<p style="text-align:center"><strong>A Global Initiative of Academic Networks (GIAN)</strong></p>

<p style="text-align:center"><em>A one week short term course on</em></p>

<p style="text-align:center"><strong>BIG DATA ANALYTICS FOR HUMANITARIAN CAUSES</strong></p>

<p style="text-align:center"><strong>Sponsored by Ministry of Human Resource Development (MHRD), Govt. of India<br>Under the Scheme 'GIAN'</strong></p>

<p style="text-align:center"><strong>(20 November 2017 to 27 November 2017) @ Dept. of CSE<br>University College of Engineering, Osmania University, Hyderabad, Telangana- 500 007</strong></p>

## Overview

Computing has come of age to facilitate the pervasiveness of machine-readable data and leveraging it for the advancement of humanity. This Big Data phenomenon is the new information revolution that no IT professional can afford to miss to be part of. There are already a number of humanitarian projects that have been made possible by the Big Data revolution. One such possible application is automated medical diagnosis. The course will go into details of this and similar applications, covering the tools and techniques needed to implement such applications.

The applications themselves rely heavily on the truthfulness of the underlying data, which is not entirely tamperproof. One of the impediments to the Big Data revolution is the quality of the data itself. Micro blogs are a significant chunk of the Big Data, which is substantially impacted by the problem of poor quality and unreliability. When the ground truth is not reliable, even the best quality model built on top of it will not be able to perform well. This is the problem of Veracity, the fourth `V' of Big Data. Machine Learning is the new mortar of modernization. Machine Learning algorithms are now used in almost every new invention. They can be used to solve the problem of Veracity as well.

The course will cover the concepts, algorithms and methodologies needed to leverage the Big Data phenomenon to the advantage of the underprivileged in India and the world. The course is expected to be research oriented, with significant discussions on current scholarly, research literature, in addition to hands-on experience.

## Objectives

The primary objectives of the course are as follows:

- Introduce the participants to the theoretical underpinnings of the cutting edge technologies of Computer Science and Engineering.
- Educate the participants on the fundamentals of Big Data, Analytics, Information Retrieval, Machine Learning, and related tools and techniques.
- Empower the participants to successfully apply the concepts, tools, and techniques learnt to leverage Big Data for the country's advantage.
- Provide exposure to practical problems and their solutions, through case studies and live projects using the theory covered.
- Enhance the capability of the participants to identify opportunities in Big Data for the advancement of humanity.

| Course Details | Day 1- Monday, 20-11-2017 |
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| | 10:30am – 11:30am:  Inauguration Function |
| | 12:00pm – 1:00pm:  Lecture 1: The Big Data Phenomenon |
| | 2:00 pm – 3:00 pm:  Lecture 2: Text Mining Basics, Zipf Law |
| | 3:00pm – 5:00pm:Tutorial 1: Problem solving session with examples: Text Mining |

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| | **Day 2 – Tuesday, 21-11-2017**<br>10:00 am – 11:00 am:Lecture 3: Vector Space Model (VSM), K-Nearest Neighbors (KNN)<br>11:30 am – 12:30 pm: Lecture 4: Evaluation of Systems: Precision, Recall, ROC, AUC, F-Score<br>1:30 pm – 2:30 pm: Lecture 5: Application: Automated Medical Diagnosis for the masses<br>3:00 pm – 5:00 pm:Tutorial 2: Problem solving session with examples: VSM, KNN and System Evaluation<br><br>**Day 3 – Wednesday, 22-11-2017**<br>10.00a.m – 11:00am : Lecture 6: Possible Applications of Text Mining with Big Data<br>11:30 am – 12:30 pm: Lecture 7: Other topics in Information Retrieval and discussion<br><br>2:00pm – 4:00pm :Tutorial 3: Significant Paper Presentations on Text Mining Applications<br><br>**Day 4 – Thursday, 23-11-2017**<br><br>10:00 am – 11:00 am: Lecture 8: Veracity of Big Data<br><br>11:30am – 1:00 pm :Lecture 9: Linear and Logistic Regression, Linear Discriminant Analysis (LDA)<br>2:00pm – 4:00 pm: Tutorial 4: Problem solving session with examples: Linear and Logistic Regression, LDA<br><br>**Day 5 – Friday, 24-11-2017**<br><br>10:00 am – 11:00 am: Lecture 10: Unsupervised Learning, Clustering Methods<br>11:30 am – 12:30 pm: Lecture 11: Maximum margin classification, Support Vector Machines (SVM)<br>2:00 pm – 4:00 pm: Tutorial 5: Problem solving session with examples: SVM, Unsupervised Learning, Clustering Methods<br><br>**Day 6 – Saturday, 25-11-2017**<br><br>10:00 am – 11:00am:Lecture 12: Other approaches to the problem of Veracity of Big Data<br>11:30 am – 1:00pm:Lecture 13: Change Detection Techniques: Kalman Filter, CUSUM, Chi Square Test<br>2:00 pm – 4:00 pm: Tutorial 6: Problem solving with Change Detection Techniques and Significant Paper Presentations on Big Data Veracity<br>**Day 7 – Sunday, 26-11-2017**<br><br>10 am – 11 am: Lecture 14: Application of Machine Learning and Change Detection Algorithms for Big Data Veracity<br><br>11:30 am – 1:00 pm :Lecture 15: Collaborative Filtering<br><br>2:00 pm – 4:00 pm: Tutorial 7: Problem Solving with Collaborative Filtering and Significant Paper Presentations on Humanitarian Applications of Big Data Analytics<br>**Day 8 – Monday, 27-11-2017** |

