Multimodal and Advanced Biometrics Authentication

Malaviya National Institute of Technology Jaipur
Department of Computer Science and Engineering

Under

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

Resource Person

Ajay Kumar
Department of Computing
The Hong Kong Polytechnic University
Hung Hom, Kowloon, Hong Kong

Coordinators

Dr. Neeta Nain
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Department of Computer Science and Engineering
Malaviya National Institute of Technology Jaipur
Jaipur, Rajasthan, India

Dr. Vijay Laxmi
(Associate Professor)
Govt. of India approved a new program titled **Global Initiative of Academic Networks (GIAN)** in Higher Education aimed at tapping the talent pool of scientists and entrepreneurs, internationally to encourage their engagement with the institutes of Higher Education in India so as to augment the country’s existing academic resources, accelerate the pace of quality reform, and elevate India’s scientific and technological capacity to global excellence.

GIAN is envisaged to achieve the following objectives:

a) Provide opportunity to our faculty to learn and share knowledge and teaching skills in cutting edge areas.
b) To provide opportunity to our students to seek knowledge and experience from reputed International faculty.
c) To create avenue for possible collaborative research with the international faculty.
d) To increase participation and presence of international students in the academic Institutes.
e) Opportunity for the students of different Institutes/Universities to interact and learn subjects in niche areas through collaborative learning process.
f) Provide opportunity for the technical persons from Indian Industry to improve understandings and update their knowledge in relevant areas.

**About the Course**

Automated human recognition in real environments is one of the most critical and stringent security. Biometrics authentication of individuals establishes identity of an unknown individual using their physiological or behavioral features. Unlike password or PIN, biometrics cannot be forgotten or lost and requires physical presence of the person to be authenticated. Unimodal biometric systems have to contend with a variety of problems such as noisy data, intra-class variations, restricted degrees of freedom, non-universality, spoof attacks, and unacceptable error rates. Several of these problems can be addressed by deploying multimodal biometric systems that combine two or more biometric modalities in order to cope up with the stringent performance requirements imposed for high security access. Recent advancements in the design of multimodal biometrics system concerns with information fusion, i.e. how the individual modalities should be combined to minimize errors and achieve high accuracy.

Systems based on fingerprints and eye features have, so far at least, achieved the best matching performance, the human hand also contains a wide variety of features that can be used by biometric systems. These features of the human hand are relatively stable and the hand image from which they are extracted can be acquired relatively easily. Furthermore, identification systems based on hand features are the most acceptable to users. The approaches to development of unimodal and multimodal biometric authentication system based on fingerprints and iris will be described in the proposed course.
<table>
<thead>
<tr>
<th>Dates</th>
<th>25&lt;sup&gt;th&lt;/sup&gt; July to 5&lt;sup&gt;th&lt;/sup&gt; August 2016</th>
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<tbody>
<tr>
<td>Location</td>
<td>Malaviya National Institute of Technology Jaipur, Rajasthan, India</td>
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<td>Objective</td>
<td>The course is residential, spanning 12 days, and consists of lectures and hands-on experiences relating to diverse topics on Biometrics authentication. It is intended that the course will complement and extend the materials in existing technical courses that many students will encounter in their first year of postgraduate training. It will also provide an opportunity to broaden awareness of knowledge and techniques in Biometrics, Security, Pattern Recognition, Vision, and Image Computing, and to develop appropriate research skills.</td>
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<tr>
<td>Who should attend</td>
<td>Faculty, professionals and research scholars working in research areas like security, authentication and in promoting multimodal and advanced biometric authentication.</td>
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| Format for the Course | Logistics:  
| | Number of days: 12  
| | Number of Sessions: 30 Lectures and 10 Labs  
| | Format of Sessions:  
| | 20 hours Lectures  
| | 10 hours Tutorials  
| | 20 hours Labs |
| Contents | **Module 1: Introduction to Biometrics**  
| | • Existing Biometrics Technologies  
| | • Performance Evaluation and Comparison of Biometrics  
| | • Multimodal Biometric Authentication  
| | • Biometric Security  
| | **Module 2: Contact less and Contact-based Fingerprint Identification**  
| | • Fingerprint Sensors and Imaging, Feature Extraction, Template Generation  
| | • Matching Algorithms, Performance, Individuality of Fingerprints  
| | **Module 3: Iris Recognition**  
| | • NIR/Visible Iris Imaging, Segmentation, Enhancement  
| | • Feature Encoding Algorithms  
| | • Periocular Recognition, Matching and Classification  
| | **Module 4: Lab Sessions**  
| | • Lab Practice and Tutorials  
| | • Assignments (Questions and Discussion on Answers)  
| | • Mini project (Multimodal Biometric problem and its implementation)  
| Important Dates | **Registration opens:** May 20, 2016  
| | **Registration closes:** July 20, 2016  
<p>| | <strong>Accommodation Requests:</strong> Before July 20, 2016 |</p>
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<tr>
<th>Registration Fee</th>
<th>Participants from</th>
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<tr>
<td></td>
<td>Abroad: USD $250</td>
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<tr>
<td></td>
<td>Industry/Research Organizations: Rs.10,000/-</td>
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<tr>
<td></td>
<td>Faculty (Academic Institutions): Rs. 5,000/-</td>
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<td></td>
<td>Research Scholar: Rs. 3,000/-</td>
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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.

