

Big Data Analytics Research in India – A Perspective

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Abstract—Big Data Analytics is one of the main technological drivers of economy today. There is ample scope of research and application of the research of Big Data Analytics in day-to-day lives. The author reviewed several research papers from scholars in India and other Asian countries in topics related to Big Data Analytics for multiple conferences and journals. Based on that experience, the author felt the need to use the opportunity that the Ministry of Human Resources Development gave to him in the form of the one-week Global Initiative of Academic Networks (GIAN) course, to orient scholars in the country towards higher standards of research. The following is a perspective on the need to spruce up research in India and how courses such as the ones organized under the GIAN initiative can contribute to this noble cause.

Index Terms—Research Standards, Big Data Analytics, India, GIAN

1 INTRODUCTION

The world is advancing because of research, particularly in the hi-tech areas. India has talent that is matchless. From times immemorial, Indians have proven their aptitude for in-depth understanding and discovery of subtlest of the subtle aspects of science, math and engineering, which are the basis for research in the hi-tech. In spite of this, the western world has always taken a lead in research in the modern times. This is mainly because of the exposure, funding, and environment that the developed world provides. The Government of India's Global Initiative of Academic Networks (GIAN) program [1] is a step forward in bridging this gap. The article examines how.

According to the portal for 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 existing academic resources, accelerate the pace of quality reform, and elevate India's scientific and technological capacity to global excellence." There have been detailed studies such as [2], on where India's knowledge economy is headed. This article, however focuses on only initiatives such as the GIAN program.

Several hundreds of courses were approved and organized all over India in the past one year through the GIAN program. As part of the program, the author taught a 7-day course on "Big Data Analytics for Humanitarian Causes" at Osmania University, Hyderabad from November 20 – 27, 2017. It was attended by about 50 research scholars, mostly professors in all grades from New Delhi

in the North to Chennai in the South. The intensive course covered several topics and research problems in the Big Data Analytics area. This article is a perspective on the role that programs such as GIAN can play in bringing India on par with the United States when it comes to research in Hi-Tech.

2 THE WESTERN SCENARIO

Within a month or two of the author's landing in USA, a book-store near his home hosted a free-to-attend talk by none other than the legendary Turing Award winner, Professor emeritus, Donald Knuth of the "Art of Programming" fame. He just walked-in casually, and interacted with the audience, answering each and every question patiently. Over the more than two decades the author lived in the USA, he got many such opportunities to interact with legends and get inspired. He did not make a lot out of those great opportunities because of his own personal commitments. But if someone did, he would probably become another Raj Reddy, Satya Nadella or Sundar Pichai.

These legends or soon-to-become legends are not too different from the many engineers and research scholars in India in terms of upbringing. They just made excellent use of the opportunities with utmost focus and dedication. Success begets success. Due to its advanced placement, the west continues to lead in world-changing innovations and unfortunately, countries like India are unable to make the impact they are highly capable of because of the lack of exposure. In spite of the infrastructural and environmental drawbacks, India's contributions in some areas are exceptional, as acknowledged by foreign authors such as in [3].

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It is really heartening that the Government of India is proactively coming forward to bridge this gap through programs like the GIAN. Such programs have the potential to give the much-needed exposure to the research methodologies, standards, and efforts that are advancing the world. It is also appreciable that institutions like Osmania University are taking advantage of these programs and playing the much-needed role of being a catalyst in advancing research in the field of Computer Science and Engineering.



Figure 1 Inauguration of the GIAN course

3 MORE THAN TECHNOLOGY

It is not just the technology or the subject that is important for learning. I'm sure you have the courses, which teach most of the advanced topics. Even if courses are not available, excellent books, lucidly written on many topics are readily available in the market at affordable prices. Learning the subject should not therefore be too difficult. It is the methodology, the standards, and the practice, which make a difference to the research efforts. When programs like the GIAN are organized, it is important to focus more on these than the topics. Many years back, when the author graduated, the then Principal, Prof. BN Garudachar, said education teaches not the subject, but how to learn the subject.

It is very true. Learning how to learn the subject is more important than learning the subject itself. It is for these reasons that when the author received the information about this program from the college, he decided that the workshop should be research-oriented and not just a series of topics covered sequentially. The participants tried several innovative ways of learning and researching topics. For instance, they generated a concept map of the topics covered in each class. They were encouraged to use LaTeX for their reports and class notes. The tutorials included thought-provoking problems. The final exam was open-book and open-Internet and included similar kind of thought-provoking problems.

4 RAISING THE BAR FOR RESEARCH

Learning requires substantial efforts. We should not forget that the Sanskrit word for training is *Siksha* – the same word that also means punishment. This word literally came true to the author, when he took what was then known as one of the toughest graduate Computer Science course at Stanford University. The author of the book taught the course and covered approximately 1200 dense pages full of math and abstractions in less than 3 months. GIAN programs need not necessarily go through that kind of a rigor, but the participants will make the best of the program if they practice similar kind of focus and dedication.

Standards are high when it comes to research. Any good conference does not have an acceptance rate of more than 20% these days. That mean, 80% of the papers received by these conferences are rejected. That itself indicates how difficult it is to do research. The readers may find it interesting to note that even the "Page Rank" algorithm based on which, the company Google was formed, was rejected by a conference organizers, when the founders of the company were doing their PhD.

The standards are high, and rightfully so. Publishing a paper that no one reads or doing research that no one uses is probably worse than not doing any research. Quality is important and standards should be high. The other aspect that is clearly evident in the west is teamwork. A lot of work in the USA happens in teams. Everyone in the team really works hard and contributes selflessly to the overall goal.

5 PRACTICING HIGHER STANDARDS OF RESEARCH

One becomes an expert, by thinking like experts. By critically analyzing the work done by experts, we gain deeper insights. Brainstorming the work in a team further leads to ideas. One can then build upon those insights to come up with new ideas. In programs such as those offered through GIAN, the participants should endeavor to practice all these principles of research. In the course that the author offered, participants were asked to fully understand a paper from a journal with a high impact factor, preferably on a humanitarian topic and present it to the class in teams.

Economy grows as more and more people join its core echelons. One of the reasons the government exists is to make sure that the rich do not keep getting richer at the cost of the poor. It does not do good to the economy or the civilization, if the rich vs poor divide continues to increase. While mandates like Corporate Social Responsibility help in this respect, there is an increasing need for the research community to also share this social responsibility. IEEE organizes its signature conference every year

called the Global Humanitarian Technology Conference, GHTC every year to highlight this responsibility. Programs such as GIAN should also give impetus to research towards humanitarian causes.

The participants should take the best advantage of the opportunity to contribute to the global advancement in wholesome steps, not leaving anyone behind. Each of the participants in the course offered by the author, for instance, submitted a future directions report, that focused on humanitarian causes.

6 CONCLUSION

India played a substantial role in advancing the world, from times immemorial. Programs such as the Government of India's GIAN initiative has the potential to bring India back into the forefront of the research in areas driving the world economy. Research scholars, particularly in India are on a noble mission - research is the highest form of education and has ample scope of application within India.

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Vishnu S. Pendyala is a Senior Member of the Computer Society of India and IEEE. He has delivered multiple keynote addresses in International Conferences sponsored by IEEE and has over 400 citations of his publications. His research interests include Machine Learning, Big Data, Information Retrieval, Semantic Web, and Artificial Intelligence.

CSI SIGBDA SIGNS MoU WITH NITW



Sri Chandra Dasaka, secretary seen signing the MoU along with NITW officials. Please see detailed report and newspaper coverage on the next page.

