Third Workshop on Full-Body and Multisensory Experience

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ABSTRACT
The workshop on "Full-Body and Multisensory Experience" aims at discussing the rich possibilities that the body offers to experience the external world and the prospects that arise for interaction designers when these often-neglected abilities are taken into account. In particular, the workshop will focus on the rediscovery of the human senses, either alone or in a multimodal combination, and of the perceptual-motor abilities of our body. The one-day workshop is divided in three steps: first phase is for the generation of ideas on multisensory interfaces, in the second phase, participants will have the possibilities to explore and rediscover their sensorimotor abilities through several exercises and games; in the third and last phase, there will be a further creative session in order to evaluate how the full body and multisensory activities have fostered people's creative processes. The aim of the whole experience is twofold: first, inspiring participants in designing novel concepts for multisensory interfaces; second, providing a preliminary study on the effect of these exercises in fostering creativity and supporting the design process of multisensory interfaces.

Author Keywords
Full-Body Interaction; Multisensory Experience; Multimodality; Body-Centered Design.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
The ubiquitous computing era is bringing to the human the possibility to interact always and everywhere with digital information. However, the interaction opportunities used to access this information exploit only few of the human sensorimotor abilities. Most of these interactions happen through traditional desktop or mobile interfaces, which mainly involve vision and hearing senses and require the movement of only one or two fingers. Although modern smartphones are able to provide haptic feedback and allow richer interactions through phone movements, they still exploit few of the user's sensorimotor abilities. The aim of this workshop is rediscovering the role of the whole human body and senses, focusing on the exploitation of those abilities that are often forgotten by the HCI designers. The main research question of the workshop is the investigation of how to provide new body experiences through the design of novel interactions in smart environments. During the workshop, new methods to foster creativity for the design of multisensory and full-body interactions will be assessed with participants.

RELATED WORK
The first BodySenseUX workshop [3] was hosted at Ubicomp'15 in Osaka, Japan. The aim was to explore body capabilities, fostering a renewed attention on human body and senses in Ubiquitous and Pervasive Environments. We chose this goal in response to the dangerous trend of massive adoption in everyday life of mobile technologies, which poorly exploit natural human physical and cognitive abilities. In the Ubicomp'15 workshop, we wanted to look at the rediscovery of innate human skills and their possible uses to interact with a pervasive digital environment. During the workshop, we organized a brainstorming session, in which three groups discussed novel multisensory and full-body interactions for three application scenarios selected from the talks: introspection, social inclusion and subtle communication. Before the brainstorming phase, we organized a warm-up session during which participants were able to physically engage different experiences with

their full-body and senses. During the warm-up and the brainstorming sessions, the participants manifested substantial engagement, which encouraged us to repeat the warm-up multisensory and full-body experience during the second edition of the workshop.

The second edition of BodySenseUX was hosted at TEI'16 in Eindhoven, The Netherlands [2]. The workshop scheduling was similar to the Ubicomp'15 workshop scheduling. However, an additional goal of this workshop was to go a step deeper into our research question, exploring how the physical engagement of the participants during the full-body and multisensory experiences could foster their creative processes. To this purpose, we organized two brainstorming sessions in three groups, each working on a different topic. The first brainstorming session was conducted before the full-body and multisensory warm-up experience, while the second one was scheduled just after, in order to understand if the body experiences could enhance participants' creativity. The participants reported a general positive effect of the experience, with different appreciation depending on the senses engaged. Some participants also reported the interest in having the possibility to engage in a rapid prototyping session. Following these encouraging results, a more rigorous evaluation of the proposed method to boost creativity for full-body and multisensory is proposed in the following section for the third edition of the BodyeSenseUX workshop.

The topics treated in this workshop are raising increasing interest in the scientific community. "Touch, Taste, & Smell User Interfaces: The Future of Multisensory HCI workshop" (Multisensory HCI) will be held at the CHI'16 conference and aims at exploring meaningful design spaces and map future trajectories for touch, taste, and smell for interactive systems (reference will be added for the camera ready). At the same conference, a Special Interest Group (SIG) is going to meet to discuss on how it is possible to bridge the gap in research on body sensing, body perception and multisensory feedback [5]. The "Touch, Taste, and Smell: Multi-sensory Entertainment" workshop, held at the ACE'13 conference, investigated the design of entertainment multimedia artifacts that exploits the five senses [1].

The peculiarity of the BodySenseUX is considering the body as a whole. Inspired by the image of the Vitruvian man, we aim at exploring all our sensorimotor abilities to design interactions for the body, according to a body-centered approach. As a consequence, we are giving much importance to the physical body experience, which is used as a tool to foster creativity during the workshop and as a target of the design, with ultimate purpose to increase human well-being.