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<tr>
<th>Mode of payment</th>
<th>Participants are requested to send a Demand Draft in favor of “Registrar MNIT Jaipur” payable at Jaipur with a print out of the filled in Registration form, by Courier/ Speed Post/ Registered Post before 20 July 2016 to:</th>
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<tbody>
<tr>
<td></td>
<td>Dr. Neeta Nain</td>
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<tr>
<td></td>
<td>Department of Computer Science and Engineering</td>
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<td></td>
<td>JLN Marg, MNIT Jaipur-302017</td>
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<tr>
<td></td>
<td>Rajasthan India</td>
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<td></td>
<td>Please label the envelop, ‘GIAN: Multimodal and Advanced Biometrics Authentication’. 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.</td>
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<tr>
<th>How to Reach Jaipur</th>
<th>Jaipur is well connected by Air, Road and Rail with all the major cities and railway stations in India. It is about 280 kms from New Delhi. It has direct flights from New Delhi (45 min), Mumbai (1.5 hrs) and Kolkata (2.2 hrs).</th>
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<td></td>
<td>The Institute is prominently located on JLN Marg and is 15 minutes from the Airport. It is 10 kms from the main Railway Station and Bus Stand. You easily find taxis and autos 24 hrs.</td>
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<tr>
<th>Local Accommodation</th>
<th>Accommodation at the Institute Guest houses will be available on payment on first come first served basis. The details regarding boarding and lodging are as follows:</th>
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<tbody>
<tr>
<td>Rates:</td>
<td><strong>Guest House 1 (Limited capacity):</strong> Single occupancy, double-bedded a/c room): Rs. 750/- per day</td>
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<td><strong>Guest House 2:</strong> (Single occupancy, double-bedded a/c room): Rs. 550/- per day</td>
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<td></td>
<td><strong>Aurobindo Boys Hostel:</strong> (Single occupancy, double-bedded non a/c room): Rs. 100/- per day</td>
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<td></td>
<td><strong>Gargi Girls Hostel:</strong> (Dormitory): Rs. 100/- per day</td>
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<td></td>
<td>There are many good fair price lodging facilities available nearby the campus.</td>
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| Places to Visit | Jaipur is famous for its hospitality, culture, forts and palaces, gems and jewelry, blue pottery and hand printed organic textiles. Most prominent of them are Hawa Mahal, Jantar Mantar, City Palace, Albert Hall Museum, Amber Fort – Heritage Palace, Nahargarh fort, Jaigarh fort, Jal Mahal, Kanak Varindavan garden, Govind Dev Ji temple and many more. You may also visit Agra for a day on Sunday to visit one of the wonders Taj Mahal and Fetehpur Sikari. Agra is very well connected to Jaipur via Train, you may leave in the morning at 6:00 AM and can come back by 9:00 PM in the evening. |
**Brief Profile of Resource Person**

**Ajay Kumar** is currently working in the Department of Computing, The Hong Kong Polytechnic University, Hong Kong, as an Associate Professor. He has been earlier working in the Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi, India, as an Assistant Professor (2005-08). He earned his Ph.D. Degree from The University of Hong Kong, in 2001. He holds several U.S. patents, and has authored extensively on biometrics and computer vision-based industrial inspection. He was the program chair of the Third International Conference on Ethics and Policy of Biometrics and International Data Sharing in 2010 and CVPR 2016 Biometrics Workshop, the Program Co-Chair of the International Joint Conference on Biometrics held in Washington, DC, in 2011, the International Conference on Biometrics held in Madrid, in 2013, CVPR 2013-2015 Biometrics Workshops, He has been Member, Departmental Research Committee, IIT Delhi (2006-07). M. Tech Coordinator, IIT Delhi (2006-07). He was the Founder and Lab-in-Charge, Biometrics Research Laboratory, IIT Delhi.

**Memberships and Positions Held:**

- Editorial Board Member, IEEE Transactions on Information Forensics and Security (2010-2013)
- Editorial Board Member, Pattern Recognition Letters (since 2012)
- General Co-Chair for the Second International Joint Conference on Biometrics in 2014
- General Co-Chair for First International Conference on Identity, Security and Behavior Analysis in 2015
- Senior Member IEEE (2007-)

**Coordinators**

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India, PIN 302017  
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e-mail: vlaxmi@mnit.ac.in
Malaviya National Institute of Technology Jaipur
Department of Computer Science and Engineering

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REGISTRATION FORM

Name (In Block Letters): ________________________________________________

Designation: __________________________________________________________

Qualification: __________________________________________________________

Institution: ____________________________________________________________

Address: __________________________________________________________________________

Email address: ____________________________________________________________________

Mobile No: _______________________________________________________________________

Payment by DD in favor of “Registrar, MNIT Jaipur” payable at Jaipur.

Details of Demand Draft:

DD No: ______________________________________________________________________

Bank: __________________________________________________________________________

Amount Rs: ______________________________________________________________________

Date: ___________________________ Place: _____________________________

Signature of the Candidate