

Interactivity Press Tour

Monday 6:00PM – 6:30PM

Exhibit Hall D

#i103

IMPAD - An Inexpensive Multitouch Pressure Acquisition Device

Ilya Rosenberg, Alexander Grau, Charles Hendee, Nadim Awad, Ken Perlin
New York University Media Research Lab, USA

Inexpensive Multi-Touch Pressure Acquisition Devices (IMPAD) are flexible, paper-thin sensing surfaces that can scale from portable devices to large tables. These devices can sense varying levels of pressure at a resolution high enough to sense and distinguish multiple fingertips, the tip of a pen or pencil and other objects. Other potential applications include writing pads, floor mats and entry indicators, bio-pressure sensors, musical instruments, baby monitoring, drafting tables, reconfigurable control panels, inventory tracking, portable electronic devices, hospital beds, construction materials, wheelchairs, sports equipment, sports clothing and tire pressure sensing.

#i102

Nano Touch: Back-of-Device Interaction allows creating very small touch devices

Patrick Baudisch, Gerry Chu, *Microsoft Research, USA*

We explore how to add pointing input capabilities to very small screen devices and argue that the key to touch-enabling very small devices is to use touch on the device backside. In order to study this, we have created the Nano Touch prototype. In order to study this, we have created a 2.4" prototype device; we simulate screens smaller than that by masking the screen. We present a user study in which participants completed a pointing task successfully across display sizes when using a back-of-device interface. The touchscreen-based control condition (enhanced with the shift technique), in contrast, failed for screen diagonals below one inch. We present four form factor concepts based on back-of-device interaction and provide design guidelines for extracted from a second user study.

#i101

Graspables: Grasp-Recognition as a User Interface

Brandon T. Taylor, V. Michael Bove Jr., *Massachusetts Institute of Technology, USA*

As computational ability continues to be implemented in more and more objects and devices, new interaction methods need to be developed. The Graspables System is embodied by a physical set of sensors combined with pattern recognition software that can determine how users hold a device. The Graspables System has been implemented in two prototypes, the Bar of Soap and the Ball of Soap. Usable applications developed for these prototypes demonstrate the effectiveness of grasp-recognition as an interface in multiple scenarios.

#i108

Low-Cost Gaze-Pointing and EMG-Clicking

Javier San Agustin, John Hansen, Dan Hansen, Henrik Skovsgaard,
IT University of Copenhagen, DK

Some severely disabled people are excluded from using gaze interaction because gaze trackers are usually expensive (above \$10,000). We present a low-cost gaze pointer, which we have tested in combination with a desktop monitor and a wearable display. In front of a desktop monitor, the system is precise enough to support communication. Supplemented with a commercial EMG-switch it offers a complete hands-free, gaze-and-click control for less than \$200.

#i109

A Hand Clap Interface for Sonic Interaction with the Computer

Antti Jylhä, Cumhur Erkut, *Helsinki University of Technology, Finland*

We present a hand clapping interface for sonic interaction with the computer. The current implementation has been built on the Pure Data (PD) software. The interface makes use of the cyclic nature of hand clapping and recognition of the clap type, and enables interactive control over different applications. Three prototype applications for the control interface are presented: a virtual crowd of clappers, controlling the tempo of music, and a simple sampler. Preliminary tests indicate that rather than having total control via the interface, the user negotiates with the computer to control the tempo.

#i110

Tactful Calling: Urgency-Augmented Phone Calls through High-Resolution Pressure Input on Mobile Phones

Fabian Hemmert, Matthias Löwe, Anne Wohlauf,
Deutsche Telekom Laboratories, Germany

We present a system that simulates urgency-augmented phone calls on mobile phones and discuss various scenarios and interaction techniques. In addition, we report on a user study that indicates a general need for such a system and explore the applicability of using a force sensor as a way of intuitive call urgency articulation.

