance existing research on local Internet practices, local communities their interrelation and potential evolution.



Fig. 2. The cocktail San_Kriti_Gin was the *winning cocktail* of the event in the Fb page

⁴ their interaction and their connection

⁵ through the way that they are perceived and experienced by the citizens

7 Conclusions

It is suggested that nowadays the prevailing atmosphere and especially the contemporary notions related to public sensitivity favors actions in public spaces. This paper presents as one of the main reasons that affect public awareness the expansion of digital prosumerism (creating and sharing content on the web) through the daily practices on digital media and particularly through our engagement to social media practices affecting multiple issues relevant to self identification and the private-public sphere. This paper suggests that actions that promote goal orientated actions of prosumerism could aid activities in public spaces and contribute in revitalizing public space in general.

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Playfulness and Large-scale Interactive Projections in Public Space

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Abstract. In this paper we present our perspective on the role of playfulness regarding large scale, interactive floor and façade projections in urban public space. We start with a model to identify the key elements and their interplay within this experience design space. This model will develop a deeper understanding of the design space in order to act as being a conceptual tool for creating interactive projects. We discuss the potential of playful projects to reconfigure public space in terms of the performative and motivational aspects of play. We conclude with our findings from observing playful projects built or supported by our research team.

Keywords: Public Space; Interaction; Playful; Social; Media Art; Games; Installations;

1 Introduction

“Public space is our open-air living room, our outdoor leisure centre.” (Lipton, 2002)

This open, collectively owned space provides a neutral ground for social interaction and hence is a space of possibilities for playful engagement and communication. However, for the younger generation the internet and mobile communication increasingly fulfill these roles (Rogers et al., 2011). Youths might rather sit on a park bench talking and playing with someone miles away, looking at a small screen, rather than engaging with the space or people around them.

As research group^{1,2}, we believe that squares and parks are deeply social (Lefebvre, 1991). They are not just pure geometric spaces: they become meaningful through interaction and context. A look into the history of public squares (Sitte, 1901) reveals their varying functions – e.g. political, economic and social. These are subject to constant and substantial change. Small markets where local goods were traded now become arenas for interactive advertisement via public screens. Commercialization is on the verge of ruining this experiential space. As media artists and researchers we want

¹ PELS (Pervasive Experience Lab Salzburg), <http://www.pels.at>

² CADET (Center for Advances in Digital Entertainment Technologies), <http://www.cadet.at>

to contribute these thoughts and findings to discussions on how to shape the appearance and function of urban public space in the near future. The number of people working and living in urban areas is bigger than it ever has been and new technologies offer exciting opportunities to create novel experiences in urban public spaces, while pervasive computing and mixed reality provide new visions on how to blend these experiences with our everyday life. We try to leverage technology to reconfigure public space in a dramaturgic, respectively game design space and thereby stimulate social interaction and communication.

This paper provides an overview of the work we carried out between 2011 and 2013. It extends our previous work in the area of playful interactive façade and floor projections in public space (Wagner, 2012). In the following sections we will discuss our perspective on urban playfulness and urban public space as a design space, and later analyzing prototypes and experiments in terms of their implication, success, and challenges.

2 Urban Playfulness

In our work we interpret urban playfulness as broader than the mere act of playing a game. We consider interactive artworks or reactive musical instruments with less rigid structures also playful. Salen and Zimmerman (2003) define play as *free movement within a more rigid structure*. This relates to Huizinga's understanding of play (Huizinga, 1949) as an integral part of human culture, not only associated with games, but e.g. also performing arts, literature and religion. Designing playful experiences in public space however entails different challenges in comparison to designing games for computers, or installing interactive artworks in a confined space like a gallery or the living room. In order to get a better understanding of the design space, key elements and their interplay were identified. The elements found were: the space itself [S], the people currently inhabiting it [P], not to be confused with just the active players, the rules [R] implied by society as social rules and the rules in the context of the individual person (in our case the game/interaction logic). Together these components form a dynamic system, in which interaction and behavior [I] is shaped by the mentioned elements in an evolving feedback system. What we describe is a transformation process, triggered by a change in context involving all three elements.

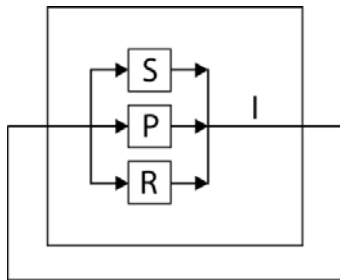


Fig. 1. Key elements within the urban public design space

2.1 Space

This basic model is greatly inspired by Goffman (1966), from a sociological point of view, and Gehl (2003), from an urban design perspective. Both note that the environment (in our model defined as space) significantly shapes the interaction that occurs in public space. Public space can facilitate varying forms of activities, which Gehl groups in three categories, namely necessary activities, optional activities and social activities. While necessary activities are compulsory and will take place under almost any condition, optional and social activities are influenced by spatial conditions enabling or constraining certain behaviors or interaction. We see space as the geometric structure including visual and auditory displays, but not the context or social meaning, which is in accord with studies in HCI (Akpan et al., 2013; Harrison & Dourish, 1996). It becomes evident that this quality of public spaces itself is an essential element of the dynamics shaping interaction and behavior in public space.

2.2 People

Another influence for our model was the research conducted in the human-computer interaction domain regarding large-scale public displays (Müller et al., 2010) and collocated interaction (Vaida & Greenberg, 2009). Müller et al. describe the various interaction phases in the form of an audience funnel, which is similar to the contextual awareness model and the roles offered by pervasive games as discussed by Montola and Waern (Montola & Waern, 2006) extending Reeves et al. model for designing the spectator experience (Reeves et al., 2005). The audience funnel is a fine grained model which consists of (1) passing by, (2) viewing and reacting, (3) subtle interaction, (4) direct interaction, (5) multiple interaction and (6) follow up actions. In contrast Montola and Waern introduce the following roles: (1) active participation as a player, (2) participation, but not in a direct player role, (3) spectatorship and (4) refusal. Taking only the player/user experience into account is definitely shortsighted. Vaida & Greenberg, who discuss the role of the game console as a computational meeting place, come to a similar conclusion. They point out that due to the often diverse individuals participating, games need to provide different modes of gameplay and should *foster audience participation or an otherwise enjoyable audience experience*. For projects on public squares as a design spaces, multiple levels of engagement and interaction need to be taken into consideration.

2.3 Rules

Beside the space itself and the people inhabiting it, also the rules are an important element in this dynamic system. As mentioned earlier, there are social rules and rules that belong to the context the individuals are acting in (Goffman, 1959). Creating a game or playful installation means bringing a change to the context that people are interacting in through introducing new game/interaction rules to the system. The characteristics of these rules are essential. Rules that are easily explored and understood and that result in a discernible outcome offer an invitation for those willing to

play and spectate. An important thing to remember is the collocated nature of public space. Offering just a single-player experience with short game sessions is one solution for gameplay in a collocated interaction space (Voldo & Greenberg, 2009). Another option is to offer a multi user/player experience, which we will discuss in Chapter 5 in regards to our experimental prototypes.

2.4 Summary

In reality public space is highly complex: the space underlies exterior transformations e.g. weather and time and people belong to different groups in terms of motivation and engagement, so the game/interaction rules should ideally reflect this heterogeneity. The main questions which arise from this configuration are: (1) How to design rules for installations and games in a way that people become active players/users? (2) How to deal with non-players or passive observers? (3) How to stimulate engagement and long-term motivation? (4) Which modalities can increase social interaction and communication?

3 Designing for Performative Play

“All game play is performance. There is no gaming without performance.” (McGonigal, 2005)

Performative play is our weapon of choice and a key to understand how playfulness offers different levels of engagement, while fostering the transition from passerby to observer and from observer to player. McGonigal is not the only one arguing that game play has an inherent performative aspect, but this can be found in a variety of domains ranging from psychology (Bateson, 1955), sociology (Huizinga, 1949) and game studies (Bogost, 2008; Salen & Zimmerman, 2003; Wardrip-Fruin & Harrigan, 2004) to performance studies (Dixon, 2007; Schechner, 2006). There is an in-game performance that relates to the role of players both as performer and audience, but more interesting for us is the out-of-game performance. There are clear indicators for play as performance. On one hand, there are e-sport events, where computer game matches are broadcasted live and players earn respective prize money and gather a loyal fan base watching them - the performance is a show of attained skills. On the other hand, there are games like Dance, Dance, Revolution or Guitar Hero and game controllers ranging from the Wii-Mote motion sensor to the Kinect full-body tracking that foster theatrical performances. *“Guitar Hero and Rock Band are deeply theatrical by design and many players choose to enhance that theatricality in their gameplay. [...] a parody of rock authenticity.”*(Miller, 2009). The performance is mimetic play and a form of creative expression.

The act of playing creates a framing (Huizinga, 1949), which is commonly referred to as the magic circle (Salen & Zimmerman, 2003). Play needs to be recognizable to create this protective and liberating framing. It provides the players with a certain degree of freedom, different to the role Goffman (1959) points out, which people impose on themselves restricting their behavior in public space. To support performative

play the space needs to be reconfigured, so that play becomes obvious and the connection between play and its outcome is clearly visible.

4 Designing for Long-Term Motivation

Things that are pleasurable keep us engaged and motivated. Researchers at Nokia Research introduced PLEX the pleasure experience framework (Arrasvuori et al., 2011), which is based on the framework created by Costello and Edmonds (2007). Both frameworks are conceptual and evaluation tools for playful experiences with interactive applications and products. They built up on theory ranging from psychology (e.g. Csikszentmihalyi's flow theory) and philosophy (e.g. Callois) to game design (e.g. LeBlanc). While Costello and Edmonds relate their framework to interactive artworks, the researchers from Nokia tried to widen the approach to interactive products in general. The results are categories that contribute to a pleasurable, respectively playful experience. Here the list from the most recent publication (Arrasvuori et al., 2011): Captivation, Challenge, Competition, Completion, Control, Cruelty, Discovery, Eroticisim, Exploration, Fantasy, Fellowship, Humor, Nurture, Relaxation, Sensation, Simulation, Submission, Subversion, Suffering, Sympathy and Thrill. We were interested, which of those categories contribute to long-term motivation for games and playful installations in public space and will discuss this after presenting our experimental prototypes.

