Advancing the science that recognizes people by their face, fingerprints, gait, and voice -- and protecting the privacy of those images -- have earned an international award for a faculty member in the Michigan State University College of Engineering.

Arun Ross, an associate professor of computer science and engineering at MSU, will receive the 2014 J.K. Aggarwal Prize from the International Association for Pattern Recognition (IAPR) in Sweden on Monday, Aug. 25. The prize is given to a scientist, under the age of 40, who has brought a substantial contribution and impact to the pattern recognition field.

The Aggarwal Prize acknowledges his research contributions on biometric fusion, fingerprint analysis, iris recognition and biometric privacy.

“Biometrics is a fascinating pattern recognition problem, and my students and I are fortunate to be working in a field that has direct societal benefits,” he explained.

Ross and his students are currently developing algorithms to perform robust face, fingerprint and iris recognition, including:

- matching a face image obtained using a thermal camera against one from a regular digital camera;
- protecting the privacy of face and fingerprint images that are stored in a database;
- and “anti-spoofing” techniques for detecting a fake fingerprint or a cosmetically altered face.

A colleague from the University of Notre Dame said Ross’s work in biometrics is widely respected and highly cited. “(His) remarkable range of contributions reflects an agile and creative approach to research, a talent for identifying and mentoring talented students, and a collaborative spirit that has fostered many productive relationships with other schools in the U.S. and abroad,” said Patrick Flynn, Duda Family Professor of Engineering at the University of Notre Dame.

Kevin W. Bowyer, who is the Schubmehl-Prein Professor and Department Chair, Department of Computer Science and Engineering at the University of Notre Dame, noted that Ross seems to always be doing interesting research. “Most recently, I have followed his work in iris recognition and in face recognition across the visible and near-infrared wavelengths. He is certainly deserving of this recognition,” Bowyer added.

Ross said he is grateful for this international honor and very appreciative of his PhD advisor and research mentor at MSU, University Distinguished Professor Anil K. Jain. “Professor Jain introduced me to this field more than 15 years ago. Since then, I have been privileged to work with excellent students in the iPRoBE Lab as well as a number of collaborators.”

The award will be given at the 22nd International Conference on Pattern Recognition (ICPR) in Stockholm, Sweden, Aug. 24-28, hosted by the Swedish Society for Automated Image Analysis. This international forum advances pattern recognition, machine learning, and computer vision and the application of these technologies. Ross will deliver a plenary address, Biometrics: From Pattern Recognition to Data Privacy.
Matt Mutka, chair of the Department of Computer Science and Engineering, said the award is significant and recognizes the researcher who has already had a substantial impact on the field, but is not yet 40 years old. "With the large number of researchers in the field of pattern recognition, it is truly an important honor."

Mutka noted that previous award recipients are Bernhard Schölkopf (Max Planck Institute, 2006), Song-Chun Zhu (UCLA, 2008), Antonio Torralba (MIT, 2010), and Rene Vidal (Johns Hopkins, 2012).

"Prior recipients from places such as Max Planck Institute, MIT, and John Hopkins, as have Arun, have all distinguished themselves," Mutka added.

Arun Ross
Ross is the director of MSU’s iProbe (Integrated Pattern Recognition and Biometrics Lab). He joined the MSU faculty in January 2013, coming from West Virginia University.

This is the second “under 40” award for Ross. In June 2013, he delivered a plenary address when he received the first International Association for Pattern Recognition (IAPR) Young Biometric Investigator Award, presented at the International Conference on Biometrics in Madrid, Spain.

Other special recognitions include:

- Serving as a panelist at a special event organized by the United Nations Counter-Terrorism Committee at U.N. headquarters in New York City in May 2013. Ross focused on the use of biometrics for border control and discussed the importance of biometric fusion, vulnerability assessment and mitigation, and biometric data privacy.
- Testifying before the Michigan Senate about the potential use of biometrics in Cyber Security in January 2014. He focused on the need for effective user-authentication mechanisms in Cyberspace, where the goal is to ensure that the financial, health, and social data of constituents are appropriately protected and accessed only by authorized individuals.
- Currently serving as the vice president of education for the IEEE Biometrics Council and the vice chair of the IAPR Technical Committee on Biometrics.
- Recipient of the NSF CAREER Award and designation of Kavli Frontier Fellow by the National Academy of Sciences in 2006.

He earned doctoral and master’s degrees in computer science and engineering from MSU in 2003 and 1999, respectively, and a bachelor’s degree in computer science from the Birla Institute of Technology and Science, Pilani, India, in 1996.

Pattern Recognition and Biometrics
In general, pattern recognition involves the automatic categorization of data – from faces to buildings to stars. It can also be used to identify trends in the financial market or energy consumption. Pattern recognition principles are used extensively in bioinformatics, biometrics, medical diagnosis, search engines, astronomy, and natural language processing.

Biometrics is the science of establishing human identity based on physical or behavioral traits, including fingerprint, face, gait, voice, etc. In its simplest form, biometrics compares biometric signals (such as two iris images) to determine if they belong to the same individual.

Related Website: 2014 plenary address, “Biometrics: From Pattern Recognition to Data Privacy.”
Communications contact: Patricia Mroczek

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