#i111

CaraClock: An Interactive Photo Viewer Designed for Family Memories

Daisuke Uriu, Naruhiko Shiratori, Satoru Hashimoto, Shuichi Ishibashi,
Naohito Okude
Keio University, Graduate School of Media Design

CaraClock is an interactive photo viewer supporting participative interaction for family. CaraClock downloads and shows selected photos by probabilistic computation from which the Bayesian Networks model that manage human relationships, and several tags with interactive operations. The participative interaction among familiar persons using CaraClock makes an experience that people can remember past memories depended on each person's human relationships by browsing the photos with using an interactive structure.

#i112

Tangible Sketching in 3D with Posey

Michael Philetus Weller (1), Mark D Gross (1), Ellen Yi-Luen Do (2)
(1) Carnegie Mellon University, (2) Georgia Institute of Technology, USA

Posey is a physical construction kit that is instrumented to capture assembly and configuration information and convey it to a host computer. Posey can be used to build applications that present a reconfigurable physical model as a tangible interface for various domains. We demonstrate these applications to support a case for computationally enhanced construction kits as a semi-general interaction modality.

#i113

An education-friendly construction platform for wearable computing

Grace Ngai, Stephen C.F. Chan, Joey C.Y. Cheung, Winnie W.Y. Lau, Hong Kong Polytechnic University

We present the TeeBoard, a construction platform for e-textiles and wearable computing that is designed to be robust, reliable, easy to construct and to program. Wearable computing and e-textiles are a compelling educational tool that let students exercise their creativity as they learn concepts about computers and technology.

#i114

Natural Throw and Tilt Interaction between Mobile Phones and Distant Displays

Raimund Dachsel, Robert Buchholz, *University of Magdeburg, Germany*

To provide intuitive ways of interacting with media data, this research work addresses the seamless combination of sensor-enabled phones with large displays. An intuitive basic set of tilt gestures is introduced for a stepwise or continuous interaction with both mobile applications and distant user interfaces by utilizing the handheld as a remote control. In addition, we introduce throwing gestures to transfer media documents and even running interfaces to a large display. To improve usability, data and interfaces can be thrown from a mobile phone to a distant screen and also fetched back to achieve mobility. We demonstrate the feasibility of the interaction methods with several advanced application prototypes facilitating a natural flow of interaction.

#i115

"Hiya-Atsu" media: Augmenting digital media with temperature

Mutsuhiro Nakashige, Minoru Kobayashi, Yuriko Suzuki
NTT Cyber Solutions Laboratories, Japan

Despite the many types of telecommunication systems that have been developed, it is still be hard to convey various types of information expressively to a remote partner. Our research focuses on using variations in temperature to achieve this. Hiya-Atsu-Mouse, which we developed to implement this idea, is a mouse device with thermal capabilities; the device becomes warmer or colder to the user's palm or fingertip according to the "temperature" of objects on the computer screen. Our work evaluates the thermal performance of the device and we introduce a practical Hiya-Atsu-Mouse and describe it in operation.

#i116a

Occlusion-Aware Menu Design for Digital Tabletops

Peter Brandl (1), Thomas Seifried (1), Jakob Leitner (1), Michael Haller (1), Bernard Doray (2), Paul To (2)

(1) *Media Interaction Lab, Upper Austria University of Applied Sciences*

(2) *Nortel Networks*

On interactive display surfaces, occlusions created by the user's hand decrease interaction performance with menus. We seek to avoid these occlusions and to adapt the menu placement to the user's handedness and position on the tabletop. Our adaptive menu placement method allows the correct menu placement around the table. We also introduce a gesture input area for fast interaction with areas that are partially occluded by the user's hand.