5 Experimental Prototypes

There are already a great variety of projects, experiments and prototypes dealing with playful interaction in public space, including art projects, games and commercial applications like playful tourist guides. A lot of research has been done in the field of pervasive games including the IPerG (Integrated Project on Pervasive Gaming), an EU funded project. In terms of interface and technology we see three directions concerning playful interaction in large public space, which can also be combined: (1) Mobile and wearable personal devices are an inherent part of our everyday life. Mobile phones have been successfully incorporated in experimental and commercial projects ranging from location-based services to multi-player scenarios adopting public space as a narrative or playful space (Ballagas, 2006; Benford et al., 2006; Brown et al., 2005). (2) The public space with its public displays, media façades (Fischer & Hornecker, 2012) and open spaces for projections offers new means for interactive experiences. (3) Physical computing provides new multisensory experiences in public space and real physical manifestations, which do not rely on light conditions (hence the time of day) in the way projection systems and media façades do. Regarding interaction paradigms that support urban playfulness we identified presence in space, movement, full-body interaction, gestures and facial expression, remote interaction via mobile and wearable devices and physical interaction with any sort of mechanism. Volda and Greenberg (2009) mention that players preferred gestural and physical

input devices over button-based input devices and suggest an intuitive mapping in a collocated design space.

This research project has focused on large-scale projections, creating interactive façade and floor projections. In the next two chapters we present a selection of projects starting with the interactive floor projections.

5.1 Interactive Floor Projections

This first chapter will focus on multi user, interactive floor projections. To create these games and installations, we developed a low-cost tracking system for use in large public space areas ($> 100\text{m}^2$) based on thermal imaging technology, which can be used in conjunction with projections. The concept of the LinkedDots System was to create digital playgrounds (overlays) on public squares, and has been presented in an earlier paper (Wagner, 2012). We imagined it as a system that invites people to collaboratively explore and play. The people interact with the system by means of presence and movement. To enable more complex scenarios, our main challenge was to create a robust tracking, which provides consistent IDs for the people within the interaction area. Leaving removes the player's ID and when re-entering a new ID is assigned by the system.

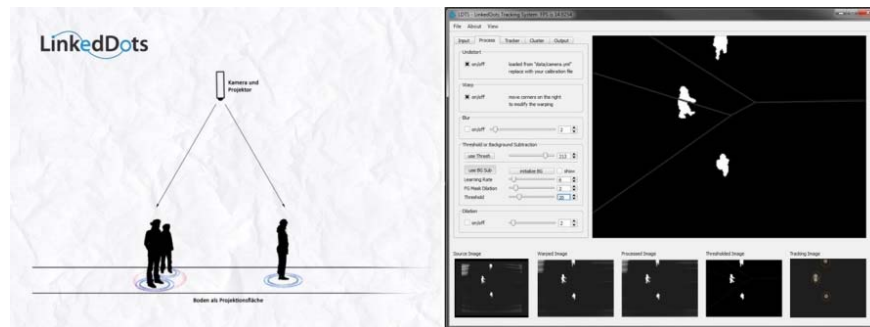


Fig. 2. LinkedDots System. Camera and Projector mounted above (left).
GUI of the tracking (right).

Reactive Visuals

During Schmiede³, a media art festival in Hallein/Salzburg, Austria, we offered a workshop with our tracking and projection system. Several reactive visuals were created and the user's position was used as input parameter. On the users' position meta-ball objects magnified the texture of the visuals and a slight trail marked their paths. The rules of interaction with the visuals were quite simple and the visuals indeed an eye-candy, so people were attracted to explore them, but just for a very short amount of time (2-3 minutes). The expressiveness of the interaction in this scenario was very

³ <http://www.schmiede.ca/>

limited, so performative play could not emerge. The rules did not incorporate a connection of some sort between the participants, which resulted in a lack of social interaction and communication. These simple reactive systems are not enough to keep participants engaged and the audience entertained.

Fragments

Fragments is an audio-visual installation that was created for a public square as part of the foundation event of the “Salzburger Hochschulkonferenz”. People within a defined proximity form clusters, which are reflected by visuals and sound. The system assigns a different fragment (sound generated e.g. birds or water drops) to each of the clusters. The sounds’ position in the multi-channel audio environment is determined by the central positions of the clusters. The density of the cluster controls the frequency of occurrence and pitch of the sound. The variance of the sound within each cluster is controlled by the sum of motion within the cluster. The maximum motion vector in the scene controls the intensity of the beat, accompanying the sound fragments.

The visible connection of the people in the clusters worked quite well and people started to collaborate. They realized that the maximum motion controlled the beat, but could not figure out how the sound fragments (clusters) worked in detail. The link between the action (repositioning) and its effect (auditory) was not clear to them. This lack in control hindered expressiveness. Overall we observed a slight transformation process and people mentioned, that they loved the idea and would like to see such things to happen more often. The most challenging part in the design was to create a discernible mapping between the cluster properties and the sound. In an interactive audio-visual dance performance, created later, we used a similar system, but reduced the complexity of the mapping. We used very distinctive sound samples, where we connected the maximum motion vector of the cluster nodes to the speed of the playback, which also influenced the pitch. The density was mapped to an echo effect. After the performance, we invited the audience to play and observed an increase in performative play and mean residence time.



Fig. 3. People exploring fragments at a public square in Salzburg.

To sum it up, curiosity, exploration and collaboration can contribute to long-term motivation, when the rules (mapping) are simple and discernible. Audio installations, resembling a musical instrument are challenging to create, because on one side they need to be easy enough to understand and learn in a very short amount of time and on the other complex enough to enable expressiveness.

Absorbit

Absorbit is a multiplayer movement based game built by Adam Awan (an artist from the UK) and Rene Baumgartner (a student at our MultimediaTechnology program). An orb follows each player, which is growing as the player absorbs stars and smaller players. The game ends when one player accomplishes to reach a certain size of his or her orb. Once out of the game, people can either wait for the next round or start anew by exiting and re-entering the game area. There is no constraint for people to join a round, which has already started. There are clear roles of fleeing and hunting defined by the simple rules of the game. Absorbit was installed at several locations and proved to be a very captivating project, mainly due to the following reasons: (1) The barrier of entry was lowered due to the simple set of rules of the game. (2) The game consisted of short but intense sessions with immediate feedback. (3) The competitive character of the game fostered long-term motivation. It is a good example of meaningful play, which Salen and Zimmerman define as follows: *“Meaningful play occurs when the relationship between action and outcome in a game are both discernible and integrated into the larger context of the game.”* (Salen & Zimmerman, 2003) The players were quite enthusiastic about the game. The majority of the people played several times. The audience gathered around the interaction area watching others play.

Reflecting on the design and development process, the game was comparatively easy to create and balance. Competitive play offers a distinct opportunity to transform the context of a public square, to become a playful gathering.



Fig. 4. People playing Absorbit at Schmiede 2012.

5.2 Interactive Façade and Wall Projections

We created several interactive façade projections with the Kinect as single user experience. The depth camera allows full-body interaction. Although a Kinect and simi-

lar devices allow more sophisticated interaction gestures, we choose to go for easy to grasp interaction models, to make it work in public space without the need to have a thorough introduction.

EnziTron

EnziTron is a large-scale and fun gaming experience, which was projected onto the huge glass façade of the Lentos Art Museum in Linz⁴. Like in the movie Tron the players' body is transported into a computer game. The goal of the game is to move slick and quick and use hands and feet to collect puzzle tokens that fly towards the player. In the game each hand and foot node has a collision area attached to it (comparable to a baseball glove) which the players use to catch the tokens flying towards them. These 4 tokens are arranged in varying shapes to increase the difficulty over time. Each game session lasts two minutes and a high score is presented at the end.

EnziTron is good example how to stage the players, to increase the performative character of a game. Although such a staging might frighten away some people, our observations and informal interviews with spectators and participants over a time period of four evenings underpinned our assumption that EnziTron is an enjoyable interlude for players and spectators alike. We watched the so called “honeypot effect” (Müller et al., 2012), where those people that interact and spectate catch the passers-by attention and focus and observed that people were in general more likely to participate, when in groups, due to group cohesiveness and an increase in self-confidence. When planning such kind of games or installations, it is important to define a dedicated interaction area, so spectators know, where there is a safe-spot to watch and those interacting or playing are not disturbed by those spectating. For catching the people's attention the oversized projection was a big boost and the way the player was represented as a stickman fostered immediate immersion in the game. So size in this respect really matters. Having a high score enhanced replayability, so eventually people came back later to check if someone has beaten their score.



Fig. 5. People spectating (left). A girl playing EnziTron (right).

⁴ LENTOS Kunstmuseum Linz, <http://www.lentos.at>

Move (Reloaded)

Move invites people to capture short movement sequences (five seconds), which are then projected one at a time on a wall or façade in ever changing order. The short clips are blended into each other with a morphing algorithm. The installation uses a depth sensor and a RGB camera to stencil the people out of the RGB image. The people have a small interaction area of about 2 x 3 meters. The interaction rules are very simple to invite the broad public to try the installation. When someone enters the interaction area and the person gets detected by the system the playback changes to a counter and their silhouette is projected. As mentioned in Müller et al. (2012), silhouettes catch people's attention and are very attractive and intuitive for those who interact with the installation. They see the shape of themselves and understand immediately, that it is their silhouette that is projected. People can improvise their movement to the rhythm of music, so it influences the people's movement and contributes largely to the overall quality of the installation. Therefore an adequate playlist was created to have some variety. Later this year we are planning to create an installation with a similar principle interaction, but where the parameters calculated from the clips themselves drive the sound installation accompanying the visuals. With no deeper engagement for the people, participants watched the clips while approaching, recorded a clip and then watched as their clip was played. The sorting of the clips was not purely random, but the most recent clip was shown within the following four clips. Sometimes people showed quite inappropriate gestures in the clips they recorded, so it is wise to implement an option to discard such clips. In accordance with the observations from EnziTron, it was more likely that people participated, when they arrived in groups. People especially enjoyed the possibility to dance with their friends to record a clip.

