Interactive Technology for Cycling — ideate, make – remote, together

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ABSTRACT

Cycling is absolutely in trend, not only for health reasons but also as a major contribution to future sustainable mobility. The purpose of this workshop is to discuss and explore the design space and interaction methods for technological augmentation of bicycles. The workshop will achieve this goal through invited talks, demos, brainstorming sessions and prototyping activities. The workshop various cycling tours to promote outdoor discussions about development of new technologies and research direction by exploring the design space of different cycling areas. The workshop is connected to a SIGCHI summer school on HCI & Cycling, which will take place before the conference. We expect that in addition to open submissions to the workshop, the participants of the summer school will submit their results and design space explorations to the workshop.

CCS CONCEPTS

• **Human-centered computing → Interactive systems and tools**;
• **Computer systems organization → Embedded systems**.

KEYWORDS

Cycling; Mobile Interaction; User Interface; Inclusion

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1 BACKGROUND

Cycling is a unique activity, which encapsulates an endless number of benefits, including health and socializing. It is a fun form of exercise for all ages and a great way to actively explore new landscapes and a quick sight-seeing method in urban areas. For many people around the world cycling is the most comfortable and accessible transportation mean to reach their workplace, do shopping or visit friends. Since the invention of a bicycle over 200 years ago, the technological development went a long way of bringing assistance for people. For example, embedded, mobile and wearable technology offer a plethora of interaction opportunities for augmenting bicycles, making cycling more accessible, pleasant, engaging and fun.

The purpose of this workshop is to discuss and explore the design space and interaction methods for technological augmentation of bicycles, helmets, and surrounding environments [3, 5–9, 12]. The workshop will achieve this goal through a series of interactive brainstorming sessions and hands-on prototyping activities. To address different cycling contexts and challenges in them, the program of the workshop is going to be framed around different cycling-related themes: Scenic cycling [11], Urban Cycling, Accessible Cycling [2], Fun Cycling and Remote Cycling.

2 GOALS OF THE WORKSHOP

The workshop will bring together participants from both academia and industry. We will announce the *Call for Participation* at popular mailing lists, calendars, and social media (e.g., Twitter, Facebook). Furthermore, we will directly contact international researchers working in the fields of bicycle interaction, user interfaces, mobility, and related areas. Since we are aiming for a strong collaboration with industry practitioners, we will reach out to leading players in the mobile navigation, cycling accessories, and bike-sharing community. We will continuously promote the workshop during the period leading up to the workshop deadline.

A workshop website will be set up to provide information about the workshop topics and offer relevant material to support people interested in the topic. Accepted submissions will be made available through the website before the start of the workshop.

3 WORKSHOP ORGANIZATION

The workshop runs across one full day. It will consist of workshop paper position pitches, -on exercises, and discussions. Every participant of the workshop will receive a set of hardware and prototyping material to actively participate in the collaboration remote prototyping session (Figure 2), based on our previous experience from teaching a hardware-oriented course remotely [1].

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Figure 1: Examples of use cases to support cyclists on-the-go for different age groups, e.g., elderly people (left), and using mixed reality technology to support cyclists using augmentations to helmets (right).

The estimated number of workshop participants is around 10-15 and should be a good mix of academic researchers and industry practitioners. Each participant contributes a position paper which presents the participants' interest and research area as well as their focus of contribution they want to bring to the workshop. The workshop committee will review position papers, and participants will be selected based on the novelty, inspirational aspect, and fit for the workshop. Based on the position papers' topics, the practical sessions of the workshop will be further refined.

3.1 Pre-Workshop Schedule

The goal of the pre-workshop period is to provide participants an opportunity to ideate and make own prototypes at their comfortable working pace and present, discuss and iterate the ideas in the intermediary meetings with workshop participants and organizers. The participants in this phase will receive a physical computing kit (sponsored by SIGCHI development fund) to enable them into early prototyping stage. The participants will be documenting their ideas and results in a project diary which will also be input for their position paper and the actual workshop day during the conference.

- Workshop advertisement and recruitment of participants (Over the summer)
- Kickoff with all participants with invited talks, tutorials, and networking of the participants (8 weeks before MobileHCI 2021)
- Send hardware kits to the participants for at home prototyping sessions
- Share own cycling experiences with certain perspectives on user needs and requirements
- Regular online discussions about the goals, ideas, prototypes and experiences
- Discussion about intermediary results (2-3 weeks before the position paper deadline)
- Discussion of the pre-submission results (1 week before the position paper deadline)

3.2 Workshop Day Schedule

The primary goal of our one-day workshop is to involve participants and organizers into detailed presentations of the results from the pre-workshop phase and longer and deeper discussions about the ideas around augmenting cycling. The submissions are also open for participants who did not participate in the pre-workshop phase, by submitting work in form of sketches, photo stories, experiences.