WORKSHOP TOPIC

The workshop topics include but are not limited to:

- Theory and ground knowledge on multisensory experiences
- Embodied cognition theory and applications
- Traditionally recognized five senses: hearing, sight, touch, smell, and taste.
- Unconventional senses: proprioception, tactile, spatial-audio interaction, etc.
- Innovative technologies and applications for interacting through senses and motor abilities
- Full-body interactions
- Bodily play interaction
- Gestural interaction
- Sensory emotional design
- Multisensory branding
- Multisensory product design
- Multisensory games and media

WORKSHOP GOALS

The aim of this workshop is twofold: first, inspiring participants in designing novel concepts for multisensory interfaces, and second, providing a preliminary study on the effect of the proposed exercises in fostering creativity.

First Goal: Promoting Multisensory Design

The main aim of this workshop consists in offering a unique opportunity to discuss new ideas with people from different backgrounds around the topic of full-body and multisensory interaction. During the hands-on session, the workshop participants will have the opportunity to enjoy new experiences, discovering innovative ways to exploit our body and our senses for the design of digital interactions. As in the previous workshops, we will conduct full-body and multisensory experience based on a series of bodily games. Participants will engage in full-body physical activities, such as skipping rope, bubble soap, hula-hoop. These will be useful in order to stimulate bodily awareness, concentration and balance. Participants will also have the opportunity to engage in sensorial explorations through the traditional five senses: black boxes with hidden material, unconventional food to taste, tools for unexpected visions, as well as a cross-modal multisensory experience. The experiences aims at make the participants rediscover his or her natural skills, since most of them are often forgotten by current interaction paradigms. Finally, this workshop intends to stimulate the exploration of the world through all our senses, enriching a full-body interaction approach. The workshop main goal will be providing workshop participants with a new perspective on the role of the body in experiencing the reality. We would like to support a multidisciplinary approach combining the knowledge and the needs derived from both academic and industrial fields, in order to identify a valuable contribution also for commercial purposes.

Second Goal: the Experiment

We will exploit this workshop also to conduct a preliminary research: we want to measure the effect of full-body and

multisensory activities we will offer to the participants on their creativity.

The full-body and multisensory activities can be considered as a kind of embodied storming [4], a physically situated brainstorming group method to find new ideas and design proposals in real contexts. This approach has showed that when people are fully engaged, they essentially "act first" and then learn from their actions, establishing a rapid cycle of action and perceptive feedback. Simultaneously, they are constrained by their embodiment; in fact, they learn to perceive physical objects by interacting with them, defining a well-structured order between action and knowledge about reality. To form groups introduces a further level of reflection. Indeed, people are pushed to communicate what is happening to coordinate and the use of body language, kinesics, gesture, and proxemics, creates an active dynamics of non-verbal communication. For example, engaging participants in interacting with a skipping rope, we provide the setting to establish a real relation with the whole body, stimulating them in feeling the physical effort and in managing the coordinated physical movement. The main purpose of this exercise is first to create the experience of physical performance, and second to move towards the ideation phase carrying a strong experiential awareness about possible physical sensations. This method will allow identifying new potential features and emerging opportunities for design. Furthermore, this method allows to engage participation at a physical level of experience, but also it enables the expression and exchange of tacit knowledge, fostering a direct communication and exchange between participants as well as the generation of design proposal and scenarios according to the things we observe around us and we perceive during the full-body and multisensory activities. As already written above, these activities have been already conducted during the two previous editions of the workshops, receiving positive feedback from participants and suggestion for improvements. During this workshop we want to conduct a formal experiment to validate the benefit of these activities.

WORKSHOP SCHEDULING

The workshop schedule is based on the experiment design and is composed of 5 phases.

(1) We expect to have about 16 participants. We will split the participants in two groups: the first group will go in another room to experience the multisensory activities. Meanwhile, the second group will stay in the room and will start directly with the collaborative session to design as many multisensory interfaces as they can and then fill in a short questionnaire. Semi-structured interviews will-be conducted to gather additional insights on the participants' opinion about the experience. This phase will last 50 minutes.

(2) The participants of the first group will have to collaborate in a creative session to produce as many multisensory design concepts as they can and then fill in the questionnaire and participate to the semi-structured interviews; meantime, the second group will experience the multisensory activities. The second phase will last 50 minutes.

(3) The first group will start with the hands-on activity, in order to prototype the best idea they had. Meantime, the second group will go into another collaborative session to create as many new concepts as they can and then fill in a questionnaire. The third phase lasts 50 minutes.

