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High-performance data analytics: Platforms, resource management and middleware

Enterprises, social networks and smart systems that leverage the Internet of Things technology often lead to large datasets. Data analytics concerns the extraction of knowledge from such raw data. The challenges underlying the processing of such data sets are captured in the 3V characteristics of Big Data: Volume, Velocity and Variety. The first refers to the large size of stored data sets, the second to data in motion streaming from social networks or sensor-based smart systems for example while the third concerns the large variety in data types and formats. High-performance computing platforms such as clusters and clouds are often deployed to address these challenges. Enabling technology that includes parallel processing frameworks and platforms, as well as algorithms for the management of resources in the cloud/cluster, is crucial for performing data analytics in a timely manner. Focusing on such enabling technology this talk will address the various challenges and potential solutions in the context of cloud-based systems for supporting Big Data analytics and smart systems. Issues to be discussed include (a) Management of resources in the context of latency-sensitive data analytics applications such as deadline driven MapReduce jobs and mobile object tracking (video analytics) algorithms. (b) Scheduling techniques for supporting streaming data analytics. (c) Edge-computing based platforms for performing complex event processing in the context of sensor-based streaming applications such as remote patient monitoring. (d) A cloud-based middleware for the unification of geographically dispersed resources required in the management of smart systems such as sensor-based bridges and aerospace machinery.

Biography

Shikharesh Majumdar is a Full Professor and Director of the Real-Time and Distributed Systems Research Centre at the Department of Systems and Computer Engineering in Carleton University, Ottawa, Canada. He is a member of the board for Carleton University Institute for Data Science and of the faculty team associated with Carleton University's Canada-India Centre for Excellence. He holds a PhD (Computational Science) from University of Saskatchewan, Saskatoon, Canada. His research interests are in the areas of cloud computing, smart systems, high-performance data analytics platforms, operating systems and performance evaluation. He actively collaborates with the industrial sector and has performed his sabbatical research at Nortel and Cistech. He has been the area editor for the Simulation Modelling Practice and Theory journal published by Elsevier (2009-2017). He is a member of ACM, a senior member of IEEE and was a Distinguished Visitor for the IEEE Computer Society (1998-2001)..

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