8 square meters, 8 megapixels, 10 months:

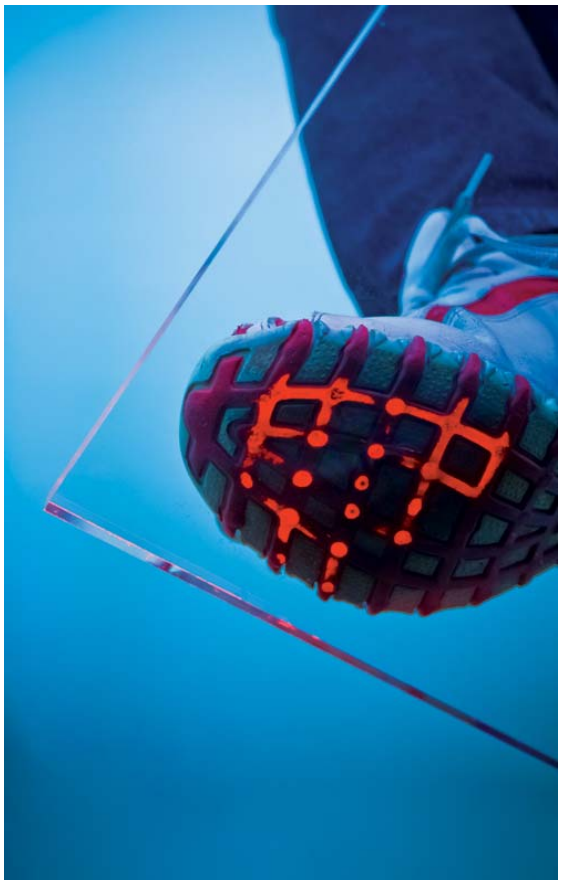
Multitoe II: whole-body interaction with a multi-touch floor

Goal

In 2009/2010, the HCI bachelor project multitoe created multitoe, the interactive floor with "toe-size" tracking resolution (google "*multitoe*" to see what came out of it). The moderate size of their prototype, however, limited the interaction to feet.

This year, the actual 8m^2 installation in the multi display lab of the new building will be ready for you. Using a JVC **12 mega pixel projector** and our **13 mega pixel camera,** you will create the camera-based tracking system and get things running at full scale.

Here the multitoe prototype is tracking a user's head



The underlying principle: light is injected from the sides, causes the user's sole pattern to light up.

Based on the floor prototype, you will create a range of **demo applications several of which will involve multiple people and/or the entire body**, i.e., applications that were not possible on traditional floors. Some of the questions you will be tackling:

(1) how can a touch-sensitive floor monitor the well-being of its inhabitants?
(2) how can people collaborate on the floor?
(3) scale multitouch performance to large size
(4) track users sitting or lying on the floor.
(5) can we integrate the concept of foot and whole-body interaction into Microsoft Surface?
(6) have fun: write a gaming application that uses the full potential of the floor, such as a live-size sports game.

Finally, you will evaluate your applications in a series of user studies as common in Human-Computer Interaction and write up your findings. Given the right results, we will support you in publishing the results (the 2009/10 team will present a full paper at UIST 2010 in New York).

External Partner

Microsoft Research, Cambridge, UK
The project will be integrated with our Human-Computer-Interaction research group, so **expect help and mentoring** from all of us, as well as your external partners Shahram Izadi and Steve Hodges at Microsoft Research Cambridge.

Prototyping

You will develop software and hardware in parallel; until you have the 8m^2 floor up and running, last year's prototypes will serve as the prototyping platform.

Recognizing users based on sole patterns

Skills

During the project you will **learn** the basics of computer vision, multi-touch, how to build large mechanical things, how to write graphics-intense applications, and how to design and run a user study. We do not expect you to know any of these things in advance, but we do expect you to be interested in learning them.

Group structure

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

Questions?

Email us at wimi-baudisch@hpi.uni-potsdam
or come see us in the multi display lab (new HPI building, H.2 Attrium) (While you are there, check out the Microsoft Surface in the hallway for inspiration). Project page: www.hpi.uni-potsdam.de/baudisch/projects/multitoe.html


A couple of months ago…