

Interaction on 10.000m² Interactive Floors

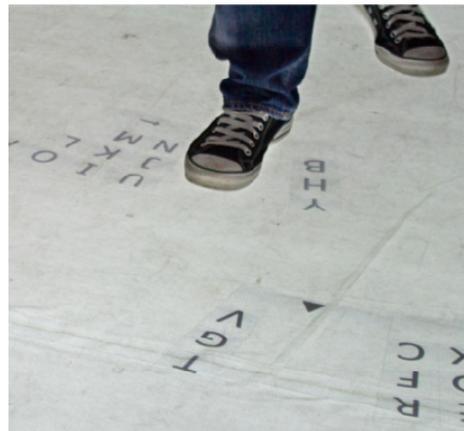
Goal

Extend the Multitoe computer vision framework written in C++ to work across multiple touch sensitive surfaces, write new outdoor tracking systems, create interaction techniques for walking, running, and skating.

Background

Multitoe is our interactive 8m² floor with “toe-size” tracking resolution. It uses a JVC 12 mega pixel projector and a 13-megapixel camera. The camera-based system allows us to observe an entire room from below. Google “multitoe” or “gravityspace” to see more.

Previous years’ students wrote a GPU based tracking system that recognizes multiple users based on their shoeprints in 50ms, a 3D framework that allows reconstructing the pose of users, and an event-based GUI framework in C++ and Qt that automatically adopts layouts in real-time across the entire floor.



In motion: Typing while walking...



...and interacting while skating

Objectives

Extend the Multitoe computer vision/user tracking framework:

- (1) write a tracking system that senses touch/motion in large spaces and outdoors.
- (2) create interaction techniques that allow users to interact & collaborate while walking, running, and skating
- (3) evaluate your applications using performance analyses and user studies
- (4) write up your findings; given the right results, we will support you in publishing.
- (5) extend “interaction across poses” started by previous project
- (6) support HCI1 class in writing applications for Multitoe

External Partner

Microsoft Research, Cambridge, UK.

The project will take place in cooperation with Microsoft Research in Cambridge, so expect help and mentoring from all of us, as well as your external partners.

Microsoft® Research

Skills

During the project you will develop software and hardware including performance-critical GPU code. You will apply your knowledge of basic computer vision, build actuated mechanical devices, and write graphics-intense applications. Given the technical nature of the project, **excellent grades in HCI2** and Computer Graphics are important.



Recognizing users based on sole patterns

Group structure

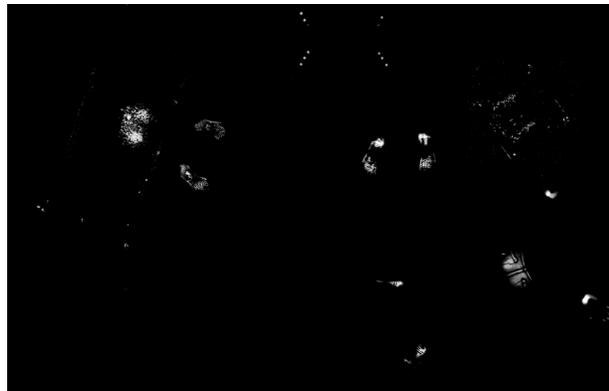
4-7 students. Roles, areas of responsibilities and specialization will be defined in the first week.

Questions?

Email us at dominik.schmidt@hpi.uni-potsdam or baudisch@hpi.uni-potsdam or come see us in the multi display lab (HPI main building, H.2 Atrium)
Project page: www.hpi.uni-potsdam.de/baudisch/projects/multitoe.html



Reconstructed 3D scene...



...from raw high-resolution pressure input