

Teaching Faculty



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Course Coordinators



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Who can Attend ?

Executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories.

Student at all levels (BTech/MSc/MTech/PhD) or Faculty from reputed academic institutions and technical institutions.

About GIAN

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 academic resources, existing accelerate the pace of quality reform, and elevate India's scientific and technological capacity to global excellence.

About IIT Patna

Indian Institute of Technology Patna, established in August 2008, is an autonomous institute of education and research in science, engineering and technology located in Bihta, 35 km from Patna. The new campus is spread over 500 acres of green land. As of today, IIT Patna has 10 academic departments that offers B.Tech, M.Tech, MSc and PhD programs.

The faculties of this institute come with academic and research training from various institutes of excellence within the country and abroad. The recent publication records of the Faculty with several practical constraints appear to be outstanding. It includes many reputed national and international journals.

About CSE Department

The department has three major programs- B.Tech CS, M.Tech CS and PhD. Additionally, there is a M.Tech in Mathematics and Computing program jointly with Mathematics dept. The CSE department is equipped with several research and teaching labs. The faculty members of the department are engaged with various research, teaching and administrative activities. The department has a liaison with reputed national and international Universities.



On Machine Learning and its Role in the Internet of Things (IoT) Analytics

4th -8th December, 2017

Organised by



Department of Computer Science & Engg.
Indian Institute of Technology Patna
Bihta-801103

Overview

The Internet of Things (IoT) has already found its way in diverse set of applications. Examples include connected cars, smart agriculture, connected home, smart grid, and numerous industrial control systems. Along with this explosive growth, we are also witnessing increased risks to security and privacy. IoT systems are often highly complex, requiring end-to-end security solutions that span cloud and different connectivity layers. Traditional security solutions are unsuitable for resource-constrained IoT devices.

Recent advances in machine learning mark another exciting milestone in the evolution of computer science. It is natural to consider the application of learning techniques to secure IoT. In this course, we will explore security vulnerabilities unique to IoT architecture, learn how to establish a baseline of the operational characteristics, and to flag anomalies that deviate from this baseline. There is a significant experiential component to this short course. At the same time, it also covers the research trends, challenges, and open problems in this exciting field.

Objective

Upon completion, successful participants will be able to understand the roles of machine learning and analytics in solving IoT security problems. The student would get exposed to some advanced analytic techniques, in particular deep learning. As a prerequisite, experience with a high-level programming is required. Students will be expected to apply the concepts learned in this course to a particular IoT vertical towards the end of the course.

Specific learning objectives include the mastery of

- Using R and Python for predictive analytics
- Networks for IoT
- Challenges in securing IoT
- IoT economics

Schedule

Day1	<p>Lecture 1 : Course Overview; IoT Application to Smart homes, Smart cities, Healthcare, Energy; Case Study: Smart Agriculture</p> <p>Lecture 2 : Wireless Communications; Bluetooth Low Energy, Zigbee, WiFi, Cellular, NFC, LoRaWAN</p>
Day2	<p>Lecture 3 : Common vulnerabilities in IoT; Sniff & Replay in locks, Command injection and Hard-coded passwords in solar panels, Privilege escalation in Smart Locks, Buffer overflow and cross-site request forgery in wireless range extenders</p> <p>Tutorial 1 : Demonstration of vulnerabilities; Case Study: Sniff & Replay in a home security system</p>
Day3	<p>Lecture 4 : Data science and cybersecurity; Intrusion detection, Statistical anomalies, Supervised learning, Unsupervised learning</p> <p>Lecture 5 : Deep Learning; Neural networks, Deep feedforward networks, Optimization of basic neural nets</p>
Day4	<p>Lecture 6 : Deep Learning (contd.); Convolutional neural networks, Deep models for text, Recurrent networks</p> <p>Tutorial 2 : Problem solving session with examples; Platforms for machine learning Tensorflow, H2O, scikit</p>
Day5	<p>Lecture 7 : Implement IoT datasets in R and Python; Predictive models for IOT datasets; Statistics for data transformation, Classification, Model training, tuning and evaluation</p> <p>Tutorial 3 : Problem solving session (Project: Choose a vertical and explain how IoT security is relevant)</p>

How to Register ?

Step 1: One Time Registration: In order to register for any GIAN course, candidates will have to get registered at the GIAN Portal of IIT Kharagpur using the following steps.

- 1.1 Create login and password at <http://www.gian.iitkgp.ac.in/GREGN/index>
- 1.2 Login and complete the registration form
- 1.3 Select course to be attended
- 1.4 Confirm your application and payment information.
- 1.5 Pay Rs 500 (one time, non-refundable) online through payment gateway.
- 1.6 Download and print your "pdf file" of your enrollment application form for your personal records and copy of the same to be sent to course coordinator.

Step 2: Institute Registration: Contact course coordinators.

-The registration fees is as below. SC/ST candidates will get 50% relaxation.

Participants from Abroad	USD 100
Participants from Industry / Research Organization	Rs 4000
Faculty	Rs 2000
Students & Research Scholars	Rs 1000

Account Details: For paying the registration fees, following account details of IIT Patna can be used. Please keep a copy of the transaction. Please mention the purpose of payment as "Registration Fees of Gian Course: Title/ID"

Account Name	Indian Institute of Technology Patna
Account No.	30957551934
IFSC Code	SBIN0017164
Bank Name	State Bank of India
Branch Name	IIT Patna, Bihta Campus
MICR No.	801002005