



University of Pittsburgh

ID: 3603, & 3604

Featured Inventors: Kent W. Nixon, Yiran Chen, PhD

Invisible Shield

Free Biometric Security without the Risk!

Value Proposition

For consumers or businesses who have sensitive information on their smartphone, Invisible Shield is a personalized security method that provides biometric authentication. Invisible Shield utilizes pioneering machine-learning technology "learn" how the phone and its owner interact, and will automatically lock itself 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.

Market Opportunity

While the Identity and Access Management (IAM) market is large (\$5.13 billion in 2015) and growing 15% annually, 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. By offering both security and convenience, Invisible Shield can quickly attract the attention of IAM providers seeking to differentiate themselves in the market.

Competitive Landscape

Invisible Shield offers a significant benefit over all existing security methodologies. For mobile, knowledge-based identification (password and PIN) suffer from low entropy, and are easily brute-forced. Token-based authentication solutions such as ID cards or keys do not apply to mobile due to the portable nature of the devices. Biometric security solutions such as fingerprint or facial recognition have been shown to be easily bypassed, and cannot be changed should such an incident occur. Invisible Shield offers a robust authentication token that is near-impossible to crack, naturally changes over time, and is suited to mobile due to its passive nature.

IP Landscape

University of Pittsburgh Copyright (2015)
Non Provisional Patent filed September 2015



INVISIBLE SHIELD



Portable



Leak-Proof



Adaptive



Continuous



Secure



Invisible

Technology

Invisible Shield is a novel new ethological security technology developed with smartphones in mind. By utilizing the information gathered from the plethora of sensors already embedded in modern device, Invisible Shield builds a model of the way the user interacts with a phone while they use it (touch area, holding position, swipe speed, etc.). Utilizing 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!

Stage of Development

The algorithm utilized 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.

Funding

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

FEATURED INVENTORS:

Kent W. Nixon

Kent W. Nixon is currently enrolled as a Ph.D. student at the University of Pittsburgh in the Electrical and Computer Engineering department. His research interests include machine-learning, security, and power-efficient techniques for mobile. With strong ties to the Pittsburgh area, he undertakes many community outreach programs, and has a vested interest in kick starting local businesses. He has himself developed and transitioned research technologies into commercial applications a number of times in the past and would like to continue these efforts with Invisible Shield.

Education

Bachelor's (2009-2013)

University of Pittsburgh
Computer Engineering

Master's (2013-2015)

University of Pittsburgh
Electrical and Computer Engineering

Ph.D. (2015-)

University of Pittsburgh
Electrical and Computer Engineering

Publications

1. Ch3. *K. Nixon, Y. Chen, Z.-H. Mao, and K. Li, User Classification and Authentication for MOBILE Device Based on Gesture Recognition, (in "Network Science and Cybersecurity", Editor: Robinson Pino), Springer, Jun. 27, 2013, ISBN: 978-14-6147-596-5.
2. Ci14: *K. Nixon, Z.-H. Mao, K. Li, and Y. Chen, "Mobile User Classification and Authorization Based on Gesture Usage Recognition," 18th Asia and South Pacific Design Automation Conference (ASPDAC), Jan. 2013, pp. 384-389.
3. Cp10. *K. Nixon, *X. Chen, Z.-H. Mao, K. Li, and Y. Chen, "The Invisible Shield: User Classification and Authentication for Mobile Device Based on Gesture Recognition," Design Automation Conference (DAC), Jun. 2013.

Yiran Chen, PhD

Dr. Yiran Chen joined University of Pittsburgh as Assistant Professor at Electrical and Computer Engineering Department in 2010. His research interests include VLSI design/CAD for nano-scale Silicon and non-Silicon technologies, low-power circuit design and computer architecture, emerging memory technologies and nano-scale reconfigurable computing system and sensor system. 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

Bachelor's (1994-1998)

Tsinghua University
Electronic Engineering

Master's (1998-2001)

Tsinghua University
Electronic Engineering

Ph.D. (2001-2005)

Purdue University
Electrical and Computer Engineering

Publications

1. Sun, Guangyu, Xiangyu Dong, Yuan Xie, Jian Li, and Yiran Chen. "A novel architecture of the 3D stacked MRAM L2 cache for CMPs." In 2009 IEEE 15th International Symposium on High Performance Computer Architecture, pp. 239-249. IEEE, 2009.
2. Dong, Xiangyu, Xiaoxia Wu, Guangyu Sun, Yuan Xie, Helen Li, and Yiran Chen. "Circuit and microarchitecture evaluation of 3D stacking magnetic RAM (MRAM) as a universal memory replacement." In Design Automation Conference, 2008. DAC 2008. 45th ACM/IEEE, pp. 554-559. IEEE, 2008.

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