Ministry of Human Resource Development
Government of India

GLOBAL INITIATIVE FOR ACADEMIC NETWORKS

Malaviya National Institute of Technology Jaipur

Biometric-based Authentication and De-identification for Privacy Protection

19th – 25th December 2016

Overview

Biometrics is an emerging technology that utilizes distinct physiological or/and behavioural characteristics possessed by a person in order to determine or verify the identity of an individual. The main physical characteristics used in biometric identification or verification systems are fingerprint hand geometry, palm print, face, iris, retina and ear. The behaviouralcharacteristics are signature, lip movement, speech, keystroke dynamics, gesture and gait. Biometric systems that use a single trait are called *unimodal systems*, whereas those that integrate two or more traits are referred to as *multimodal biometric systems*. Although unimodal systems are usually more cost-efficient than multimodal systems, in order to provide acceptable performance, to increase the scalability and the reliability of decisions and to increase the system's robustness to fraudulent technologies the multimodal biometric-based system are used.

A biometric system is a pattern recognition system, so it involves pattern recognition as the main discipline, as well as image processing, computer vision, signal processing, speech recognition and machine learning as relevant fields to developing biometric-based authentication systems. No biometric system can be error-free and this is a reason why the fundamental measurable aspects which affect system accuracy should be analysed.

Privacy is one of the most important social and political issues in our information society, characterized by a growing range of enabling and supporting technologies and services. Amongst these are communications, multimedia, biometrics, big data, cloud computing, data mining, internet, social networks, and audio-video surveillance. Each of these can potentially provide the means for privacy intrusion. De-identification is one of the main approaches to privacy protection in multimedia contents (text, still images, audio and video sequences and their combinations). It is a process for concealing or removing personal identifiers, or replacing them by surrogate personal identifiers in personal information in order to prevent the disclosure and use of data for purposes unrelated to the purpose for which the information was originally obtained. Based on the proposed taxonomy inspired by the Safe Harbour approach, the personal identifiers, i.e., the personal identifiable information, are

classified as non-biometric, physiological and behavioural biometric, and soft biometric identifiers. In order to protect the privacy of an individual, all of the above identifiers will have to be de-identified in multimedia content.

The proposed course presents review of the concept of privacy and linkage among privacy, privacy protection and technologies designed specifically for privacy protection and a comprehensive overview of de-identification of non-biometric, physiological, behavioural biometric identifiers, and soft-biometric identifiers which are present in a multimedia content.

Dates	**Course Duration : 19th - 25th December 2016** **Last date of Registration: December 18th 2016**
Who Should Attend	Faculty, professionals and research scholars working in research areas like security, authentication and in promoting multimodal and advanced biometric authentication. Engineers and researchers from government organizations and R&D SMEs
Registration Fee	MNIT Course Registration Fee (exclusive of GIAN Portal Registration Fee) • Rs. 3500.00 per delegate for participants from academic Institutes. • Rs. 2500.00 for SC/ST delegate for participants from academic Institutes. • Rs. 1500.00 for Research students. • Rs. 1000.00 for SC/ST Research students. • Rs. 5000.00 for Industry participants • The registration fees for the foreign nationals is USD $150. The above fee includes all instructional materials, computer use for tutorials and lab, free Internet facility and Lunch and Tea. The participants will be provided with single bedded accommodation on payment basis.
Registration Details	1. Fees may be paid via Demand Draft in favour of "REGISTRAR (SPONSORED RESEARCH) MNIT Jaipur" payable at Jaipur. 2. Or fees can be paid through online (NEFT) Account No. : 676801700388 In name of "REGISTRAR (SPONSORED RESEARCH) MNIT Jaipur" Bank : ICICI Bank, Branch: MNIT Jaipur IFSC Code: ICIC0006768. 3. Participants are requested to send a Demand Draft with a print out of the filled Registration form, by Courier/ Speed Post/ Registered Post before 15 December 2016 to: **Dr. Neeta Nain** Department of Computer Science and Engineering JLN Marg, MNIT Jaipur-302017 Rajasthan India Please label the envelop, `GIAN: Biometric-based Authentication and De-identification for Privacy Protection'. You may email a scanned copy of the DD and the signed registration form by the deadline to Dr. Neeta Nain at **nnain.cse[at]mnit.ac.in**

The Faculty

Slobodan Ribaric, Ph.D., is a Full Professor at the Department of Electronics, Microelectronics, Computer and Intelligent Systems, Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia. S. Ribaric is a head of the Laboratory of Pattern Recognition and Biometric Security Systems (RUBOISS). He received the B.S. degree in electronics, the M.S. degree in automatics, and the PhD degree in electrical engineering from the Faculty of Electrical Engineering, Ljubljana, Slovenia, in 1974, 1976, and 1982, respectively.

His research interests include Pattern Recognition, Artificial Intelligence, Biometrics, Computer Architecture and Robot Vision. He has published more than one hundred and fifty papers on these topics. Some articles have been published in the leading scientific journals such as IEEETransactions on Ind. Electronics, IEEE Transactions on Pattern Analysis and Machine Intelligence, Microprocessing and Microprogramming, Int. Journal of Pattern Recognition, Artificial Intelligence and Pattern Recognition. Ribaricis author of five books: Microprocessor Architecture (1986, four editions), The Fifth Computer Generation Architecture (1986.), Advanced Microprocessor Architectures (1990, two editions), CISC and RISC Computer Architecture (1996), Computer Structures, Architecture and Organization of Computer Systems (2011). The book CISC and RISC Computer Architecture was named as the best scientific books in the field of information science of year 1996 (J. J.Strossmayer award). S. Ribaric is co-author of the book An Introduction to Pattern Recognition (1988).

