Eiji Hayashi

Curriculum Vitae

Human-Computer Interaction Institute
School of Computer Science
Carnegie Mellon University
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Research Interests

My research goal is to design, develop, and evaluate systems that seamlessly merge the digital world with the real world utilizing user experience design, system design, and innovating new artifacts. Toward this goal, I am primarily conducting research in three domains: usable security, interaction techniques, and ubiquitous computing. In my work, I take an interdisciplinary approach, combining knowledge and methods — both quantitative and qualitative — from computer science, psychology, and design. Also, my interdisciplinary background prepares me to collaborate with system builders, social scientists, policy makers, and designers, and I am very open to expand my exploration.

Education

Ph.D. Candidate in Human-Computer Interaction, 2008 – May, 2015 (expected)
HCI Institute, School of Computer Science, Carnegie Mellon University, USA
Committee: Jason I. Hong (CMU, chair), Anind Dey (CMU), Lorrie F. Cranor (CMU), Stuart Schechter (MSR)
Dissertation: UniAuth: Building a Human-Centered Identity Management System

Master of Science in Information Technology – Information Security, 2006,
CyLab, Carnegie Mellon University, Japan
Advisor: Nicolas Christin

Master of Engineering in Mechatronics, 1998, Kyoto University, Japan
Advisor: Tsuneo Yoshikawa

Bachelor of Engineering in Mechatronics, 1996, Kyoto University, Japan
Advisor: Tsuneo Yoshikawa

Research Experience

UniAuth, 2013 – Present
HCI Institute, School of Computer Science, Carnegie Mellon University, USA
Working with Jason I. Hong, Anind Dey, Lorrie F. Craner, and Stuart Schechter on developing identity management system for online accounts and physical devices.

Crowd ReSourcing, 2014 – Present
Working with Jason I. Hong on developing a framework that enables building large scale systems utilizing computational resources available on existing smart phones.

Collaborative Mobile Search, 2013
Worked with Vidya Setlur (Nokia Research), Zhengxin Xi (Nokia Research), and Jason I. Hong on investigating collocated users' behaviors in searching information collaboratively using mobile phones and developing applications that helps collaborative search.

Body-based User Identification, 2012 – 2014
HCI Institute, School of Computer Science, Carnegie Mellon University, USA
Worked with Jason I. Hong on developing a system that identifies users based on their hand waving patterns and body segment lengths.

Context-Aware Authentication for Mobile Devices, 2009 – 2013
Worked with Jason I. Hong on developing user authentication system for smart phones that adjust security level based on users' current contexts estimated through sensor measurements.

Multi-Level Access Control for Mobile Devices, 2011 (at Microsoft Research)
Worked with Oriana Riva, Karin Strauss, A.J. Bernheim Brush, and Stuart Schechter at Microsoft Research on investigating users' preferences on different types of multi-level access controls and biometrics on mobile devices.

WebTicket, 2011 – 2012
Worked with Jason I. Hong on developing and evaluating a system that turns password-based authentication for web services to printable token-based authentication.

Tangible Interface for Parents and Children, 2012
Worked with Eric Paulos (UC Berkley) on developing tangible devices that facilitate time management for parents and young children.

Graphical Passwords, 2007 – 2011 (partly at CyLab Japan)
Worked with Jason I. Hong, Adrian Perrig (ETH Zurich), and Nicolas Christin (CyLab, CMU) on developing and evaluating usability and security of user authentication systems using graphics as shared secret instead of text-based passwords.

Physical Access Control Systems, 2007 – 2008 (at Mitsubishi Electric co.)
Worked with Masahito Matsushita (Mitsubishi) on developing communication protocols for DIGUARD NET that connects information security, building access control, and building management systems. Also worked on improving finger print recognition algorithms.

System Controllers, 1998 - 2006 (at Mitsubishi Electric co.)
Worked with Takashi Iwasaki (MERL) and Masahiko Fujita (Mitsubishi) on developing system control algorithms for machining centers.