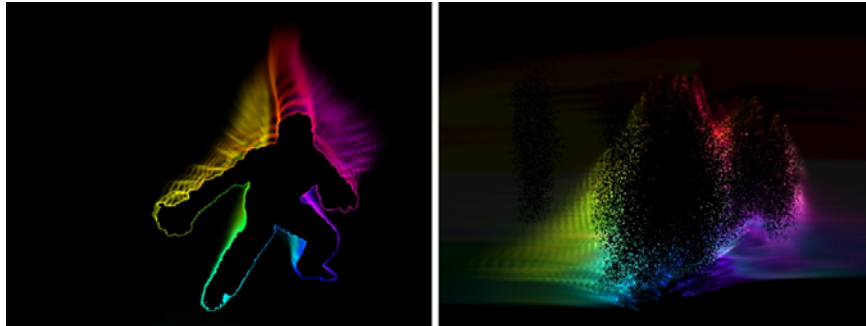


Fig. 6. Screenshots from the installation: movement (left), morph (right)

5.3 Findings

In the process of conceptualizing, creating, staging and later discussing our own work with players and spectators, we realized that the categories presented in the PLEX framework can be applied to playful experiences in large public spaces. How people interact in public space is affected by the very fact that they share the same

space with others. In this regard Hall (1966) discusses the concept of proxemics, dividing the area around individuals into zones, which reflect the level of intimacy in relation to others. These zones define some sort of personal bubbles that individuals build around themselves. Both competitive and collaborative play provide different means to invite people to let their personal bubbles burst, which liberates them to get in touch with each other. To foster long-term motivation in public space settings, competition, exploration and collaboration (fellowship in the PLEX model) are strong ingredients.

It is easier, to create projects with façade or wall projections, because people, both the designers and participant, are in general used to the perspective, which is closer to what they know traditional screens. When creating an interactive floor projection you have to adapt to the limitations and the change of perspective for those who are participating and watching the installation. Especially with projectors, there is a limitation due to the resolution, which translates into a clearly visible size of the individual pixels. A big difference to façade and wall projections is that the interaction and projection area share the same physical space, which results in a very immediate feedback. In general this immediacy invites people to just give it a try, without the need to wait in a queue.

Revisiting our model, it is the people and space that you have to be taken into account for catching the people's attention, but it is mostly the rules that result in motivation. If social interaction is the benchmark, the floor projections Absorbit and fragments were the top projects. Overall Absorbit was the most successful project in terms of long-term motivation, but collaborative and expressive audio installations have a high potential for performative play and create potentially interesting settings for the audience. Taking visibility and attention as benchmark, the façade and wall projections were up front.

6 Conclusion

In this paper we presented a model framing key elements of interaction in public space: space, people and rules. We analyzed in which respects playfulness can contribute in reconfiguring this experience design space. The performative aspect of play invites people to spectate and participate by offering different levels of engagement. This can be achieved by taking the different roles into account, when designing interactive applications for large public spaces and by reconfiguring the space in a way that supports performative play. By adding new rules for interaction and play, to enhance competitive, collaborative and explorative aspects, long-term motivation and social interaction can be fostered. Currently we are investigating the possibilities that arise from the usage of physical computing, to create interfaces that promote collaborative engagement with real world objects in public space. We started working on concepts for interactive fountains and physical interactive artworks.

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(Re)Creating Lively Cities through Ambient Technologies: Arts, Culture, and Gastronomic Experiences

Abstract. Our paper discusses different processes for animating urban spaces and creating lively cities through arts, culture, and gastronomic experiences. Such processes include interactive human scale environments, or ambient environments. These environments are sensitive and responsive to the presence of people, conveying a much more dynamic feel of a street, a plaza, a neighbourhood, or a city.

Our world is a world of signs, images, colours, symbols, and interactivity. Humans demand much more human interaction and new modes of connection with the urban space through technology and innovative design tools. Neuro-marketing, defined as an emerging area of marketing studies consumers' sensorimotor, cognitive, and affective reaction to any marketing stimulation., These aspects are present in all aspects of life including urban spaces that need to be more exciting and easily accessible and walkable. Arts, culture, and gastronomy are elements that are always present in every urban space, on different scales, thus providing us with a balanced environment. Ambient technology has the power to transmit the message of culture socially and politically by enhancing human interaction, community and cultural awareness, knowledge, creative and active consumption, progressing sustainability (spiritual and material), and access to modern technologies in urban spaces. Cities and urban spaces need to be more progressive to set place making as a concept at the heart of every lively city's design. A sense of place, conviviality, and safety can be generated through interactive design, and technologically animated spaces. The digital era is extensively impacting our urban spaces, which need to be flexible and adaptable to meet the attention and aspirations of the users.

Keywords: ambient technologies, interactivity, arts, culture, gastronomy.

1- Introduction: Place making – designing spaces for more interaction



In Australia, New Zealand, and the United States, the concept of place making has been pushed forward by city planners in order to provide citizens with more adequate urban spaces for interaction, enjoyment, and education. Governments are associated with communities to develop creative and lively atmospheres that respond to people needs, desires, and future aspirations. In May 2013, the city of Sydney organized the 2013 Media Façade Exhibition and competition, along with Vivid Sydney and the International Symposium of Electronic Art (ISEA). Biennales, symposium, and conferences help support innovation and progress the concept of interactivity in cities.

Figure 1: Media Façade Exhibition 2013, Sydney, Australia

Ambient technologies will be "capable of meeting needs", anticipating and responding intelligently to spoken or gestured wishes and desires without conscious mediation, and even these could result in systems that are capable of engaging in an "intelligent dialogue" (Punie 2003, p.5). Interactivity includes the lighting of public spaces, and Media architecture that includes text, graphics, and images within the architecture of the buildings. Place making is about rethinking public spaces and cities while taking into consideration the citizens as the main actors while designing cities for people. Users and occupants are placed at the heart of the reflection on urban spaces, where spatial designs emphasize creating dynamic atmospheres, enabling people to interact and to be part of the cultural diversity of an urban space or city.

2- Ambient technologies as tools for dynamic cities

Ambient technologies are the intelligent objects that will make our lives easier, much more relaxed and enjoyable (Philips Research, 2003). Designers and scientists explore together a new vision for a future city, where smart objects are integrated into different objects: doors, furniture, walls, cars, roads, clothes, and even food (Crutzen, 2006).

Cities are a reflection of diverse networks of interaction, representing different people and social categories from diverse backgrounds and various walks of life. Many cities are planned suddenly, and are growing under increasing pressure through urbanization. As the spaces we live in are dynamic, with emerging new applications, architects and designers being called to transform public space, and make it more interactive by transforming the urban fabric into a dynamic tool. People of the city are in need today to renew their relationships and connection with the urban life, the street, and cultural life. Ambient technologies include interactive environments that use sensor technology which responds to the presence of people. The ambient intelligence paradigm builds upon pervasive computing, ubiquitous computing, profiling practices, context awareness, and human-centric computer interaction design (Zelkha & Epstein 1998; Aarts, Harwig & Schuurmans 2001). Today, there is an urging need to think outside the box, and embed urban plazas with dynamic contexts, to convey a feeling of digital change within the city; City dwellers are provided with a real platform to establish an interface to create customized environments for people. Disabled people are very important actors, where ambient technologies can be used through touch, view, smell, and hearing, to lead the handicapped people through the space. Interactive design has inspired designers from the Design Research Lab to design for the blind and the deaf.



Figure 2: Call my attention, Design Lab Berlin

“Call My Attention” is an application for immediate Line-of-Sight Signaling on Mobile Phones. The application enables ‘buzzing’ of nearby friends to alert them. It is especially helpful for deaf users, but also in crowded environments (Design Lab, 2011). Technology is all around us, so why not using it to help the disabled find their way through our complex world.

3- Dynamic cities – Arts, culture, and gastronomy

When we think of culturally dynamic cities, we typically refer to arts, culture, and food that are part of actors to animate a city, and make it more usable.



Figure 3: Integrated design commission, SA bog, Adelaide

In the city of Adelaide, in South Australia, a new project called 5000+ is taking place, by adding dynamism to the urban environment. 5000+ is a design-led project for the redesign, renewal and reactivation of inner Adelaide. “It works to connect the three levels of government and it reaches out to business, the public, academics and researchers to build a vision for Inner Adelaide using design as its medium,” said Mr Horton, the commissioner for integrated design in Adelaide. Since June 2011, the team has been collecting and enabling ideas and propositions from design professionals, businesses, not for profit organisations, government agencies and academia.

Immersive realities environments are potential tools that can restructure the arts and the cultural life of a city, as part of a temporary exhibition. The public space is perceived as a cultural mirror, reflecting the variety of cultural values within the community, ranging from language to religion. This is a very diverse field where different techniques can be used including: sensors, artificial intelligence, and similar environments that would call for the use of acute technologies.

The Guardian newspaper started a project called Guardian Goggles, published on April 1st, 2013, which incorporates translucent screens in the lenses, overlaying the wearer's view of their surroundings with a real-time stream of specially curated opinions from the paper's reporters, critics and commentators.

Arts, culture, and especially food are the key for a successful dynamic city; therefore it is always very beneficial to create immersive environments where visitors learn about the history, virtually attend events that will take place in the next season, and also a digital interface that would present the life of gastronomic traditions.

