Keynote Speech 1 - December 19th

Discovering Knowledge from Massive Social Networks and Science Data – Next Frontier for HPC

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Abstract

Knowledge discovery in science and engineering has been driven by theory, experiments and more recently by large-scale simulations using high-performance computers. Modern experiments and simulations involving satellites, telescopes, high-throughput instruments, imaging devices, sensor networks, accelerators, and supercomputers yield massive amounts of data. At the same time, the world, including social communities is creating massive amounts of data at an astonishing pace. Just consider Facebook, Google, Articles, Papers, Images, Videos and others. But, even more complex is the network that connects the creators of data. There is knowledge to be discovered in both. This represents a significant and interesting challenge for HPC and opens opportunities for accelerating knowledge discovery.

In this talk, followed by an introduction to high-end data mining and the basic knowledge discovery paradigm, we present the process, challenges and potential for this approach. We will present many cases, examples, results and future directions including (1) mining sentiments from massive datasets on the web, (2) Real-time stream mining of text from millions of posts and tweets to identify influencers and sentiments of people; (3) Discovering knowledge from massive social networks containing millions of nodes and hundreds of billions of edges from real world Facebook, twitter and other social network data (E.g., Can anyone follow Presidential campaigns in real-time?) and (4) Discovering knowledge from massive datasets from science applications including climate, medicine, biology and sensors. The talk will be illustrative and example driven and may include 1-2 live demonstrations.

Bio

Alok Choudhary is a John G. Searle Professor of Electrical Engineering and Computer Science at Northwestern University. He is the founding director of the Center for Ultra-scale Computing and Information Security (CUCIS). Prof. Choudhary was a co-founder and VP of Technology of Accelchip Inc., in 2000, which was eventually acquired by Xilinx. He received the National Science Foundation's Young Investigator Award in 1993. He has also received an IEEE Engineering Foundation award, an IBM Faculty Development award, an Intel Research Council award. He is a fellow of IEEE, ACM and AAAS. His research interests are in high-performance computing, data intensive computing, scalable data mining, computer architecture, high-performance I/O systems and software and their applications. Alok Choudhary has published more than 350 papers in various journals and conferences and has graduated 30 PhD students. Techniques developed by his group can be found on every modern processor and scalable software developed by his group can be found on most supercomputers. Alok Choudhary's work has appeared in many traditional media including New York Times, Chicago Tribune, The Telegraph; TV channels such as ABC, PBS and many international media outlets all over the world.

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