

Title: An Overview of the Recent Development of Computational Forensics for Criminal and Victim Identification.

Abstract: Biometric researchers achieved a great success in the last decade. Their technologies, especially face, fingerprint and iris recognition systems, have been widely used in governmental and commercial applications. Many national ID projects have been carried out and biometric passports have been standardized. Recently, some biometric researchers put more effort on developing effective computational methods for criminal and victim identification. Their research covers a wide range of forensic demands. Some attempt to improve or automatize the current manual or semi-automatic recognition approaches used by law enforcement agencies. Some attempt to address new demands from sexual offenses, riots, digital crimes, and terrorism. In this talk, the tutor will give a brief summary of their recent research results, including latent print enhancement, tattoo retrieval, shoe print recognition, facial composite and sketch processing and matching, dental identification, authorship verification, soft biometrics, skin mark matching and individuality, blood vessel visualization, skin image restoration, prisoner imaging systems and androgenic hair pattern matching.

List of topics to be presented with their estimated duration and pointers to the associated literature

- Introduction to criminal and victim identification (20min)
 - A rule of forensic researchers
 - Differences between commercial biometrics and forensic biometrics
 - Different countries, different laws and different requirements
- Latent print enhancement [23-24] (15 min)
- Tattoo retrieval [20-22] (15 min)
- Face processing and matching [4-6, 16] (20 min)
- Shoe print recognition systems [1] (10 min)
- Dental identification [17-18] (10 min)
- Authorship verification [2] (10 min)
- Soft biometrics and witness descriptions [3, 27] (15 min)
- Skin mark identification and related studies [9-11] (20 min)
- Androgenic hair pattern matching and body geometry [7-8, 26] (15 min)
- Blood vessel visualization [14-15] (15 min)
- Skin image restoration [12-13] (5 min)
- A prisoner imaging system [25] (5 min)

Prerequisites for the participants: NA

Target participants: Researchers and students, who are interested in computational forensics and law enforcement officers.

Expected enrolment: 30

Important note: No audio recording, video recording or photography is allowed.

Tutor: Dr Adams Wai-Kin Kong received his PhD from the University of Waterloo, Canada. Currently, he is an associate professor at the Nanyang Technological University, Singapore and Director of the Cyber Security Laboratory. His previous research includes algorithm design and analysis, system implementation and evaluation, feature analysis and template protection. Based on his palmprint identification algorithms, he was selected as a finalist of the 4th Young Inventor Awards 2002-2003, organized by Hewlett Packard and Far Eastern Economic Review. In the summer of 2008, he served as an expert witness to the U.S. Department of Justice for a case of child sexual abuse. His forensic research results were reported by Channel NewsAsia, Straits Times, and HEY!. His papers have been published in TPAMI, TIP, TIFS, TSMC, TCSVT, CVPR, pattern recognition, BTAS and ICB. One of his papers was selected as a spotlight paper by TPAMI and another one was selected as Honorable Mention by Pattern

Recognition. With his students, he received Best Student Paper Awards in The IEEE Fifth International Conference on Biometrics: Theory, Applications and Systems and IEEE International Conference on Bioinformatics and Bioengineering. He has developed seven patents; five of his patents have been approved, and the other has been filed. His research interests include biometrics, forensics, medical image processing, image processing, and pattern recognition.

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