(4) All the participants will merge in the same room and will prototype for 2 hours.

(5) The last 2 hours will be dedicated to present the concepts developed during the workshop, for speed presentations of the ideas the participants proposed in the position papers, and for open discussion.

For the experiment results, we will use a combination of quantitative and qualitative analyses: we will count the number of ideas generated during each phase, we will count the number of senses involved in the design of each concept, and the role of the whole body played in those scenarios, and then we will submit a "creativity assessment" questionnaire to all the participants and, finally, we will observe and analyze the participants' behavior and the idea quality. Obviously, before and during the event, it will not be mentioned this second goal related to the impact of multisensory exercises on creativity in order to avoid bias. We want to compare the results between the first group and the second group. Moreover, we want to compare the difference between the first and second creative sessions of the second group.

WORKSHOP PLAN

Here the schedule for the workshop organization.

- April 29, 2016: Publication and distribution of the call for papers with relative website.
- May 27, 2016: Paper submission deadline (with predicted extension to June 7).
- June 7, 2016: Submission of the camera-ready version of the workshop proposal paper.
- June 17, 2016: Notification of acceptance to the authors.
- July 1, 2016: Deadline for the submission of the camera-ready papers.
- September 13, 2016: Workshop as in the proposal.

The following paragraphs describe the work that will be performed for the organization of the workshop divided in three phases.

Before

Before the workshop, we will create a website presenting the most relevant information about the event: the call for papers, the important dates, the program and complementary organizational information (e.g., organizers and program committee). In parallel, social media such as

LinkedIn, Facebook and Twitter will be adopted to advertise the event, share information and to start preliminary discussions on the topic. We will also send the call for papers to important newsletter lists of scientific communities interested in this topic and create a WikiCfP page. The authors organized the first edition of this workshop held in conjunction with the UbiComp 2015, and the second edition held at the conference on Tangible and Embedded Interaction (TEI) 2016, which allowed creating a community of researchers interested in this particular topic, who could help us in spreading the work about this event.

During

The workshop is thought as a full day event. The one-day workshop is divided in 5 phases, which are thoroughly described in the "Workshop Scheduling" Section.

After

We plan to have multiple follow-up activities. First, we will continue to promote the topic and form a community interested in keeping sharing knowledge and ideas also after the workshop, probably in an online forum or group. The goal of this growing community is to facilitate the exchange of researchers, the spreading of opportunities, the organization of further events and collaborative writing of papers. Second, the organizers will write a paper on the influence of the multisensory exercises on the creative generation of multimodal interface concepts and designs.

BIO OF THE ORGANIZERS

Maurizio Caon is currently lecturer and postdoctoral researcher at the University of Applied Sciences and Arts Western Switzerland (CH). He holds a PhD in Computer Science issued by the University of Bedfordshire (UK). His research domains are in the area of human-computer interaction: gestural interfaces, persuasive technology, and context-aware ambient intelligence.

Assunta Matassa is a PhD Student at the Department of Computer Science, University of Torino (Italy) and junior research fellow at the Interaction Center at University College of London (UCL). She is interested in wearable computing, body experience, and tangible interaction.

Leonardo Angelini is finishing his Ph.D. in a joint collaboration with the University of Fribourg on the topic of Tangible Gesture Interaction. He is member of the HumaTech Institute of the University of Applied Sciences and Arts Western Switzerland. His main research domains are automotive interfaces, affective computing and multisensory interaction.

Elena Mugellini is Professor at the Information and Communication Department of the University of Applied Sciences and Arts Western Switzerland. She is head of the HumanTech Institute. She holds a PhD in Telematics and Information Society received from the University of Florence in 2006. Her current research interests are on the areas of Ambient Intelligence, Multimodal Interaction, and Tangible User Interface.

Nadia Bianchi-Berthouze is a Full Professor in Affective Computing and Interaction at the Interaction Centre of the University College London (UCL). She has pioneered the field of Affective Computing and for more than a decade she has investigated body movement and more recently touch behavior as means to recognize and measure the quality of the user experience in full-body computer games, physical rehabilitation and textile design.

Ana Tajadura-Jiménez is a Ramón y Cajal Research Fellow at Universidad Loyola Andalucía and Honorary Visiting Researcher at the Interaction Centre of the University College London (UCL). She is interested on ways of altering the perception of objects and of one's body by using sensory feedback, and on its effects on emotion and motor behavior.

Aneesha Singh is a Computer Scientist with an interest in affective computing, human–computer interaction (HCI), and wearable technologies. Her research is on multisensory feedback to facilitate physical activity in chronic pain rehabilitation. She is a PhD student at the UCL Interaction Centre (UCLIC), University College London.

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