- Introduction and position pitches
- Presentation of the results from the home prototyping session
- Lunch
- General discussion on future directions
- Wrap-up

After the workshop the participants will have an opportunity to do remote-together cycling sessions to try-out their prototypes in the real-world scenarios [4, 10].

4 PLANNED OUTCOMES

The primary goal of this workshop is to bring together people from areas to discuss how to develop inclusive and safe concepts for cyclists. We plan to make the outcomes of the workshop accessible for the research community. Accepted position papers will be published on the workshop's website.

We will summarize the presented works, discussions, and results of the workshop into an article that can be published. As this topic is under-reported, we have the ambition to make a special issue, given there is enough interest from the workshop participants. We also plan to maintain future communication with the workshop participants.

5 ORGANIZERS

Andrii Matviienko (main contact) is a postdoctoral researcher at Technical University of Darmstadt. His research focuses on the assisting technology in urban environments, in particular on designing, constructing, and evaluating multimodal and mixed reality interfaces for vulnerable road users.

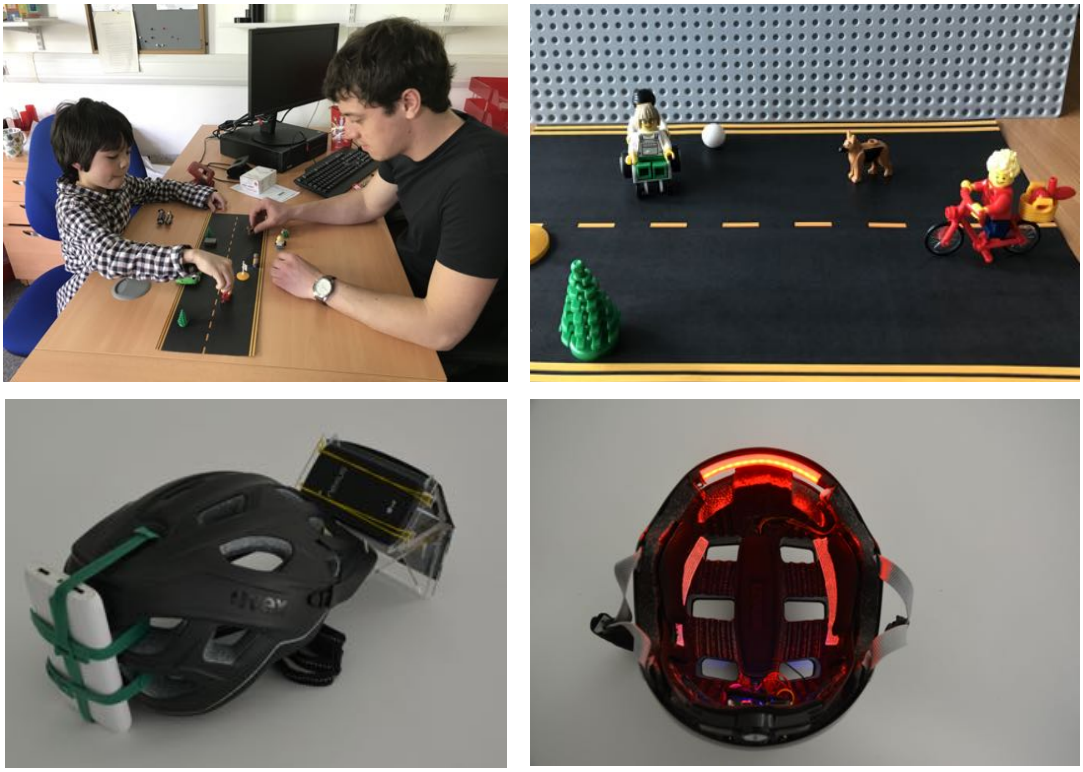

Figure 2: Examples of prototyping sessions (above) and results of helmet augmentations using LED strips and head-up displays using smartphones (below).

Wilko Heuten is senior principal scientist at OFFIS - Institute for Information Technology in Oldenburg, Germany. His research interests are the design and development of pervasive and multimodal interactive technologies to support everyday life activities. Since 2008 Wilko Heuten leads the group Interactive Systems in the health department at OFFIS.

Alan Dix is a director of the Computational Foundry at Swansea University, UK. He is a senior researcher and expert in the field HCI; in his highly visible effort on "Alan walks Wales" he has explored interactive technology while surrounding Wales in the UK.

Susanne Boll leads the Media Informatics and Multimedia Systems in the Department of Computing Science at the University of Oldenburg, Germany and is chair of Human Machine Interaction Cluster at OFFIS Institute for IT. Her research interests lie in the field of multimedia and intelligent user interfaces with a focus on transportation and mobility.

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