

ECE Distinguished Seminar Series

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Fingerprints: Proving Ground for Pattern Recognition

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Abstract: The smoothly flowing pattern formed by alternating crests (ridges) and troughs (valleys) on each finger tip is referred to as a fingerprint. A fingerprint is believed to be unique to each person (and each finger). Fingerprints of even identical twins are different and it has been claimed that the fingerprint of an individual does not change throughout the lifetime, unless there is a significant injury to the finger that creates a permanent scar. Automatic Fingerprint Identification Systems (AFIS) have been used by law enforcement agencies world wide since the late 1960s. The FBI's IAFIS (Integrated AFIS) system has a database of ~500 million fingerprint images of 50 million individuals and performs about 50,000 searches per day with an impressive accuracy and response time. The requirements of reliable and highly accurate personal identification in a number of government and commercial applications (e.g., e-passports, access to buildings, laptops and mobile phones) have served as an impetus for a huge demand for biometric recognition systems, including fingerprint recognition systems. This, in turn, has led to new developments in fingerprint sensing and robust and efficient feature extractors and matchers. This growth in the use of fingerprint technology driven by government programs and private-sector initiatives is already affecting a large portion of population worldwide (e.g., the US-VISIT program). This has placed some unique requirements and constraints on the design of fingerprint pattern recognition systems pertaining to sensing, ergonomics, recognition accuracy, response time and throughput. This talk will provide a brief history of fingerprints, design of a fingerprint pattern recognition system, emerging applications and some recent developments and challenges. We believe that research in designing large scale, automatic and robust fingerprint recognition systems will push the frontiers of pattern recognition.

About the speaker: Anil Jain is a University Distinguished Professor in the Departments of Computer Science & Engineering, Electrical & Computer Engineering and Statistics & Probability at Michigan State University. He received B.Tech. from IIT, Kanpur and M.S. and Ph.D. degrees from Ohio State University. His research interests include statistical pattern recognition, computer vision and biometric authentication. He received best paper awards from the Pattern Recognition Society in 1987 and 1991 and from the IEEE Neural Networks Council in 1996. He served as the Editor-in-Chief of the IEEE Trans. on Pattern Analysis and Machine Intelligence. He is a Fellow of the AAAS, ACM, IEEE, IAPR and SPIE. He has received Fulbright, a Guggenheim and Alexander von Humboldt Research awards. He delivered the 2002 IAPR Pierre Devijver lecture and received the 2003 IEEE Computer Society Technical Achievement Award. Holder of six patents in the area of fingerprint matching, he is the author of a number of books, including Handbook of Multibiometrics, Springer 2006, Handbook of Face Recognition, Springer 2005, Handbook of Fingerprint Recognition, Springer 2003, BIOMETRICS: Personal Identification in Networked Society, Kluwer 1999, Markov Random Fields: Theory and Applications, Academic Press 1993 and Algorithms for Clustering Data, Prentice Hall, 1988.