IEEE SSCI 2017 Tutorial

Title: CI in User Identity Management

Tutorial Speakers: Dipankar Dasgupta, IEEE Fellow and Abhijit Nag

Description: Computational intelligence (CI) techniques have shown to provide efficient solutions to address many real-world problems. There are many variations of CI, and these techniques seem to be promising to enhance cyber security measures, and have been increasingly applied in the area of information security and information assurance.

This tutorial session will provide an overview of multi-faceted CI approaches in verifying user identity via authentication processes. The discussion will start with CI in password-based authentication, followed by other complimentary (non-password based) approaches such as biometric, negative authentication, honey words, graphical passwords to verify legitimate users. Multi-factor based authentication (MFA) is the recent trend to authenticate users with more than one authentication technique chosen from independent categories of credentials. In the era of smartphones and mobile apps, it has become easier to capture various personal traits (gait, face, fingerprint, voice, keystroke, location, motion, and so on) for intelligently verifying identity of users passively on a continuous basis. An Adaptive Multi-factor based continuous authentication approaches will also be covered that uses CI techniques to facilitate user authentication in combination with active and passive traits and choose a better set of authentication factors through sensing the operating environment (connecting device, medium, and surrounding conditions) in a time varying settings.

Highlights:

- Current trends of authentication factors to facilitate user authentication process.
- CI-based authentication approaches such as Negative Authentication System
- Emerging behavioral, risk-based multi-factor and continuous authentication approaches.

Biographical Sketch of Prof. Dipankar Dasgupta

Dr. Dipankar Dasgupta is a Professor of Computer Science at the University of Memphis, Tennessee, USA. His research interests are broadly in the area of scientific computing, design, and development of intelligent cyber security solutions inspired by biological processes. He contributed remarkably in applying bio-inspired approaches to intrusion detection, spam detection and building survivable systems.

Dr. Dasgupta is one of the founding fathers of the new field of artificial immune systems, in which he has established himself. His latest book, "*Immunological Computation*", is a graduate level textbook, was published by CRC press in 2008. He also edited two books: one on Evolutionary Algorithms in Engineering Applications and the other is entitled "*Artificial*

Immune Systems and Their Applications", published by Springer-Verlag. The first AIS book is widely used as a reference book, and it was **translated into Russian.**

Prof. Dasgupta has more than 250 publications in book chapters, journals, and international conferences which are being cited widely and co-edited several conference proceedings. A search with his name in Google Scholars indicates more than 12,000 citations and according to Scholar indexing, Dipankar Dasgupta's h-index: 54 and g-index: 93 and an academic search at Microsoft shows that he collaborated with 106 co-authors—extraordinary testimony to the broad influence of his contributions within the research community. Dr. Dasgupta's work on digital immunity and negative authentication put his name in Computer World Magazine and in the list of top computer scientists whose h-index is above 40 (available at UCLA site: http://www.cs.ucla.edu/~palsberg/h-number.html).

Prof. Dasgupta is an Advisory Board of Geospatial Data Center (GDC) at Massachusetts Institute of Technology (MIT) (http://geospatial.mit.edu). Dr. Dasgupta has received five Best Paper Awards at international conferences (1996, 2006, 2009, 2011 and 2013) and special recognition from international organizations in which he is involved. Prof. Dasgupta received the 2014 ACM SIGEVO Impact Award.

Biographical Sketch of Dr. Abhijit Nag

Dr. Abhijit Kumar Nag obtained his Ph.D. in Computer Science from The University of Memphis. Previously he received his master's in Computer Engineering from The University of Memphis and got his bachelor degree in Computer Science and Engineering from Bangladesh University of Engineering and Technology. His primary research interest includes various authentication approaches, mainly continuous authentication and multi-factor authentication systems. His other research interests include evolutionary algorithms, biometric approaches, cloud computing, computer and network security, bio-inspired/nature-inspired computing, and anomaly detection. He is an inventor of a submitted Utility Patent on Adaptive Multi-factor Authentication System. He serves as a reviewer for many reputable peer-reviewed journals and conferences. He is currently working as an Assistant Professor in the department of Computer Information Systems at The Texas A&M University-Central Texas. Email: aknag@tamuct.edu