In 2013, he received the Gold medal "JosipLončar" awarded by the Faculty of Electrical Engineering and Computing, University of Zagreb for his outstanding contribution to the Faculty.Prof. Ribaric is the chair of the IC1206 COST Action “De-identification for privacy protection in multimedia content”. Professor Ribaric has held a series of invited lectures at universities and institutes in Denmark,China, Germany, India, Italy and Slovenia. He is a member of Editorial Board of CIT Journal, and he was a member of Editorial Board of IET Biometrics Journal in period 2013-2015. Ribaric is a member of the IEEE and MIPRO.

Angshul Majumdar, PhD joined IIIT-D as an assistant professor from October, 2012. Prior to that, he was associated with the Signal and Image Processing Lab at the University of British Columbia as a graduate student. He worked under the supervision of Dr. Rabab Ward. His research interests broadly include Compressed Sensing and Sparse Recovery, Low-rank Matrix Recovery, Magnetic Resonance Imaging and Color Imaging. He also worked on pattern recognition problems during his Master’s. Before coming into academia, Angshul worked in the consulting division of PricewaterhouseCoopers from 2005 to 2007 and from 2010 to 2011.

Modules

Module A: Authentication	Module B: De-identification
Lecture 1: **Personal Authentication** - Traditional Modes of Authentication, Biometrics - Science and New Technology, Biometric Authentication, Authentication Methods - Verification and Identification, Physiological, Behavioural and Soft Biometric Identifiers.	**Lecture 8:** De-identification and Irreversible De-identification, Taxonomy of the Identifiers in Multimedia Content, Non-biometric and Biometric Identifiers, Soft Biometric Identifiers.
Lecture 2: **Biometrics –** Qualitative properties, Comparison of Biometric Identifiers – Visualisation by Kiviat graphs.	**Lecture 9:** De-identification of Non-biometric Identifiers, Text, Hairstyle and Dressing Style and License Plates De-identification.
Lecture 3: **Biometric System Architecture** - Pattern Recognition System Architecture, Input Device (Sensor), Feature Extractor, Feature Matcher, Decision Module / Classifier; Enrolment and Authentication.	**Lecture 10:** De-identification of Physiological Biometric Identifiers: Face De-identification in Still Images, Video Surveillance Systems, drone-based surveillance systems. Fingerprint, Iris and Ear De-identification.
Tutorial 1: **Case study** - Palm print-based Authentication System based on Texture Features.	
Lecture 4: **Basic System Errors,** FAR (False Accept Rate), FRR (False Reject Rate), EER (Equal Error Rate), Minimum Total Error, ROC (Receiver Operating Characteristic) Curve, Cumulative Match Curve (CMC), Open vs. Closed Set Testing, Biometric System Typical Accuracies.	**Lecture 11:** De-identification of Behavioural Biometric Identifiers: Voice, Gait and Gesture. De-identification of Soft Biometric Identifiers: Body, Gender, Age, Race and Ethnicity, Scars, Marks and Tattoos (SMT) De-identification.
Lecture 5: **Unimodal vs. Multimodal Biometric Systems**, Levels of Fusion: Sensor level, Feature Level, Score Level, Decision Level, Points of Attack in Generic Biometric Authentication System.	**Tutorial 4:** Case study - Face de-identification.
	Lecture 12: Future trends, Discussion & Conclusion.
Tutorial 2: **Case study** -A biometric Personal Verification System Based on the Combination of Palm prints and Faces.	**Lecture 13 & 14:** Deep learning Architectures

Lecture 6: **Feature Extraction**: PCA, LDA, MDF, RD-LDA and ICA.	**Lab Sessions:** 1. Face recognition by PCA 2. Neural Networks 3. Hopfield Networks Bayesian Learning 4. Random forests 5. SVM Classifier
Tutorial 3: **Case Study -** A Biometric Identification System Based on Eigen palm and Eigen finger Features.	
Lecture 7: Feature Trends, Discussion.	

Course Co-ordinators

Neeta Nain is teaching Computer Graphics and Image Processing, over 15 years. Her research area is Image processing, Pattern Recognition, Multimedia Techniques and Computer Graphics. Presently she is guiding research in Handwritten Text Recognition and Image vectorization. She has written three Springer book chapters, and has authored over 30 research papers for various International Journals and conferences. She has also authored a book on Computer Graphics.

Yogesh Kumar Meena received his PhD in Computer Science & Engineering from MNIT, Jaipur, India. He is Assistant Professor at the Department of Computer Science & Engineering Malaviya National Institute of Technology, Jaipur, India. His research interests include issues related to Data Mining, Natural Language Processing, Pattern Recognition and Knowledge Management. He is author of a great deal of research studies published at national and international journals, conference proceedings as well as book chapters.

Registration Details

GIAN Portal registration (Rs. 500 fee is mandatory for all participants).

Create login and password at http://www.gian.iitkgp.ac.in/GREGN/index.

Login and complete the Registration Form and select Course(s).

Confirm application and pay Rs. 500/- (non-refundable) through online payment gateway.

Download "Pdf file" of the application form and email it to nnain.cse@mnit.ac.in

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Under

Global Initiative of Academic Networks (GIAN)
Ministry of Human Resource Development
Govt. of India

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Category: General/SC/ST/OBC

Accommodation Required: Yes/No

(Accommodation is paid and expenses need to be borne by the participant)

Registered for GIAN Portal: Yes/No

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Rs _____/-only in favour of "REGISTRAR (SPONSORED RESEARCH) MNIT Jaipur".

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