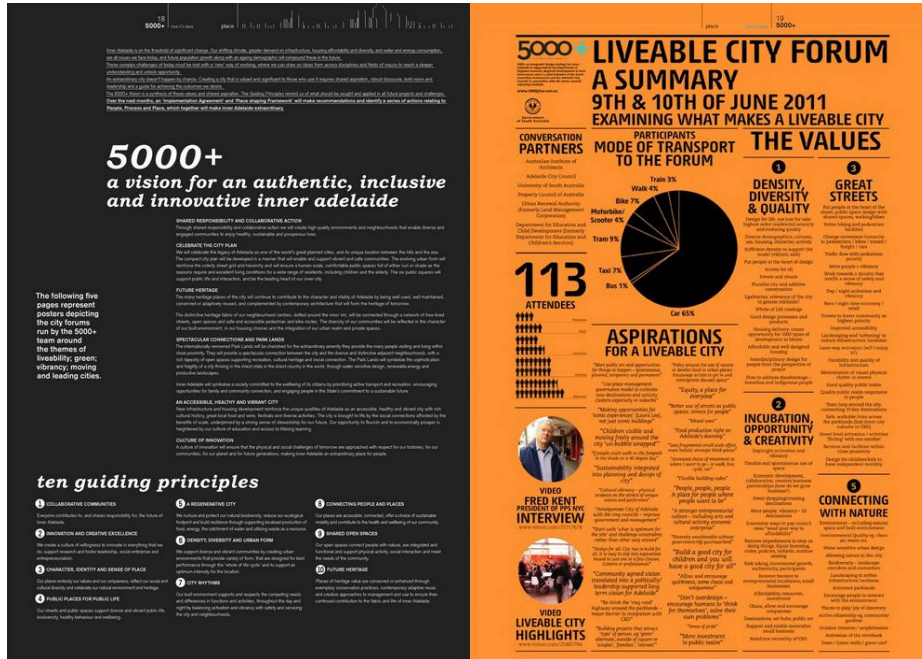


Figure 4: Aspirations for a Liveable city, Adelaide, Australia

4- The American Experience

New York City is known as a melting pot of cultures and civilizations. Food is an integrative part of this diverse culture that is a mix of Cubans, Puerto Ricans, African Americans, Europeans, Indians, Pakistanis, Arabs, and Asians. New York is a city of immigrants that bring their own distinctive customs, religions, and food traditions. The uniqueness of New York consists of several diverse neighborhoods with different culinary traditions including Harlem, Spanish Harlem, Korea Town, Little India, East Village, Little Italy, and Chinatown. This ultra-urban destination is full of urban opportunities, thus conveying a unique gastronomic and cultural experience. How about an international village with sensors of diverse scents from different countries? How about an interactive Media Façade with sensors reacting to people's countries preferences with perfumes of Japanese food, Indian food, and Mediterranean food. The gastronomic experience is still not approached as well as it should be when it comes to interactive technologies, thus there is a need to organize workshops and installations in this direction. Media technologies and ambient technologies can be integrated in a way to provide the visitors with a unique experience of smells and sounds.



Figure 5: Gastronomic diversity, New York

5- The Australian Experience

Enhancing the urban environment with use of innovative forms of new technology, large-scale light projections, installations and music is festival that happens annually in Sydney called Vivid. The Vivid festival is one such example that reflects the eagerness of the Sydney City Council and artists to embellish the city with light music and ideas. Vivid is known for its spectacular lights projected on to large-scale architectural sites littered around the city center during the festival. For instance, The Sydney Opera House is video mapped directly onto the 1,056,000 tiles. Another building that uses large scale architectural video mapping is Customs House. (CNN, Neubauer, 2013).



Figure 6: The Vivid Festival, Sydney, Australia, by CNN

During Vivid the entire city center, located in Circular Quay surrounded by Sydney harbor is ablaze with light projected onto buildings, light projected onto sculptures and LEDS's used in installation artworks. Such colorful ambient technologies provide inhabitants and visitors with progression towards a digital and creative urban future.



Figure 7: A Tunnel at the Rocks, Sydney Vivid, 2012

The event is also a gathering for lectures, workshops and debate in the fields of creative art, design, architecture, and fashion. Such a gathering certainly highlights the global image of Sydney as a center for creative arts and emerging technologies that embellish and activate the image of the urban fabric. "Vivid now leads the world in sheer number and size of buildings projections -- no other city lights up its famous landmarks and skyscrapers the way we do," says creative adviser Ignatius Jones, who co-directed the 2000 Sydney Olympics' opening ceremony.



Figure 8: The Vivid Festival, Sydney Opera House, Credits: CNN



Figure 9: The Vivid Festival, Sydney, CNN

One example of light sculpture is the media architecture project Euphonious Mobius (2013). Euphonious Mobius is a dynamic surface for infusing form and media. This work was designed by designer Rebekah Araullo. This artwork is interactive and through advanced computation and scripting techniques each block is unique in shape and size and functions as a singular pixel housing LED lights – leading to the creation of a media freeform. This freeform displays an emerging style in architecture. During construction, LED lights and sensors were embedded within the form to facilitate its interactive media component. Expressions are made through light and sound similar to a media façade where images are made on its form by the LED lights. Dynamic images are driven by input from motion and sound through the sensors. To add public value, this content was designed by a sound expert (Michael Bates) and a visual artist (OnacloV) to engage the audience and entice a multisensory interaction – sight, sound and touch.



Figure 10: Euphonious Mobius, Sydney Vivid Festival



Figure 11 : Euphonious Mobius, Sydney Vivid Festival

As a spatial intervention for Vivid Sydney 2013, Euphonious Mobius' interactivity and dynamic form create a multitude of interface experiences and facilitates dialogue in the form of contemporary media. Euphonious Mobius displays advanced applications and design that inspire the imagination in the field of architecture, media, design and lighting and echo and promote Vivid. The artwork was multidisciplinary collaboration that will brought together experts in the fields of architectural design, engineering, emergent technologies, acoustics and the arts. This project is an example of how cities can transform the fabric of urban spaces by creating vibrant atmospheres that enable people to interact and to be part of urban space and city.

6- New Zealand Interactive Experience

Place making is important to the social, cultural, and economic prosperity in New Zealand. It is an efficient model that engages both planners and the community to enhance the public space that respects people's needs and aspirations.

Luxcity is a transitional festival in Christchurch, New Zealand, where students of architecture from all over the country create "light" structures using lasers, beams, projectors, balloons, and fabric. Such design event animates the urban space and makes it livelier and more interactive, calling people from all walks of life and design levels to discuss sculptures, and to appropriate the urban space of their city. Creative-lead work also provides people with a feeling of hope and safety especially after the earthquakes that took place in the city. The 10-day festival includes workshops to build a new outdoor earth pizzeria on an empty city centre site, a guided architectural tour of the new AMI Stadium, lectures and outdoor screenings. (Stuff Online Newspaper, 2012).



Figure 12: Luxcity, the opening event in the Festival of Transitional Architecture where architecture and design students display their creations for one night, by Dean Kozanic

7- Creative cities – Public policies: Fostering distinctiveness

The post-modern humans thrive for new technologies, and digital media that enhance the navigation inside the urban and physical space, and create a feeling of safety and belonging to people from different ethnic groups in a multicultural city such as Sydney, New York, or Auckland. Our minds are highly impacted by the effect of emerging digital technologies such as laser beams, projectors, 3D cameras, and installations. Such elements are more likely to create a connection between humans and the technology inside urban spaces. These rich and interactive interfaces push the boundaries of art, culture, and creativity that cities like Sydney and New York have been pushing forward. An area of potential exploration would be the Arab world that is witnessing a great political revolution that was helped by social media. People took to the streets to demand dignity and basic rights; it would be rewarding if these same people become an integrative part of the design of their future cities, using interactive technologies to display their struggles and demands through creativity.

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A flock of sparrows in the city of Ghent: a multidisciplinary case study

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Abstract. This article elaborates on the deployment of multipurpose, aesthetic smart objects, called ‘The Sparrows’ in the city of Ghent (Belgium, Europe). The goals of the integration of the sparrows in the city were two-fold (1) augmenting the social engagement of citizens using a playful aesthetic smart artifact, and (2) exploring the ambient interaction zones with smart artifacts in a city context. In this article we present the case study carried out on the integration of the smart artifacts in the city and we describe the experiences of the involved citizens with the sparrows and the embedded ambient interactions.

Keywords: internet-of-things, ubiquitous computing, real-time data, ambient interactions, city, social engagement, ludic design

1 Introduction

Everyday life consists more and more of (often mobile) computational and communication resources assembled in heterogeneous ways making the ubiquitous presence of sensing devices a reality [1]. In the near future the presence of connected sensing devices will probably increase due to the rising number of ubiquitous available sensor networks in private and public spaces [2] and the rising number of smartphones or other mobile devices [3]. Also in the context of cities, we note an uptake in the amount of internet-connected objects. Still, these networked artifacts are only func-

tional and of interest to the people integrating the devices and capturing the data. If we want a lively city to arise where Internet connected things have a role to play, we should look for new ways of implementing Internet-of-Things (IoT) objects not only to make cities ‘smart’, but also to make citizens ‘smart’ and empowered.

One way of achieving this is to create and implement multifunctional smart city objects that are meaningful to different city stakeholders (e.g. citizens, city policymakers) without neglecting the business valorization potential. The discussed case ‘a flock of sparrows in the city of Gent’ is in this regard one of the first attempts to embed such smart objects in a city context pointing to the required affordances to make such objects actionable for different stakeholders and different goals.

2 The Internet of Things world is here to stay

Ubiquitous computing [4], pervasive computing [5], Internet of Things [6] or Ambient Intelligence [7] are different concepts that describe how intelligent computational devices get increasingly embedded in our every day life.

Although the disappearance of the infrastructure in the background, as initially predicted by Mark Weiser [4], has not yet become reality, the ubiquitous presence of sensing devices is taking foothold in society [1]. For example, smart phones having a diverse set of embedded sensors (e.g. location, distance, acceleration), in combination with the recent strong growth of adoption of smart phones [8] are already making the Internet-of-Things real and tangible.

In that sense the required scientific knowledge and the technical components and prototypes for the Internet-of-Things are almost in place. Various successful and unsuccessful applications in different domains are already on the market (e.g. health applications from Withing¹, social applications such as the Good Night Lamp², animal monitoring applications such as FitBark³). But the adoption and domestication of the Internet of Things (applications) by relevant (non-company) users and social groups only occurs partially. Among other things, privacy concerns and anxiety for getting stuck in habits defined by machines are important grounds for this lack of acceptance. However, these concerns will not stop the further uptake of Machine-to-machine (M2M) communications that is the basis for Internet-of-Things [9].

