IEEE Pervasive Computing, Special Edition on Pervasive Computing and Rapid Prototyping 12/2005

"Pervasive Computing for Road Trips" *- a work in progress report*

draft, 9/2005, do not quote from this version, please

The MediaRobotics Lab, University at Buffalo
Marc Böhlen, Jesse Fabian, Dirk Pfeifer, JT Rinker

What happens when you mix site-specific design paradigms from the installation arts with sensing technologies common in pervasive computing? That is the problem students at the University at Buffalo's Department of Media Study were confronted with when asked to imagine new uses for distributed sensors in automobiles.

Far gone are the days when driving was only about efficient travel. Cars define life styles, and many people spend more time in cars than reading books today. Moreover, the existing car culture is being transformed by a plethora of electronic gadgets. While some electronic devices such as CD players and DVD viewers are dedicated to ambient entertainment, the bulk of an automobile's electronic innards operate unnoticed for control and security. This electronic underbelly of the automobile offers new opportunities to query the role of the automobile in our modern lives. Given our lab's desire to expand technologies towards cultural objects, we designed a semester-long workshop on under-represented aspects of pervasive computing in automobiles. Our focus was set not user interaction, usability or safety, but on the meta-level activities typical of the road trip; from Lewis and Clark to Kerouac and beyond a strange attractor in the life of many North Americans.

Students were supplied with a prototyping kit that included temperature sensors, 2D accelerometers, miniature color cameras, an OBD-II diagnostic interface, a microprocessor based control environment, and an invitation to use these tools to react to the experience of being 'on the road'.

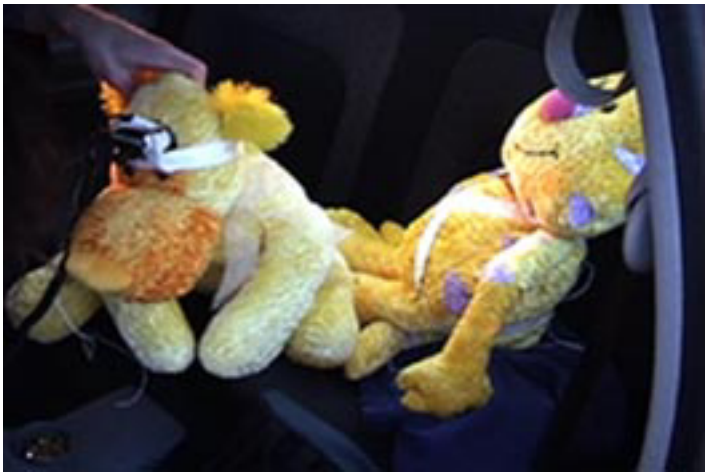
One student project explored the possibility of using the changing scenery as an input into a seat massage. The RGB-vibrator extracted a histogram of the three main color bands from the miniature camera and mapped them to motor commands for a massage seat, resulting site-specific massages while driving.

The road trip is not only about going away, but also about returning back. In a second project, a student integrated the miniature camera and a 2D accelerometer into two soft toys. As the car with its soft toy hugging passengers drove about, the camera-enabled toy recorded the optical flow of the changing scenery and the accelerometer-enabled toy registered large bumps on the road. As the vehicle approached home again, a subset of

this data was sent via wireless link back to the garage where a screen greeted the returning toy huggers with a free-form interpretation of the acquired data.

Our projects are still very much work in progress. However, we do think that such expansions of pervasive computing towards unstructured aspects of our lives will result, over time, in richer information spaces. More on our work is available here:

http://www.buffalo.edu/~mrbohlen/automotive_electronics.html



Jesse Fabian: Katzenkatze and Dutze on the road

Dirk Pfeifer: The RGB-vibrator in situ