Distributed Systems and Machine Learning

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Overview

"A distributed system is one in which the failure of a computer you didn't even know existed can render your own computer unusable." –Leslie Lamport

Modern computing has seen the proliferation of distributed systems and applications in various forms such as geo-replicated data stores, cloud computing systems, networked, fog, and serverless computing systems, etc. that drive entities that range from global enterprises to vehicular systems. Reliable and optimal operation of such systems has become issues of utmost importance. Correct and optimal operation of distributed systems depends on several factors: appropriate choice of consistency settings based on application contexts, appropriate programming models that enable the development of reliable applications, and predictive execution models that enable optimal usage of resources. Today, killer applications that utilize distributed computing systems are machine learning engines. Machine learning, in particular, deep learning, has seen tremendous success in recent years with applications ranging from web search, product recommendations, healthcare diagnostics, autonomous driving, etc. Training deep learning engines amounts to solving approximately optimization problems that require searching for a "saddle point" in a high dimensional space: a computationally expensive task. Distributed cloud-based systems are routinely used to accelerate the search for saddle points as well as storing large volumes of data for training deep learning engines. On the other hand, machine learning engines form the basis of predictive execution models for optimal usage of resources in distributed systems. In addition, machine learning systems find usage in predicting and diagnosing faults, vulnerabilities, and attacks in distributed systems. This course will focus on the interplay between distributed systems and machine learning. The primary goal is to examine how distributed systems can enable reliable and efficient deployment of machine learning engines and how machine learning can contribute towards the correct and optimal operation of distributed computing systems.

Course participants will learn these topics through virtual lectures and virtual experiments/demos. Also case studies and assignments will be shared to stimulate research motivation of participants.

Modules	**A:** **Distributed Systems and Machine Learning** :June 5-12, 2022 **B:** **Date of Examination** : June 12,2022 **Number of participants for the course will be limited.**
You Should Attend If…	• Executives, engineers and researchers from the software industry, service, and government organizations including R&D laboratories. • Student students at all levels (BTech/MSc/MTech/PhD) or Faculty from reputed academic institutions and technical institutions.
Fees	The participation fees for taking the course is as follows: **Participants from abroad : US $100** **Industry/ Research Organizations: `10000** **Academic Institutions: `5000** **Participants will be provided online resources**

The Faculty

Prof Supratik Mukhopadhyay is in the faculty of Louisiana State University,Baton Rouge,Louisiana. He is an Professor with the Computer Science Division, Louisiana State University, Baton Rouge, USA. His areas of specialization include formal verification of software, inference engines, big data analytics, distributed systems, parallel computing framework, and program synthesis. His research in these areas has been supported by NSF, ONR, DARPA, ARO, NASA, DOT, DOE, NGA, state agencies, and industry. He has published over 105 peer-refereed technical journal and conference articles in computer science and engineering and has been awarded two U.S. patents

Dr.Rajiv Misra is an Associate Professor of Indian Institute of Technology, Patna. His research interest is Distributed Systems, Cloud Computing, and Artificial Intelligence.

Course Co-ordinator

Dr Rajiv Misra
Phone: 9471859370
E-mail: rajivm@iitp.ac.in

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http://www.gian.iitkgp.ac.in/