DISTINGUISHED SPEAKER SERIES

Big Data in Climate and Earth Sciences: Challenges and Opportunities for Data Science

Vipin Kumar, Ph.D.

Regents Professor and Chair
Department of Computer Science and Engineering
University of Minnesota

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Time: 2:15 PM
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Abstract: The climate and earth sciences have recently undergone a rapid transformation from a data-poor to a data-rich environment. In particular, massive amount of data about Earth and its environment is now continuously being generated by a large number of Earth observing satellites as well as physics-based earth system models running on large-scale computational platforms. These massive and information-rich datasets offer huge potential for understanding how the Earth's climate and ecosystem have been changing and how they are being impacted by humans actions. This talk will discuss various challenges involved in analyzing these massive data sets as well as opportunities they present for both advancing machine learning as well as the science of climate change in the context of monitoring the state of the tropical forests and surface water on a global scale.

Bio: Kumar's research spans data mining, high-performance computing, and their applications in Climate/Ecosystems and health care. His research has resulted in the development of the concept of isoefficiency metric for evaluating the scalability of parallel algorithms, as well as highly efficient parallel algorithms and software for sparse matrix factorization (PSPASES) and graph partitioning (METIS, ParMetis, hMetis). He has authored over 300 research articles, and has coedited or coauthored 10 books including two text books ``Introduction to Parallel Computing'' and ``Introduction to Data Mining'', that are used world-wide and have been translated into many languages. Kumar's current major research focus is on bringing the power of big data and machine learning to understand the impact of human induced changes on the Earth and its environment. Kumar served as the Lead PI of a 5-year, $10 Million project, "Understanding Climate Change - A Data Driven Approach", funded by the NSF's Expeditions in Computing program that is aimed at pushing the boundaries of computer science research.