Data Analytics with Applications to Healthcare

Overview

This course is applicable to students (senior level undergraduate), graduate and healthcare and computer science/analytics professionals. We will cover foundations of data analytics, nature of healthcare data and descriptive and predictive health analytics. In order to help management professionals, computer scientists and industry personnel, the focus will be applied. The course will cover the following key aspects:

- Data Science, Data Analytics Big Data
- Healthcare Analytics: problems and insights;
- Descriptive Analytics as related to patient and hospital resources data
- Introduction to the R statistical software: examples from healthcare data
- Data pre-processing: outliers, missing values and dimensionality reduction using Principal Component Analysis
- Linear Regression models– Outpatient visits modelling
- Logistic regression for binary responses– Analysis of patient readmission data due to adverse events after surgery
- Support Vector Machines– Colorectal surgery outcome analysis
- Tree based methods - Analysis of patient readmission data
- Networks and Network Analytics (Graph Mining) co-occurring disease diagnostics; infectious disease spread
- Visualization – with patient data, retail data, and online education data

Lectures and case studies will be incorporated to convey the topics:

Dates for the Course	**23rd January to 3rd February**
Host Institute	**IIT Madras**
No. of Credits	**2**
Maximum No. of Participants	**50**
You Should Attend If…	▪ You are an engineer or statistician or computer scientist interested in healthcare data analytics ▪ You are a student or a faculty member interested in the use of data science in healthcare
Course Registration Fees	The participation fees for taking the course is as follows: **Student Participants:** Rs.2000 **Faculty Participants:** Rs.4000 **Government Research Organization Participants**: Rs.4000 **Industry Participants:** Rs.6000 The above fee is towards participation in the course, course material/handout, relevant text book, and any other resource utilized in IIT Madras. **Mode of payment: Demand draft in favour of "Registrar, IIT Madras" payable at Chennai.** The demand draft is to be sent to the Course Coordinator.
Accommodation	The participants may be provided with hostel accommodation, depending on the availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel

Course Faculty

Soundar Kumara is the Allen, E., and Allen, M., Pearce Chaired Professor of Industrial Engineering at Penn State. His research interests are in Manufacturing Process Monitoring, IT in Manufacturing and Service Sectors, Health Analytics, Graph Analytics and Large Scale Complex Networks. He is a Fellow of: Institute of Industrial Engineers (IIE), International Academy of Production Engineering (CIRP), American Association for Advancement of Science (AAAS), and American Association of Mechanical Engineers (ASME). He has won several awards including the Faculty Scholar Medal (highest research award at PSU. He has more than 200 publications to his credit and several of his papers have won best paper awards. Dr. Kumara held visiting professorships at some of the leading institutions in the world, including Massachusetts Institute of Technology, University of Tokyo, City University of Hong Kong and Korea Institute of Science and Technology. 50 Ph.D., and 54 MS students graduated under his tutelage. His **Erdős** number is 3.His google citations is around 5400.

R. P. Sundarraj is a Professor at IIT-Madras, and has about twenty-five years of international academic experience, including faculty positions at the University of Waterloo in Canada and Clark University in Massachusetts. His current professional interests are rooted in the application of operations research and behavioral models to cloud computing and analytics. Professor Sundarraj serves on the editorial boards of international journals such as *IEEE Transaction on Engineering Management* and *Group Decision and Negotiation*, and has published in outlets such as *European Journal of Operational Research, International Journal of Production Economics, Mathematical Programming* and various IEEE/ACM transactions.

Dr. C. Rajendran is a Professor in the Department of Management Studies at Indian Institute of Technology Madras. His research interests include production planning and scheduling, total quality management and supply chain management. He has more than 125 publications related to these areas in many international journals such as European Journal of Operational Research, International Journal of Production Research, Journal of Operational Research Society, International Journal of Operational Research, Computers and Operations Research, and International Journal of Logistics Systems and Management. He is a recipient of Alexander von Humboldt Fellowship of Germany.

Course Coordinators

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