



Invisible Shield ID: 2969

Featured Innovators: Yiran Chen, PhD and Zhi-Hong Mao, PhD

Despite increased awareness and available options, consumers resist implementing security measures on their phones. The resistance stems mostly from the time barrier associated with providing security credentials to the device, and results in significant data breaches considering that 1 in 3 people will misplace their smartphone each year. Invisible Shield offers consumers both security and convenience by learning how the phone and its owner interact and automatically locking the device when picked up by someone else. This allows for robust, biometric-based authentication that works on any device, changes over time, and remains entirely transparent to the user.

Technology Description

Invisible Shield is a novel ethological security technology developed with smartphones in mind. By using the information gathered from the sensors already embedded in modern devices, Invisible Shield uses machine learning to build a model of how the user interacts with their phone (touch area, holding position, swipe speed, etc.). Using this model, the phone is able to determine if the way it is being used/held right now is "expected." If not, the person currently in control of the phone is likely not the owner, and the phone should lock itself. Invisible Shield is unique in that it is an entirely passive solution – the user does not even know it's there.

Advantages

- Requires no extra time or effort from the user
- More secure than passwords and PINs
- Continuously changes over time, unlike fingerprint and facial recognition biometrics, which cannot be updated in the event of a breach
- More portable than token-based authentication

Applications

- Mobile Devices
- Computer
- ATM
- Wearables
- Smart Home
- Weapon ID

Stage of Development

The algorithm used by Invisible Shield is now fully developed and ready to be spun out into a startup business. Extensive in-lab data collection and testing has been completed, and will likely translate well to real-world scenarios. A packaged application for Android has been completed.

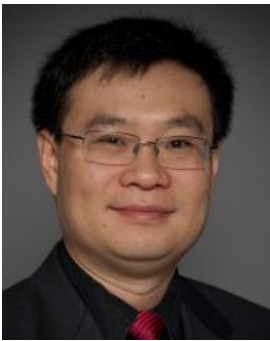
IP Status

University of Pittsburgh Copyright 2015
Non Provisional Patent filed September 2015

Notable Mentions

- Randall Big Idea Competition – 2nd Place - \$ 4,000
- 3 Rivers Venture Fair University Technology Showcase – 2nd Place - \$1,200
- Technology Commercialization Consortium – Small Business Grant - \$25,000

Innovators



Yiran Chen, PhD

Co-Director, Evolutionary Intelligence Lab
Associate Professor
Department of Electrical and Computer Engineering
University of Pittsburgh

Before joining the faculty at the University of Pittsburgh, Dr. Chen spent some time in industry. First he was with Synopsys Inc., Sunnyvale, CA, where he developed the award-winning statistical static timing analysis EDA tool "PrimeTimeVX." Dr. Chen then joined the alternative technology group of Seagate Technology, where he worked on the next-generation nonvolatile memory and solid state drive (SSD) controller.

Dr. Chen has published more than 160 technical publications in refereed journals and conferences and 7 book chapters, has 82 granted US and European patents, 21 pending US and international patents and 1 Seagate Trade Secret. His book (co-authored with Prof. Hai Li): "Nonvolatile Memory Design: Magnetic, Resistive, and Phase Changing", was published in 2011 by CRC Press.

Education

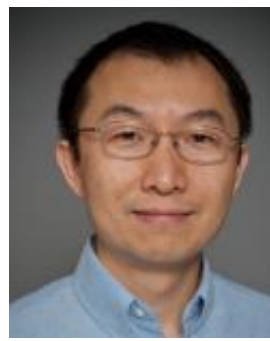
PhD in Electrical and Computer Engineering
Purdue University

MS in Electronic Engineering
Tsinghua University, China

BS in Electronic Engineering
Tsinghua University, China

Publications

- Nixon KW, Chen X, Mao ZH, Chen Y, "SlowMo-enhancing mobile gesture-based authentication schemes via sampling rate optimization. In: Design Automation Conference (ASP-DAC), 21st Asia and South Pacific, 2016; (pp. 462-467). IEEE.
- Nixon KW, Chen Y, Mao ZH, Li K, "User classification and authentication for mobile device based on gesture recognition. In: Network Science and Cybersecurity," 2014; (pp. 125-135). Springer New York.
- Nixon KW, Chen X, Mao ZH, Chen Y, Li K, "Mobile user classification and authorization based on gesture usage recognition." In: Design Automation Conference (ASP-DAC), 2013; (pp. 384-389). IEEE.



Zhi-Hong Mao, PhD

Associate Professor
William Kepler Whiteford Faculty Fellow
Department of Electrical and Computer Engineering
University of Pittsburgh

Dr. Mao joined the University of Pittsburgh faculty in 2005 and attained tenure in 2011. He was a recipient of the Outstanding Educator Award of Pitt Swanson School of Engineering in 2009, NSF CAREER Award in 2010, Andrew P. Sage Best Transactions Paper Award of the IEEE Systems, Man and Cybernetics Society in 2010, Outstanding Service Award as Associate Editor of IEEE Transactions on Intelligent Transportation Systems in 2013, and University of Pittsburgh Chancellor's Distinguished Teaching Award in 2016.

His research interests include human-in-the-loop control systems, networked control systems, and neural control and learning.

Education

PhD in Medical Engineering and Medical Physics
Harvard-MIT Division of Health Sciences and Technology

MS in Aeronautics and Astronautics
Massachusetts Institute of Technology

MEng in Intelligent Control and Pattern Recognition
Tsinghua University, China

BS in Automatic Control and Mathematics
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