



Distinguished Lecture Series

50 Years of Biometric Research: The Solved, The Unsolved, and The Unexplored



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Auditorium 106 at New IIS Building

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Abstract

The practice of using anatomical traits to determine the identity of an individual dates back to the late 19th century when Alphonse Bertillon advocated a personal identification system based on a set of anthropometric measurements. But the Bertillon system lacked automation and was cumbersome and tedious to use. Not surprisingly, it was abandoned in favor of a simpler and more accurate approach involving fingerprint comparison by human experts, which was made possible by the pioneering works of Faulds, Galton, Henry, and Herschel. Though fingerprint identification systems were adopted by several law enforcement agencies including the Scotland Yard at the beginning of the 20th century, it was not until 1963 that the first scientific paper on automated fingerprint matching was published by Trauring in the journal Nature. Trauring's work laid the foundation for modern day biometric recognition systems and was followed by the development of automated systems for matching other anatomical and behavioral traits such as voice (Przansky, 1963), face (Bledsoe, 1964), signature (Mauceri, 1965), hand geometry (Jacoby et al., 1972) and iris (Daugman, 1992). It is instructive to reflect on what progress has been made in biometric recognition over the past 50 years since Trauring's landmark paper. Significant progress has indeed been achieved making it possible to accurately recognize individuals based on biometric trait(s) (e.g., fingerprint, face, iris, or voice) acquired in controlled acquisition environments with user cooperation. While these developments have enabled a wide variety of identification applications ranging from personal laptop access to national civil registry systems, a number of thorny issues continue to inhibit the potential of biometric systems. One of the main unsolved issues is the problem of processing poor quality biometric data, possibly acquired from uncooperative users in unconstrained environments. Moreover, issues related to the security and privacy of the biometric data itself, robustness of the system to spoofing and obfuscation, and uniqueness and persistence of biometric traits need to be systematically studied. Unlocking the potential of biometrics through fundamental research in the context of these larger systemic issues will not only lead to widespread adoption of this promising technology, but will also result in user acceptance and societal good.

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