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| | 10:00 am – 11:00 am: Lecture 16: Formal Methods<br><br>11:30am – 12:30pm :Lecture 17: Comparison and application of various<br>                                 Algorithms learned<br>2:00 pm – 4:00 pm: Exam |
| **Who Should Attend** | Executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories.<br>Students at all levels (BTech/MSc/MTech/PhD)/Faculty from reputed academic institutions and technical institutions. |
| **Fees** | The participation fees for taking the course is as follows:<br>**Participants from Abroad : US $500**<br>**Industry/ Research Organizations: Rs. 6,000 /-**<br>**Faculty from Academic Institutions: Rs. 3,000 /-**<br>**Student Participants: Rs. 1,000/-**<br>The above fee includes all instructional materials, tutorials, assignments and internet facility. On request, accommodation will be provided for few participants (on first come first basis) in the campus on payment. |
| **How To Register** | **Stage1:** Web (Portal) Registration: Visit GIAN Website at the link: http://www.gian.iitkgp.ac.in/GREGN/index and create login user ID and Password. Fill up blank registration form and do web registration by paying **Rs. 500**/- on line through Net Banking/ Debit/ Credit Card. This provides the user with life time registration to enroll in any no. of GIAN courses offered.<br><br>**Stage2:** Course Registration (Through GIAN Portal): Log in to the GIAN portal with the user ID and Password created. Click on "Course Registration" option given at the top of the registration form. Select the Course title "Big data Analytics for Humanitarian Causes" from the list and click on "Save" option. Confirm your registration by Clicking on "Confirm Course". Only Selected Candidates will be intimated through E-mail by the Course Coordinator. They have to remit the necessary course fee in the form of DD drawn in favor of "**PRINCIPAL UCE OU COORDINATOR GIAN"** payable at SBI, University College of Engineering, Osmania University, Hyderabad-500 007. OR through NEFT/RTGS:<br><br>Name of the Beneficiary: The Principal UCE , OU<br>Account Name: **PRINCIPAL UCE OU COORDINATOR GIAN**<br>Name of The Bank: State Bank of India, Osmania University, Hyderabad<br>Beneficiary A/C No: 37072716197<br>Bank MICR Code: 500002342<br>IFSC Code: SBIN0020071 |

Vishnu Pendyala: Foreign Faculty

Vishnu Pendyala has more than two decades of software experience with industry leaders like Synopsys, Informix (now IBM), and Electronics Corporation of India Limited and is currently a Technical Leader with Cisco. He is a Senior Member of IEEE, Computer Society of India, and an institutional member of the ACM. He holds BE(CSE), MBA(Fin.), and MS(Comp. Eng'g) degrees from Indian and U.S. universities and is expecting his PhD from Santa Clara University before the commencement of this program.

He is a frequent, repeat TPC member / technical paper reviewer for professional journals and conferences, including the IEEE Computer, the annual IEEE International Conference on E-Commerce from 2003 – 2007, and twenty five others, over the years. He served as an Area Governor with Toastmasters International and received the Distinguished Toastmaster, Area Governor of the Year, and Silver Scribe awards. He is on the Executive Council of SIG BDA, Computer Society of India and is the founding editor of its newsletter, Visleshana.

Vishnu received the Ramanujam memorial gold medal at State Math Olympiad and has been a successful leader during his undergrad years. He also played an active role in Computer Society of India and was the Program Secretary for its annual convention, which was attended by over 1500 delegates. Marquis Who's Who selected Vishnu's biography for inclusion in its flagship publication, Who's Who in America and Who's Who in Science and Engineering for multiple years since 2011.

Vishnu spends his fast vanishing spare time volunteering and has been a reviewer / judge for competitions like the Grace Hopper Celebration of Women in Computing, at High School conferences like state level DECA, science fairs and other STEAM events for the last several years. He has traveled widely, covering ~30 states in the US and 13 countries. He resorts to yoga, spirituality, and listening to music, to unwind and be himself.

Prof  K. Shyamala



Shyamala K  is Associate Professor at Dept of CSE, University College of Engineering, Osmania University, Hyderabad.  She is member of IEEE and Computer Society of India,  Member of ACM. She holds BE and MTech in Computer Science and  Engineering from Osmania University, Hyderabad, India. She hols PhD from Indian Institute of Technology, Madras, Chennai.  She published papers several papers in International conferences and Journals. She  co- authored book on VLSI design.

**For further details Contact**

**Course Co-Ordinator**

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