Object Manipulation using Robot Hands, 1995 – 1998 (at Kyoto Univsersity)
Worked with Tsuneo Yoshikawa on developing algorithms for object manipulations with robot hands.

Publications

Refereed Full Conference Papers

Eiji Hayashi, Manuel Maas, and Jason I. Hong. Wave to Me: User Identification Using Body Lengths and Natural Gestures. In Proceedings of the ACM Conference on Human Factors in Computing Systems. Toronto, BC. [*Acceptance Rate: **22.8%***]

Sauvik Das, **Eiji Hayashi**, and Jason I. Hong. (2013). Memorability of the Mundane: Exploring Capturable Everyday Memory for Autobiographical Authentication. In Proceedings of the ACM International Joint Conference on Pervasive and Ubiquitous Computing. Zurich, Switzerland. [*Acceptance Rate: **23.4%***] (**Best Paper Award**)

Eiji Hayashi, Sauvik Das, Shahriyar Amini, Jason I. Hong, and Ian Oakley. (2013). CASA: Context-Aware Scalable Authentication. In Proceedings of Symposium on Usable Security and Privacy. Newcastle, UK. [*Acceptance Rate: **29%***]

Eiji Hayashi, Oriana Riva, Karin Strauss, A.J. Bernheim Brush, and Stuart Schechter. (2012). Goldilocks and the Two Mobile Devices: Going Beyond All-Or-Nothing Access to a Device's Applications. In Proceedings of the Symposium On Usable Privacy and Security. Washington, DC. [*Acceptance Rate: **20%***]

Eiji Hayashi, Bryan Pendleton, Faith Kursat Ozenc, and Jason I. Hong. (2012). WebTicket: Account Management Using Printable Tokens. In Proceedings of the ACM Conference on Human Factors in Computing Systems. Austin, TX. [Acceptance Rate: 23%]

Eiji Hayashi, Jason I. Hong, and Nicolas Christin. (2011). Security through a Different Kind of Obscurity: Evaluating Distortion in Graphical Authentication Schemes. In Proceedings of the ACM Conference on Human Factors in Computing Systems. Vancouver, BC. [*Acceptance Rate: **26%***]

Eiji Hayashi, Nicolas Christin, Rachna Dhamija, and Adrian Perrig. (2008). Use Your Illusion: Secure Authentication Usable Anywhere. In Proceedings of the Symposium on Usable Privacy and Security. [*Acceptance Rate: **30%***]

Hirokazu Sasamoto, Nicolas Christin, and **Eiji Hayashi**. (2008). Undercover: Authentication Usable in Front of Prying Eyes. In Proceedings of the ACM Conference on Human Factors in Computing Systems. [*Acceptance Rate: **22%***]

Refereed Short Conference Papers

Shahriyar Amini, Vidya Setlur, Zhengxin Xi, **Eiji Hayashi**, and Jason I. Hong. (2013). Investigating Collaborative Mobile Search Behaviors. In Proceedings of International Conference on Human-Computer Interaction with Mobile Devices and Services. Munich, Germany. [*Acceptrance Rate: **22%***]

Eiji Hayashi, Martina A Rau, Zhe Han Neo, Nastasha Tan, Sriram Ramasubramanian, and Eric Paulos. (2012). TimeBlocks: "Mom, Can I Have Another Block of Time?" In Proceedings of the ACM Conference on Human Factors in Computing Systems. Austin, TX. [*Acceptance Rate: **23%***]

Eiji Hayashi and Jason I. Hong. (2011). A Diary Study of Password Usage in Daily Life. In Proceedings of the ACM Conference on Human Factors in Computing Systems. Vancouver, BC. [*Acceptance Rate: **26%***]

Other Publications

Akira Funakoshi, Toshihiro Sugie and **Eiji Hayashi**. (1999). Modeling and Control of Tooling Machine Based on Redundant Drive System. Proceeding of Institute of Systems, Controls and Information Engineers Conference.