When referring to Social Construction of Technology (SCOT) Theory we could say interpretative flexibility [10] of the technology by different groups is still possible. There currently is no fixed meaning attached to Internet-of-Things objects or application. No monolithic mental model of the Internet-of-Thing world is established yet. This goes together with vagueness on the side of the technology developer and the user. Developers are still in search of the right features, interfaces, jargon and applications, while users are still adapting their opinions and practices to an Internet-of-Things world.

¹ <http://www.withings.com>

² <http://goodnightlamp.com>

³ <http://www.fitbark.com>

The research described in this article tries to lift the veil of vagueness and transformation that is currently still part of the changing world of connected objects. We start this article with a description of the case of the sparrows and the context of their use during the four-week city intervention. Next, we discuss the defined human-sparrow interactions. Finally, we outline our empirical set-up and present our results and lessons learned based on the analysis of the collected data.

3 Case description

The flock of sparrows consists of eight multipurpose, aesthetic smart objects used as part of a city intervention and game called *Zwerm*⁴. The city intervention aimed at augmenting the social engagement of citizens within different neighborhoods in Ghent (a city in Belgium). Both engagement with each other and engagement with the city were the envisioned goals. In this context, we especially focused on ‘neighborhood cohesion’, a concept relevant for capturing locally available resources in the form of affective and instrumental support. Neighborhood cohesion has been referred to as the ‘predominant property’ worthy of investigation [11]. A neighborhood high in cohesion refers to a neighborhood where residents, on average, report feeling a strong sense of community, report engaging in acts of neighboring, and are highly attracted to live in and remain residents of the neighborhood. *Zwerm* used a number of gamification mechanisms to achieve this goal [12]. Around 250 citizens actively participated in the game during a period of four weeks (23 February 2013 – 22 March 2013). Different organizations⁵ worked together on realizing *Zwerm*. In this article, we only discuss the sparrows.

3.1. The sparrows

A sparrow is a smart ambient artifact that embeds a set of dedicated, in-house developed sensors and actuators that are connected to the cloud (see Figure 1). During the trial the sparrows were attached to windowpanes of resident’s houses using a suction-unit. Different people agreed on hosting a sparrow by providing access to their window or balcony to install the sparrow. The design of the smart object is inspired by Gaver’s ludic design [13]. Ludic design aims to encourage reflection and exploration of meaning through designing for playful engagement and curiosity. Through the design of the ‘ambiguous’ sparrow object, citizens are stimulated to reflect about their environment and their interaction in urban space in a playful way. Central in ludic design is the creation of a playful, aesthetic interaction. The sparrows also consolidated different purposes into one object. Firstly, the sparrows are an interactive part of the socially engaging *Zwerm* city intervention. The sparrows react to whistling citi-

⁴ *Zwerm* is the Dutch word for “flock of birds”. A movie of the city intervention can be found at <http://vimeo.com/65648085>

⁵ iMinds vzw (www.iminds.be), city of Gent (www.gent.be), MAD-faculty (www.mad-fac.be) and Alcatel-Lucent Bell Labs (<http://www3.alcatel-lucent.com/wps/portal/belllabs>)

zens by lighting up and randomly changing colors. Secondly, he sparrows unobtrusively measure different environmental parameters.

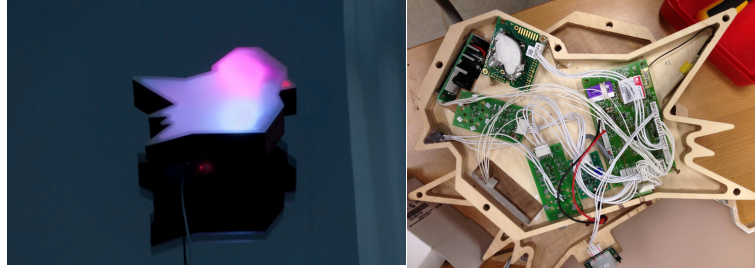


Fig. 1. Outside design of a sparrow (left), inside of a sparrow (right)

Each sparrow works autonomously, powered by a solar panel and communicates with the cloud using the mobile network. A sparrow contains a set of sensors (movement, light, CO₂ and noise sensors and 18 light-emitting diodes (leds) distributed over its surface. The information acquired by the sensors, such as whistling sounds, is send to the network, where it is consumed by different processes or stakeholders (see the ‘distributed data’ on Figure 2). This is done by the game engine as well as by the real-time analytics engine that transforms the raw sensor data into meaningful data before exposing it through the real-time data API⁶ (other stakeholders could use this API to re-use the real-time data in other applications).

3.2. Human-sparrow interactions

As a guideline for the definition of the ambient interactions with the sparrows in the city, we look at the defined zones of interactions with ambient displays by Streit, Rocker and Prante [14]. We divided the surrounding space of each sparrow in three different distance based zones (see figure 2). Each zone has its own semantics and interactions associated to it.

⁶ API: Application Programming Interface

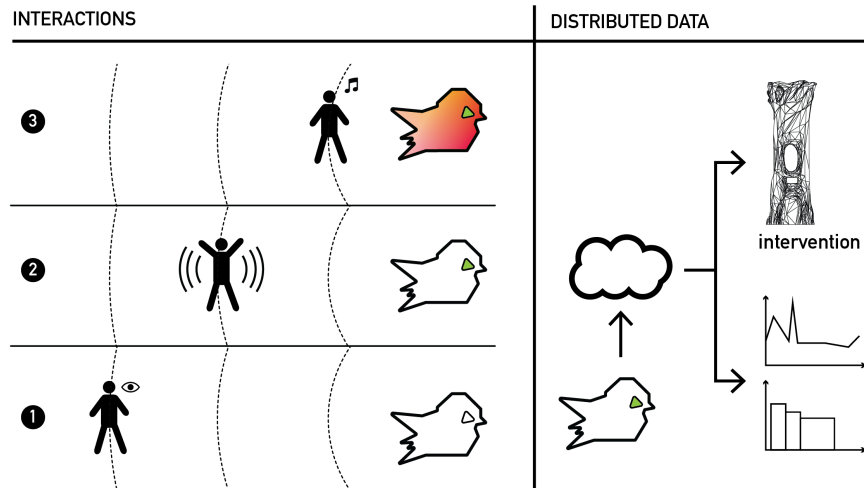


Fig. 2. The sparrow's ambient zones of interaction

- (1) The ambient zone (the long distance interaction zone): a person who finds him/herself in a visible range of the sparrow but outside the range of the sparrow's sensors, experiences the sparrow in an ambient mode; the (leads inside the) sparrow acts independently of the presence of the person (number (1) on Figure 2);
- (2) The notification zone (the moderate distance interaction zone): a person that comes closer to the sparrow (measured by a long range movement sensor) activates the eye of the bird (the eye becomes green) in order to attract the attention of the person passing by (number (2) on Figure 2);
- (3) The interaction zone (the nearby distance interaction zone): when the person is in the vicinity of three meters of the sparrow, the person can whistle to it. The lights of the sparrow then start flickering, the beak of the sparrow lights up (which indicates that it starts sending data) and the color of the sparrow changes⁷ (number (3) on Figure 2).

3.3. Real-time environmental data

The real-time data acquired by the sensors is made accessible online through REST⁸ API's. The update frequency of the data is defined depending on its type. For example, the CO₂ and light levels are sent every five minutes, the noise level is only sent when a certain noise threshold exceeded and the whistling or person presence data is

⁷ The sparrows were part of the Zwerm game because each time someone whistled to the sparrow the neighborhood where the bird resided got game points.

⁸ REST=Representational State Transfer

only sent when the corresponding event is detected. Multiple third party applications use similar real-time data in their applications for different purposes, such as the comparison of air quality, monitoring efficiency of the solar panel or monitoring people gatherings.

4 Case study

4.1. Case study

Our research is part of an overall research project studying the impact of city interventions on stimulating citizen engagement. This overall research can be considered a case study because it can be defined as an empirical enquiry that investigates a contemporary phenomenon within its real life context where the boundaries between phenomenon and context are not clearly evident [15].

The flock of sparrows is only a small part of the study, but can take advantage of the gathered empirical data of the overall Zwerm research to gain insight in the possibilities of smart artifacts to create engaging, aesthetical playful interactions in the city and to try-out proximity-dependent ambient interactions. Because of the different methods and gathered data sources we are also able to triangulate our data. The goal of the described study is to explore, describe and in limited way explain certain aspects of the created and experienced socio-technical smart object interactions in the city context. The defined research questions are:

- (1) How is a ludic designed smart object as the sparrow perceived by the involved citizens? Did it stimulate to reflect about the environment and the interaction in urban space?
- (2) Did people perceive the zones of interactions as defined by Streit when interacting with the sparrow?

4.2. Data collection

Different research methods are used, and different stakeholders are questioned. From the people that engaged (citizens) in Zwerm and interacted with the sparrows (1) participative observations (1 day) (2) observations (9 days) (3) informal interviews (40) (3) online questionnaires (55) and (4) log data was gathered.

4.3. Analysis

At the start of the city intervention 1441 people received an invitation (a Zwerm card) to participate. As we define participation to the intervention as using the received Zwerm card, we can state that 19,2 % of the invited population participated in

Zwerm. Evaluation results show that the general Zwerm city intervention was much appreciated by the citizens. 20% (n=55) of the citizens that were active participating in Zwerm answered the online questionnaire(s) and in that way participated in the research. More than 80% of them stated that Zwerm helped them to get to know the people in their neighborhood better, while more than 75% stated that Zwerm induced a sense of community and improved neighborhood cohesion. 48 from the 55 citizens involved in the research (87%) answered that they interacted with the sparrows, but the intensity of interaction with the sparrows varied greatly (Figure 3).

