Abstract

Biometrics refers to the technology of recognizing or validating the identity of an individual based on the physiological and/or behavioral characteristics. It is superior to conventional knowledge or possession based methods in both security and convenience. However, there exist some inherent concerns of the technology. In the first place, biometrics cannot be easily changed or reissued if compromised due to the limited number of biometric traits that humans possess. Secondly, since biometric data reflect the user's physiological or behavioral characteristics, privacy issues arise if the stored biometric templates are obtained by an adversary. To that end, changeability and privacy protection of biometric templates are two important issues that need to be addressed for widespread deployment of biometric technology.

In this work, we investigate repeatable and non-invertible transformation based methods for addressing the changeability and privacy protection problems in biometrics enabled recognition systems. We first present a random projection based method with a detailed analysis on the similarity and privacy preserving properties. To further enhance privacy protection as well as to improve the recognition accuracy, a sorted index number (SIN) approach is introduced. The SIN framework is then evaluated in conjunction with various forms of random transformations for producing changeable and privacy preserving biometric templates. The feasibility of the proposed methods is well supported by detailed theoretical analyses. Extensive experimentation on a face based biometric recognition problem demonstrates the effectiveness of the introduced solutions.

Biography of Speaker

Yongjin Wang received the Ph.D. degree from the Dept. of Electrical and Computer Engineering, University of Toronto in 2010. Since May 2010, he has been a post-doctoral research fellow at Ryerson University. During his graduate study, he has been the recipient of numerous scholarships and awards for academic and research excellence, including the prestigious NSERC Canadian Graduate Scholarship doctoral award, Ontario Graduate Scholarship, and many institutional scholarships. He also holds the pre-approved NSERC Industrial R&D Fellowship and Visiting Fellowship to Canadian government laboratories. His research interests are in the areas of biometrics, multimedia signal processing and applications, intelligent systems, and pattern recognition. He has contributed more than 20 papers in journals, conferences, and book chapters. He is a member of IEEE.