Eiji Hayashi. (1998). Object Manipulation by a Multi-Fingered Hand using Visual Feedback. Master's Thesis in Kyoto University.

Eiji Hayashi and Tsuneo Yoshikawa. (1996) Automatic Generation of Contact State Network for Assembly Operation Using Environments. Proceeding of Robotics Society Japan Conference.

Teaching Experiences

Co-Instructor, Fall 2011
Human-Computer Interaction Institute, Carnegie Mellon University
"User Centered Research and Design" with Nikhil Sharma, Carl Angiollio, Erica Deitzel and Matthew Kam.
Contents: Research, Evaluation, and Design Methodology in HCI

Graduate Teaching Assistant, Spring 2010
Human-Computer Interaction Institute, Carnegie Mellon University
"Applied Gadgets, Sensors and Activity Recognition in HCI" with Scott Hudson
Contents: Prototyping, Hardware building, Machine Learning

Graduate Teaching Assistant, Spring 2006 – Spring, 2008
CyLab, Information Networking Institute, Carnegie Mellon University
"Introduction to Information Security" with Nicolas Christin. (Fall, '07).
Contents: Cryptography, Network Security Basics, Introduction to Security Policy.

"Security in Networked Systems" with Nicolas Christin. (Spring '07 and '08).
Contents: Applied Cryptography, Information Network System, Network Security.

"Information Security Risk Analysis" with Ashish Arora. (Spring '07 and '08).
Contents: Risk Analysis, Risk Management, Economics, Decision Making.

"Information Security Risk Policy and Management" with Rahul Telang. (Spring '06 and '07). Contents: Policy, Risk Management, Decision Making, Game Theory.

Supervising Undergraduate Students' Research, Summer 2011 and 2013
Body-Based User Identification Project (Summer, 2013)
WebTicket Project (Summer, 2011)

Professional Experience

Intern Researcher, Summer 2011
eXtreme Computing Group, Microsoft Research, Redmond.
Worked on building an implicit authentication system that utilized sensor inputs to authenticate users without explicit user inputs, such as passwords.

Senior Researcher, 2007 – 2008
Advanced Technology Research and Development Center,
Mitsubishi Electric Cooperation
Worked on developing communication protocols for DIGUARD NET that connects information security, building access control, and building management systems, as well as improving finger print recognition algorithms.

Researcher, 1998 – 2005
Advanced Technology Research and Development Center,
Mitsubishi Electric Cooperation
Worked on development and evaluation of system control algorithms for factory automation machines.

US Patents

Microsoft Research
US 20130160110 A1 Device Locking with Hierarchical Activity Preservation

Mitsubishi Electric Cooperation
US 7194329 Numerical control apparatus and numerical control system
US 6912428 System for developing an application system and implementing thereof
US 6861814 Control parameter automatic adjustment apparatus
US 6639376 Frequency characteristic identifying method and drive controlling apparatus

Academic Service

Program Committee, 2014 – Present
ACM Conference on Ubiquitous Computing, 2015

Organizing Committee, 2011 – Present
ACM Conference on Human Factors in Computing Systems, 2011 – 2014
ACM Conference on Ubiquitous Computing, 2012 and 2015
ACM Symposium on User Interface Software and Technology, 2013 and 2014
ACM Interactive Tabletops and Surfaces Conference, 2013 and 2014

Reviewer, 2012 – Present
ACM Conference on Human Factors in Computing Systems, 2012 – 2015
ACM Conference on Designing Interactive Systems, 2012
ACM Conference on Mobile Systems, Applications, and Services, 2012 and 2013
ACM Conference on Ubiquitous Computing, 2012
ACM Symposium on User Interface Software and Technology, 2012
ACM Conference on Computer and Communications Security, 2013
IEEE World Haptic Conference, 2013
International Conference on Human-Computer Interaction with Mobile Devices and Services, 2013