



Spring 2010 CIS Colloquium Series

Design as Optimization: Automatically Generating Personalized User Interfaces

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11am-12pm, Friday, April 30
4th Floor Conference Room (Wachman Hall, CC 447)

Abstract: Today's computer-human interfaces are usually designed with the assumption that they are going to be used by an able-bodied person, who is using a typical set of input and output devices, who has typical perceptual and cognitive abilities, and who is sitting in a stable warm environment. Any deviation from these assumptions may drastically hamper the person's effectiveness---not because of any inherent barrier to interaction, but because of a mismatch between the person's effective abilities and the assumptions underlying the interface design.

I argue that automatic personalized interface generation is a feasible and scalable solution to this challenge. In this talk, I will present our SUPPLE system, which can automatically generate interfaces adapted to a person's devices, tasks, preferences, and abilities. I will show how interface generation can be cast as an optimization problem and demonstrate that, despite a large solution space, the problem is computationally feasible. In fact, for a particular class of cost functions, SUPPLE produces exact solutions in under a second for most cases, and in a little over a minute in the worst case encountered, thus enabling run-time generation of user interfaces. I will also present two systems for eliciting informative cost functions from the users: ARNAULD, an active preference elicitation system for modeling the user's subjective preferences, and ABILITY MODELER for building predictive models of users' actual motor abilities.

The results of our study show that, compared to manufacturers' defaults, interfaces automatically generated by SUPPLE significantly improve speed, accuracy and satisfaction of people with motor impairments.

Bio: Krzysztof Z. Gajos is an assistant professor of computer science at the Harvard School of Engineering and Applied Sciences. Krzysztof is primarily interested in intelligent interactive systems, an area that spans human-computer interaction, artificial intelligence, and applied machine learning. Krzysztof received his B.Sc. and M.Eng. degrees in Computer Science from MIT. Subsequently he was a research scientist at the MIT Artificial Intelligence Laboratory, where he managed The Intelligent Room Project. In 2008, he received his Ph.D. in Computer Science from the University of Washington in Seattle. Before coming to Harvard in September of 2009, he spent a year as a post-doctoral researcher in the Adaptive Systems and Interaction group at Microsoft Research. URL: <http://www.eecs.harvard.edu/~kgajos/>

Refreshments will be served!