#i116b

FLUX, a tilting multi-touch and pen-based surface

Jakob Leitner (1), James Powell (1), Peter Brandl (1), Thomas Seifried (1), Michael Haller (1), Bernard Doray (2), Paul To (2)

(1) *Media Interaction Lab, Upper Austria University of Applied Sciences*

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FLUX is an interactive touch-sensitive tilting surface that can be used as a sketching board, as an interactive discussion table and as a digital presentation whiteboard. The surface, based on a rear-projection screen, supports both multi-touch interaction as well as multiple pen interaction with individual identification of each pen. We use two tracking technologies: Frustrated Total Internal Reflection (FTIR) technology for the hand-tracking and Anoto for pen-tracking.

#i104

Wearable EOG Goggles: Eye Based Interaction in Everyday Environments

Andreas Bulling, Daniel Roggen, Gerhard Tröster
ETH Zurich, Switzerland

Our goggles rely on Electrooculography (EOG) and uses electrical signals detected through dry electrodes to recognize a set of predefined eye gestures. We present a novel embedded eye tracker for context-awareness and eye-based human-computer interaction – the wearable EOG goggles. In contrast to common systems using video, this unobtrusive device relies on Electrooculography (EOG). It consists of goggles with dry electrodes integrated into the frame and a small pocket-worn component with

a powerful microcontroller for real-time EOG signal processing. Using this lightweight system, sequences of eye movements, so-called eye gestures, can be efficiently recognized from EOG signals for HCI purposes. The device allows for seamless eye motion sensing and natural eye-based interaction in everyday environments.

#i105

The Mousegrip

Florian 'Floyd' Mueller (1,2), Martin R. Gibbs (1), Frank Vetere (1),
Stefan Agamanolis (2)

(1) The University of Melbourne, (2) Distance Lab

The Mousegrip is an exertion interface to control computer applications while simultaneously exercising hand and arm muscles based on a handgrip device. Through our implementation of the game of Pong we show how an exertion activity can be included in an application's designs in order to support a healthy lifestyle.

#i117

SLAP Widgets: Bridging the Gap Between Virtual and Physical Controls on Tabletops

Malte Weiss (1), Julie Wagner (1), Roger Jennings (2), Yvonne Jansen (1),
Ramsin Khoshabeh (2), James D. Hollan (2), Jan Borchers (1)

(1) RWTH Aachen University, (Germany) (2) University of California, San Diego, USA

Silicone illuminated Active Peripherals (SLAP) are untethered, inexpensive, & battery-free, tangible translucent widgets for use on vision-based multi-touch tabletops. SLAP widgets include sliders, knobs, keyboards, and buttons and they add tactile feedback to multi-touch tables, improving input accuracy. SLAP widgets can be relabeled dynamically and combine the flexibility of virtual objects with physical affordances.

#i106

TypeRight: a Keyboard with Tactile Error Prevention

Alexander Hoffmann, Daniel Spelmezan, Jan Borchers
RWTH Aachen University, Germany

TypeRight is a new tactile input device for text entry. It combines the advantages of tactile feedback with error prevention methods of word processors. TypeRight extends the standard keyboard so that the resistance to press each key becomes dynamically adjustable through software. Before each keypress, the resistance of keys that would lead to a typing error according to dictionary and grammar rules is increased momentarily to make them harder to press, thus avoiding typing errors rather than indicating them after the fact. Two user studies showed that TypeRight decreases error correction rates by an average of 46%.

#i107

Aurally and visually enhanced audio search with SoundTorch

Sebastian Heise, Michael Hlatky, Joern Loviscach,
Hochschule Bremen (University of Applied Sciences), Germany

Finding a specific or an artistically appropriate sound in a vast collection containing thousands of audio files containing recordings of, say, footsteps, gunshots, and thunderclaps easily becomes a chore. To improve on this, we have developed an enhanced auditory and graphical zoomable user interface that leverages the human brain's capability to single out sounds from a spatial mixture: The user shines a virtual flashlight onto an automatically created 2D arrangement of icons that represent sounds. All sounds within the light cone are played back in parallel through a surround sound system to immerse the user in a dense cloud of sounds. Test show that the user can pick the "right" sounds more quickly and/or with more fun than with standard file-by-file auditioning.

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