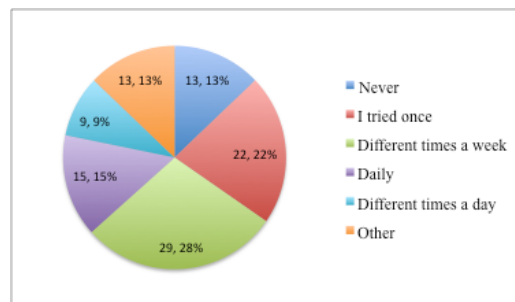


Fig. 3. The amount of times participants whistled at the sparrows

Creating a prototype with a multidisciplinary team, especially for combining design requirements with creating dedicated innovative sensortechnologies, is a real challenge. This is in part due to known obstacles in multidisciplinary teams such as vocabulary alignment, methodological burdens and power issues [16], but also some other challenges. One of the key challenges during the development of the sparrows as well as during the trial itself was the lack of a clear responsible for the integration process and the integrated solution (hardware, designed casing, software). This proved to be especially difficult since the integrator had to work with the constraint that only a prototype was created and not a final product. Also the group structure didn't facilitate the work. Normally an integrator is a person with the bird's eye view and the power to steer decisions in certain directions, but for this prototype a non-hierarchical decision-making structure was chosen.

From a technical angle working on multiple places in the city added the constraint of wireless solutions, for communicating with the cloud as well as for energy provisioning. The last one proved to be the most difficult one to tackle. Also the weather conditions and issues related to local conditions like the peculiar sounds made in the environment, movement and light conditions proved a challenge and where difficult to foresee beforehand. Each Sparrow needed a different fine-tuning. This had as implication that the sparrows had to go through different adaptations after their launch. This had clearly impact on the quality and intensiveness of the sparrow interactions (see also Figure 4).

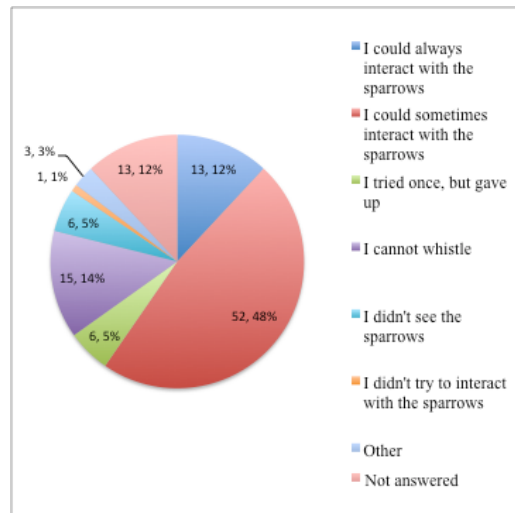


Fig. 4. The experience of the interaction with the sparrows

4.3.1. The ludic design of smart objects

Interviews, questionnaire and observations data show that the sparrows were perceived as playful and aesthetic objects, impacting the sense of neighborhood atmosphere for some inhabitants. Several players reported that they found the objects aesthetically pleasing. Especially the ever-changing random mix of colors proved a trigger for interaction. At numerous observations, citizens commented on the colors while whistling consecutively. One of the participants, a person hosting a sparrow, indicated in an interview that while he initially started whistling at the sparrow to score points for his team, at one point, exploring color variations became his main motivation. As a sparrow host, he had the opportunity to open the window on which the sparrow was attached, and could interact with it from a close distance. The majority of citizens of the neighborhood did not have access to sparrows at such a close distance, but this exemplifies how *Zwerm* players did not always interact with the sparrows for points alone. The questionnaire answers on the topic of motivations of interacting with the sparrows support this finding. Another underpinning of this finding is found in the way participants describe their experiences with the artifact. One participant portrays it as an absurdly playful experience “*how funny, doing crazy as kids on the street, jumping, weaving, whistling, to laugh, doing weird stuff*”. Interacting with the sparrows also became a performance for spectators nearby, which in some cases provoked group interaction such as whistling in turns, or cheering when the bird lighted up. The sparrows also provoked a sense of ambiguity. One interviewee described the sparrows as generating curiosity about where it came from. Another

player described her impression of the sparrow upon seeing it for the first time with “*Such a nice design. I was wondering why it was hanging there.*” Using Gaver et al.’s classification of ambiguity [17] we can describe it as *ambiguity of information*. This type of ambiguity leaves it up to the viewer to interpret the object and its message, in this case, the reasons of its placement in the neighborhood and the message behind the whistling interaction and the changing of colors.

While the playfulness of the sparrows had a positive impact on the atmosphere in the neighborhood for some participants, it was not a complete success. Citizens that did not play the Zwerf game, and did not have the chance to see others interact with the sparrow, did not get enough cues on how to interact with the system.

Evaluating the prototype with the lens of ludic design [13], we can state that it was not effective. There were no observations of players who had interpreted the system in novel ways, or hints that the objects had provoked critical thoughts about the object or the neighborhood context it was embedded in. In hindsight, this is no surprise. The communication about the sparrows with the citizens wasn’t done in a ludic design spirit, it was communicated that the goal of interacting with the sparrows was to score points. This explanation removes the ambiguity around the object and gives it a clear goal. As Gaver et al. note “*If people are to find their own meaning for activities, or to pursue them without worrying about their meaning, designs should avoid clear narratives of use. Instead they should be open-ended or ambiguous in terms of their cultural interpretation and the meanings—including personal and ethical ones—people ascribe to them.*” [13]. Maybe non-player citizens might have interacted with the sparrows with other motivations, but the questionnaire results only consisted of people engaging in the Zwerf game, which were all well aware of the Sparrow’s functioning and the goal of scoring points. As a ludic system in Gaver’s terms, we identify two points of necessary improvement: 1) communicate about the artifact in more ambiguous terms 2) design a more ambiguous link of the artifact with the rest of game than scoring points. Only then a ludic intervention could occur, this because the aim of scoring point is in contradiction with the openness of a ludic intervention.

4.3.2. The ambient zones of interaction

We did not explicitly advertise the required interactions to make the sparrows light up, neither did we supply explicit indications on their placement. Local social networks and social media proved to be efficient platforms for the spread of information on the placement and functioning of the sparrows, but were far from perfect. Therefore we now look into the experiences of the ambient zones of interactions. To answer the research question on the appropriateness of the zones of ambient interaction of Weiser, we analyze the different zones separately.

(a) The ambient zone:

The questionnaire data indicated that it was difficult to notice the sparrows while passing by without knowing in advance where they were located (see Figure 4). Also different comments of citizens state this difficulty, comments as “*they were smaller than I thought, I especially went looking for them, otherwise I wouldn’t have seen them*” or “*I never saw one*”, point clearly at a non-satisfactory creation of the ambient zone. Because only participants were questioned about their experiences, the above results only refer to them. So even while the participants of Zwerm could lookup the location of the sparrows online, they in general complained about their visibility. Non-participants have probably never seen them. We conclude that the visibility affordances should be made clearer for the ambient zones, especially if we want all types of users to be able to discover the system with no verbal explicit explanation. Some possible improvements that could be made are: 1) increasing the size of the sparrows, 2) implementing repetitive light signals to attract people passing by or just 3) choose better locations for the sparrows.

(b) The notification zone:

The questionnaire data and observations taught us that the notification zone was not recognized as a separate zone. Persons perceived no difference between the notification and the interaction zone. While asking participants to describe the sparrow’s interaction (in the questionnaire), participants always combined the illumination of the green eye (part of the notification zone) with the blinking of the whole sparrow while whistling (part of the interaction zone).

The reason for the elimination of the notification zone could be explained by a design decision we took to bypass a technical problem that was detected during the first days that the sparrows were installed. The problem consisted of false detections of whistling by environmental noise (e.g. by a wheezing tram passing near the sparrow or warning signals (beeps) by a truck driving backwards in front of a sparrow). This meant that not only the sparrows blinked more often but also that unjustified game points were awarded to the opponents in the game. We considered two possible solutions to resolve this problem. First option was to do nothing. This solution meant that we had to live with the false whistling detections. This wouldn’t harm the ludic design (since it would have minor impact on the actual interactions and probably be perceived as part of the ambiguity related to the design choice) and not the assumed zones of interactions (it would most probably even increase the impact of the ambient zone since a blinking sparrow could attract more people’s attention). From gaming perspective this remained, however, unfair. Second option was to tighten the original condition (=whistling) to avoid false positives. Instead of the initially two seconds of movement in front of the sparrow needed to illuminate the green eye (notification signal), we could change it to ten seconds and add the illuminated green eye as a necessary condition to detect a “valid whistling”. This solved the false detection but this made the notification signal part of the interaction since it required long, deliberate movement in front of the sparrow.

We opted for the last solution since we would not decouple the birds from the whole game. It shows, however, the tension between the different purposes of the sparrows (game, zones of interactions, ludic design). This tension was recognized both during the design phase of the sparrows and during the actual intervention.

(c) The interaction zone:

The choice to change the interaction behavior (as described above) made it more difficult to trigger the interaction, which increased the drop out. One participant describes it as follows: *“It is apparently very difficult to adjust the sparrows so that they respond to human sound, and not on passing cars ... It can not be the intention to respond to any car or tram that passes, nor that you should be jumping, endlessly waving, whistling and calling, and still does not light up!”* Participants were not very happy with the made changes. Moreover the participants perceived this change as “changing the rules during the game”. Some hosts even advertised the functioning of the birds with self-made posters to explain to citizens.

One additional observation was that the participants were looking for visual feedback to confirm that they got points after whistling to a sparrow. Many perceived the red blinking of the mouth of the sparrow as “getting points”. We can conclude this out of the descriptions participants give on the working of the sparrows. One participant tells, *“How the sparrow works? move first nine seconds, then a green triangle is lightning up, whistle, then the sparrow lightens up in different colors, the red beak turns on and points are scored”*. This feedback was not designed for this purpose but perceived as this by the participants after discussing it with each other. This could be seen as a successful part of the ludic design, although not planned in beforehand

Although above analysis shows that the technical design and implementation of the zones of interactions failed for the vast majority, observations made clear that non-technical counterparts replaced the zones of the interactions in different ways during the intervention. For example, people sitting in the window and waving in front of the movement sensor of the sparrow. One participant tells, *“To activate the sparrow you should move untill the beak lights up, and then whistling untill the colors light up. If it does not work and the resident is at home, ask to open and close the window several times and then whistle and enjoy the colors”*. Another person tells *“Nice that someone whistles back, echoing behind the window. A friend of mine thought the sparrow really whistled back, but it was someone behind the open window, behind the curtain. Exciting invisible interaction with someone inside ... beautiful, especially at night when it is dark and you see lightening up the colors well”*. This human intervention didn't only made it more easy to interact with the sparrow, but there were also interventions that attracted the attention on the sparrow and in that way can be interpreted as a notification signal. Examples we observed were people playing the flute below the sparrow. This attracts people's attention (ambient zone), and because the flute player starts moving more and playing faster when a person comes to take a

closer look, the green eye illuminated what could be perceived as a notification signal (notification zone). When the person starts whistling him/herself this could be interpreted as interacting with the sparrow (interaction zone). The fact that the places with persons waving or playing the flute seemed to be the most popular places during the observations, could indicate that the importance of taking the zones of interactions into account while designing city related products.

5. Conclusions

The research on the four-week trial with the ambient sparrows provides interesting material on the perception and interaction of citizens with ambient artifacts in a city context. When looking back at our research questions we can conclude the following.

Our analysis shows that the Sparrow intervention functioned well within the overall ZwerM game system: citizens interacted playfully with the objects, and in some cases group interaction and social engagement emerged. The Sparrow was also widely used to score points for the teams. However for it to function well as an independent project the interaction affordances should be contained within the interface. Moreover, if the Sparrows are to function as a ludic design object, the relation and influence between the artifact and the other components of the ZWERM game should be made more ambiguous than scoring points.

The implementation of the zones of interaction with the sparrows was not very successful. Not only didn't the notification and interaction zone exist as separate zones, the lack of information on the interactions seemed not manageable for the citizens. The affordances should have been more explicit available to create the ambient zones of interaction in an intuitive way. Also the contradictory purposes of Ludic design and game mechanics and the chosen implementation in favor of the gaming aspect haven't benefited the ambient zones of interaction.

A lot of new ideas on future research on the design, implementation and interactions of ambient artifacts in city contexts that we hope we will be able to test during the next months.

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Recognizing Cultural Differences on Food

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Abstract. Cultural differences play a very important role in matching ICT interaction to the expectations of users from different national and cultural backgrounds. But to date, there has been few research as to the extent of such differences, and how to produce software that takes into account these differences. Considering the third wave of HCI research on context, involving the intangible aspects of the interaction with users and ICT solutions, like culture, we are studying these issues using a unique resource: Common Sense knowledge bases in different languages. We have knowledge bases containing millions of sentences describing people and everyday activities, collected from volunteer Web contributors, in three different cultures: Brazil, Mexico and the USA. It is described the experiences with these knowledge bases. Though preliminary, we hope that our work will contribute to software that takes better account of such differences, and fosters inter-cultural collaboration.

Keywords: Cultural differences, common sense, human-computer interaction.

1 Introduction

Envisioning the future of our society based on pervasive and ubiquitous ICT systems supporting our life style [18], we are seeing increasing the new wave of HCI, based on context [16], and context being understood as having a broader meaning, embracing the intangible aspects of the interaction with users and ICT solutions, like sociality, emotion, experience, culture [17]. Many researchers have pointed that cultural differences should be considered in the design of interactive systems [1,2]. AS Marcus states, user-interface developers may need to go to “culture class” in order to minimize culture clashes in their designs [1], once that is not clear how to access, consider and design cultural values [19]. Culture is a shared meaning system which forms a framework for problem solving and behavior in everyday life. Individuals communicate with each other by assigning meaning to messages based on their prior beliefs, attitudes, and values [2]. The cultural differences express the “world vision” a group of people have. This vision is expressed in the simple activities that people do everyday.

Arguably the most general and widely applicable kind is knowledge about the everyday world that is possessed by most people in a given culture — what is widely

called ‘common sense knowledge’. While ‘common sense’ to the ordinary people is related to ‘good judgment’ as a synonymous, the Artificial Intelligence community uses the term ‘common sense’ to refer to the millions of basic facts and understandings that most people have. For example, the lemon is sour; to open a door, you must usually first turn the doorknob; if you forget someone’s birthday, they may be unhappy with you. Common sense knowledge, thus defined, spans a huge portion of human experience, encompassing knowledge about the spatial, physical, social, temporal and psychological aspects of typical everyday life. Common sense is acquired from the interaction with the environment. Changing the environment changes the perception of common sense and is one of the reasons why different and diverse cultures exist. This conception of common sense is building ontology about everyday life based on the shared experiences of a community [3].

In this context, the main purpose of this work is to evaluate how the cultural differences can be recognized in the databases that store common sense. For that, we select a theme that frequently appeared in the Brazilian knowledge base – food. Considering that eating habits express culture and common sense affects eating habits, we could say that common sense expresses culture.

To demonstrate that common sense is reflected in eating habits, we collected and compared semantic relations about food from the Brazil, Mexico and USA common sense databases. Also, we must consider the potential use of these knowledge bases: by those who want to develop systems focusing on a specific user group (e.g. a maitre that wants to prepare a menu to celebrate a certain country or a certain group of costumers who consults the common sense database to prepare a specific dish); by those who want to develop systems which use the cultural knowledge stored in the knowledge bases (e.g search engines that consider the cultural context); and by those who want to facilitate communication between people, providing mutual knowledge about their cultures.

This article is divided as follows: section 2 presents how data are collected in the Open Mind Common Sense bases, section 3 presents the comparison realized, section 4 discusses the use of the cultural differences knowledge for the three developer profiles presented previously; and in section 5 some conclusions and future works are discussed.

2 The Open Mind Common Sense approach for gathering and using common sense facts

Since every ordinary person has the common sense that computers lack, why not involve everyone in building the knowledge base that is necessary to give computers what they need to be able of common sense reasoning? Nowadays, it is easy to reach lots of people through the Internet. Also, considering advances in the natural language processing area, it is possible to elicit common sense facts in natural language so that the users don’t need technical to enter facts in the system [4,5]. Parsing and semantic net mining technologies can convert natural language into a form usable by computer

interfaces. In this way, the Open Mind Common Sense Project gathered common sense knowledge, as depicted in Figure 1.

For gathering the common sense data some Open Mind Common Sense websites were built. As the name suggests, the Open Mind Common Sense sites are open. Everyone who wishes to help can access them and contribute with his or her knowledge.

After registering and logging onto the system, users have access to several activities that are proposed to gather different kind of common sense knowledge. Some of those activities are template-based like “People ____ when they ____”. and others allow the user to provide entries in free form language. Filling out the activities results in growing the common sense facts database.

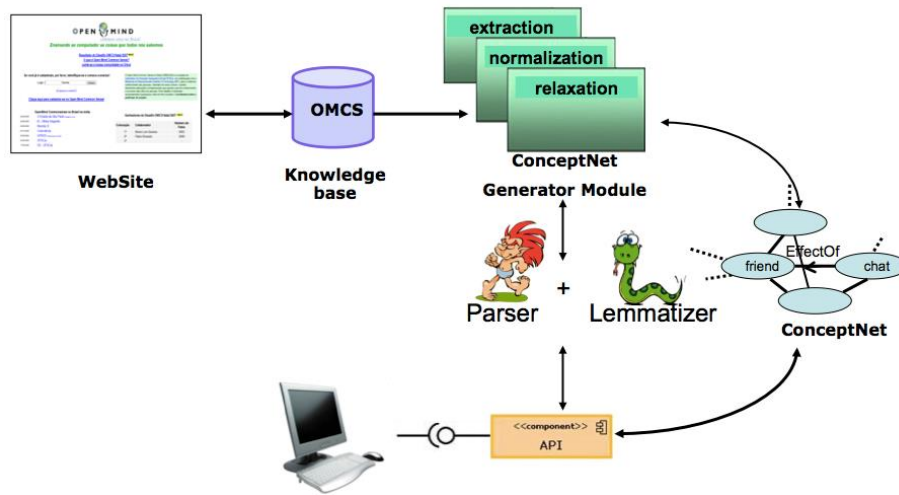


Figure 1. Open Mind Common Sense Project Approach for Gathering and Using Common sense facts.

The data are stored in the Open Mind Common Sense database as simple statements in natural language. However, for machine use, it is necessary to put them in a representation that allows machines to make practical inferences and analogies. For that, the data are submitted to a natural-language parser that generates a set of normalized nodes that are semantically related, composing a semantic network. A better understanding about how this semantic network is generated is presented by Liu [3].

Once the semantic network is ready, applications can be developed using the common sense knowledge provided by different users.

3 Common Sense and Eating Habits

To demonstrate that common sense affects eating habits the first step was the selection of facts related to food, for example: “People eat salami when they drink beer” or “You generally want a hot dog for lunch”.

Considering the redundancies in our data, we selected categories that appeared in higher frequency in each base. The categories are: at what time people have their meals, what people eat for each meal, kinds of food, food for special occasions as parties and Christmas and ingredients used to make some kinds of food.

Analyzing these categories we registered some aspects that we believe are related to some cultural values.

Time for meals

One of the themes about food that commonly appears in the knowledge bases is the time for meals. Table 1 shows what is considered common sense for most of the collaborators

Table 1. Time for meals that typically people would consider .

	<i>Brazil</i>	<i>Mexico</i>	<i>USA</i>
<i>Lunch</i>	<i>11:30 to 13:00</i>	<i>14:00 to 16:00</i>	<i>12:00 to 14:00</i>
<i>Dinner</i>	<i>18:30 to 20:00</i>	<i>20:00 to 21:00</i>	<i>18:00 to 19:00</i>

Here it is interesting to note that meals in Mexico are the latest one. Although in Brazil and USA meals happen in similar hour in Mexico it seems to be common to have lunch after 14:00.

Kind of food

Also, many facts about types of food are usual in the bases. The inferences “something is food” is also usual. Table 2 shows the most cited kind of food.

Table 2. Types of food people remember most.

<i>Brazil</i>	<i>rice, bean, fruit</i>
<i>Mexico</i>	<i>burritos, chilaquiles, taco, escamoles</i>
<i>USA</i>	<i>pancakes, hamburger, hot dog, pizza, sandwich, pumpkin pie, apple pie, ice cream, cheese cake</i>

A curious thing is that in Brazilian database, fruits are cited as food many times and also many kinds of fruits were inserted. In Mexican and USA bases it doesn't happen.

What do people eat in each meal?

Differences between what is eaten in each meal also can be noticed. Table 3 shows what seems to be considered common sense about what to eat in each meal.

Table 3. What do people eat in each meal?

	<i>Brazil</i>	<i>Mexico</i>	<i>USA</i>
<i>Breakfast</i>	<i>bread</i>	<i>tamales, eggs with hot sauce</i>	<i>pancakes, bagels</i>
<i>Lunch</i>	<i>rice, bean, meat, salad, egg</i>	<i>chicken with mole, roast meat, pastes, chilaquiles, barbacoa, tacos</i>	<i>fluffer Nutters, hamburger, hot dog, pizza, sandwich, wafers</i>
<i>Dinner</i>	<i>rice and bean, soup, salad, sandwich</i>	<i>tamales and atole, quesadillas, coffee and cookies, bread with bean</i>	<i>steak and eggs, bake chicken, clam chowder, mash potatoes</i>
<i>Dessert</i>	<i>ice cream, fruit, candy</i>	<i>rice with milk, churros with chocolate, nuts with honey (crowbar), sweet coconut</i>	<i>pumpkin pie, apple pie, ice cream, cheese cake</i>

It is possible to notice that Brazilian people prepare lighter food at breakfast. Also Mexican people seem to like food made with flour.

About desserts, Brazilian people associate ice cream to something cooling, what leads to the situation where companies have problem on selling ice cream during winter time, because commonsense says that ice cream is a summer related food, although our winter time has temperatures around 22 degrees Celsius. On the other hand, American people seem to prefer pies for dessert.

Food for special occasions

Christmas and parties were topics that collaborators remembered too. Table 4 shows the main types of food cited for these occasions.

Table 4. Food for special occasions.

	<i>Party</i>	<i>Christmas</i>	<i>Birthday</i>
<i>Brazil</i>	<i>Salted snacks (salgadinhos), candy (docinhos), cake, meat (barbecue), beer</i>	<i>turkey, pork, lamb</i>	<i>Cake with candles</i>
<i>Mexico</i>	<i>beer, tequila</i>	<i>romeritos, codfish, spaghetti</i>	<i>Cake with candles</i>

<i>USA</i>	<i>beer, vodka</i>	<i>cranberry sauce, pineapple salad, frozen Christmas Pudding</i>	<i>Cake with candles</i>
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For Brazilians, party is about drinks and food. For Mexican and North Americans, they are happy in a party with drinks only. It is interesting to notice that in Brazil and México seem to be common have salty food for Christmas while in USA sweet dishes seem to be more appreciated. Turkey, typically associated to Thanksgiving in USA, is a typical Christmas dish in Brazil. To celebrate birthday, you can't go wrong choosing a cake with candles. And beer seems to be appreciated in parties anywhere.

Expressing food preferences and Age

As we get old, our capacity of analysis, observation and criticizing become more accurate, we review up our standards and our preferences become more detailed. That is a fact that is expressed in the OMCS-Br knowledgebase when people with distinct age talk about food and their descriptions. Table 5 shows how young people name dishes in general and how mature people comment about their preferences in Brazil.

Table 5. Age and Food description.

<i>Age</i>	<i>Food description</i>
<i>Teenagers (from 13 to 27)</i>	<i>food, fish, rice, meat, fruit, bread, salad, beer</i>
<i>Adults (above 60)</i>	<i>Baked Meat, green salad, hot sandwiches, traditional candies, milk pudim, various snacks, bottle of wine, bowl of fruit, special soup, jarr of juce, bowl with fried potatroes, terrine with baked meat, bottle of champaing, chicken with spice dressing, trail with snacks, baked fish dish, jarr with water, plate with fried eggs, dish with oysters, dish with meat and potatoes</i>

In summary, all these results show how important food is as an expression of culture, values and life style for people no matter where they are from, and how values are attached to the food people choose to eat in different occasions.

4 Cultural Differences and the Uses for Common Sense

We believe the cultural differences stored in the common sense bases can be helpful in such a variety of situations:

- Helping those who want to consider these differences in the development of interactive systems;
- Facilitating the interaction of different users by applications that use this common sense;
- Facilitating the communication between people.

The next sections point out how developers involved in the situations cited above can use the cultural differences stored in common sense knowledge bases.

Developing systems considering cultural differences

Computer Human Interaction research raises further questions about how to understand culture and how it can and should affect user-interface design. Attributes as attraction, dynamism, activity, level of expertise, faith, intentions, locality, social validation, preferences, and scarcity have different weightings in different cultures [6]. Consequently, user-interface developers face further challenges [1].

Many questions still persist while talking about considering cultural differences in the design of interactive systems. Marcus[1] raises some questions: Are our notions of usability culturally biased? How should culture differences relate to persuasion and establishment of trust in Web sites and Web-based applications? How should culture dimensions relate to established dimensions of intelligence and change your thinking about online help, documentation, and training? How do culture differences relate to new insight about cognition differences? Do these differences change your thinking about user search strategies, mental models, and navigation?

The only consensus seems to be that these attributes have different values and are key characteristics of the cultures to which they belong [7].

Despite the importance of these questions, some developers still face an uphill battle to get budgets for culture-oriented research and development accepted, to find and allocate the necessary human resources, and to achieve project success [1].

In this context, considering cultural aspects in the design of interactive systems is not an easy task. Besides, the beliefs, attitudes and values of a group of people change with time. Collecting these “world views” and making them available for everyone that wants to develop a user-interface, can be expensive and laborious.

The common sense databases store the cultural knowledge that is being created and modified all the time. The use of the Internet and the collaboration of millions of people allows knowledge bases to reflect actual cultural knowledge without cost, as anyone can have access to the database at the sites.

Developing systems which consider cultural differences

As the complexity of computer applications grows, it may be that the only way to make applications more helpful and avoid stupid mistakes and annoying interruptions is to make use of common sense knowledge. Cellular telephones should know enough to vibrate mode if you're at the symphony. Calendars should warn you if you try to schedule a meeting at 2 AM or plan to take a vegetarian to a steak house. Cameras should realize that if you took a group of pictures within a span of two hours, at round the same location, they are probably of the same event [8].

In the web context, the necessity of using common sense knowledge becomes even more evident. The number of web pages available on Internet increases day after day, and consequently, finding relevant information becomes more and more a difficult task [9]. Also, Web Search tools do not do a very good job of discerning individuals' search goals [10]. However, when we consider communities of people with common interests, it is possible to improve the quality of the query results using knowledge extracted from common sense databases and observing behaviors of peo-

ple of same culture. When a user submits a query, the cultural aspects suggest specific information exploiting previous observations about the behavior of other users when they asked similar queries. Different users may merit different answers to the same query [9].

A comparative study shows differences in Web searching by U.S. and European users [11]. Specifically, the results suggest some differences in the topics searched and searching behaviors. The paper also suggests interesting differences in search behavior and in topics searched by U.S and European users. For example, U.S users are more focused on e-commerce search topics [11]. These cultural and social differences represent a major challenge to search engines. Search engines will be more effective if they support cultural information about the user.

As cultural differences can be detected in common sense bases, search engines that attempt to leverage common sense have a great opportunity to reflect cultural differences in their results. Communication between people from different cultures is a field which presents many interesting aspects and is being explored in Brazil using the OMCS-Br knowledgebase like, Contexteller, FamilySense, What is it? and TapSense [20,21,22,23].

Developing systems which facilitate communication between people by showing cultural differences

Communication between people from different cultures is a field which presents many interesting aspects. To show that common sense can help showing the cultural differences, some tools using the OMCS-Br knowledgebase were developed like e-Rural and C2C [24,25]. These applications use the knowledge base and agents that keeps watching what the user types, while make suggestions from the knowledgebase for translation and simplification on the content to help users' understanding the content. The systems also make analogies for concepts that evoke the same social meaning in those cultures.

5 Conclusions

This paper discuss the possibility of using the common sense knowledge stored in Open Mind Common Sense bases, specially OMCS-Br, to verify cultural differences and consider the differences during designing for the third wave of HCI, looking for culturally contextualized ICT solutions. We explained how common sense is collected and manipulated. Facts from Brazil, Mexico and the USA were compared considering the eating habits domain.

Preliminary analyses point to Open Mind Common Sense bases express cultural differences. These differences should be considered by those who want to develop systems focusing on a specific user group; by those who want to develop systems which use the cultural knowledge stored in the knowledge bases; and by those who want to facilitate communication between people, providing mutual knowledge about their

cultures, considering better suited ICT solutions allowing adoption and appropriation of such solutions [26] by users.

As future works we are going to investigate cultural expressions in Open Mind Common Sense considering a larger number of facts. Also other domains are being studied in order to verify the cultural differences besides eating habits domain.

We hope developers of interactive systems use the knowledge about culture stored in Open Mind Common Sense databases in order to facilitate human-computer interaction. For that, a cultural filter for the Brazilian OMCS-Br knowledgebase was developed and is available for developers interested on embracing the challenge of developing culturally contextualized ICT solutions.

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Personalized fruition of cultural heritage in a city environment

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Abstract: Our current work aims at supporting and enriching the cultural heritage exploitation, by tools and creative functionalities in order to enhance user experience. In a recent project we realized an application for city exploring (on mobile device Android OS) joining a traditional interface with augmented reality features. One of the key points of our approach is the adaptation of the information offered according to context of usage, the user history and the users activity (wisdom of the crowd). We make usage of a real time analysis both via explicit means such as a visited point of interest, and via implicit means, that is a more general analyses of user behaviors (individually and in aggregate). A preliminary user trial has been made in the cities of Rome and Latina. The results suggest that users have a good attitude using the personalized functionalities proposed but that the immersive experience needs a more in deep evaluation.

Keywords: user modeling, user interface adaptation, cultural heritage, immersive user interface, ambient technology