Abstract
Big Data is emerging as one of the hottest multi-disciplinary research fields in recent years. Big data innovations are transforming science, engineering, medicine, healthcare, finance, business, and ultimately society itself. In this presentation, we examine the key properties of big data (volume, velocity, variety, veracity, and value) and their relation to some applications in science and engineering. To truly handle big data, new paradigm shifts (as advocated by the late Dr. Jim Gray) will be necessary. Successful applications in big data will require in situ methods to automatically extracting new knowledge from big data, without requiring the data to be centrally collected and maintained. Traditional theory on algorithmic complexity may no longer hold, since the scale of the data may be too large to be stored or accessed. To address the potential of big data in scientific discovery, challenges on data complexity, computational complexity, and system complexity will need to be solved. In particular, cloud computing will be a platform for supporting big data applications. We illustrate these challenges by drawing on examples in various applications in science and engineering.

Biography
Benjamin W. Wah is currently the Provost and Wei Lun Professor of Computer Science and Engineering of the Chinese University of Hong Kong. He also serves as the Chair of the
Research Grants Council of Hong Kong. Before then, he served as the Director of the Advanced Digital Sciences Center in Singapore, as well as the Franklin W. Woeltge Endowed Professor of Electrical and Computer Engineering and Professor of the Coordinated Science Laboratory of the University of Illinois, Urbana-Champaign, IL. He received his Ph.D. degree in computer science from the University of California, Berkeley, CA, in 1979. He has received a number of awards for his research contributions, which include the IEEE CS Technical Achievement Award (1998), the IEEE Millennium Medal (2000), the IEEE-CS W. Wallace-McDowell Award (2006), the Pan Wen-Yuan Outstanding Research Award (2006), the IEEE-CS Richard E. Merwin Award (2007), the IEEE-CS Tsutomu Kanai Award (2009), and the Distinguished Alumni Award in Computer Science of the University of California, Berkeley (2011). Wah’s current research interests are in the areas of big data applications and multimedia signal processing.

Wah cofounded the *IEEE Transactions on Knowledge and Data Engineering* in 1988 and served as its Editor-in-Chief between 1993 and 1996, and is the Honorary Editor-in-Chief of *Knowledge and Information Systems*. He currently serves on the editorial boards of *Information Sciences, International Journal on Artificial Intelligence Tools, Journal of VLSI Signal Processing*, and *World Wide Web*. He has served the IEEE Computer Society in various capacities, including Vice President for Publications (1998 and 1999) and President (2001). He is a Fellow of the AAAS, ACM, and IEEE.
Scalable Data Analytics for Big Data Applications on Cloud

Jinjun Chen
University of Technology Sydney (UTS), Australia

Abstract
Cloud Computing provides the opportunity for collecting, storing and processing a variety of data from disparate data sources such as flight booking, supermarket, cloth shops and etc, forming big data. Aggregate analysis of such data sources which were previously far away from each other can help to identify new niche market opportunities for modern business, which could in turn grow up as new strategic major market. At the same time, scalable solutions will help to enable “fast to market” requirement especially for analysing continuously increasing data collection. In this talk, we provide overall analysis for this requirement, challenges and a solution to address such challenges.

Short Bio
Dr Jinjun Chen is an Associate Professor from Faculty of Engineering and IT, University of Technology Sydney (UTS), Australia. He is the Director of Lab for Cloud Computing and Data Intensive Systems at UTS. He holds a PhD in Information Technology from Swinburne University of Technology, Australia. Dr Chen’s research interests include big data, data science, data intensive systems, scalability, cloud computing, software engineering and services, workflow management, privacy and security, and related various research topics. His research results have been published in more than 130 papers in international journals and conferences, including IEEE Transactions on Service Computing, ACM Transactions on Autonomous and Adaptive Systems, ACM Transactions on Software Engineering and Methodology (TOSEM), IEEE Transactions on Software Engineering (TSE), IEEE Transactions on Parallel and Distributed Systems (TPDS), IEEE Transactions on Cloud Computing, and IEEE Transactions on Computers (TC).
Opportunities and Challenges in Global Network Cameras

Prof. Yung-Hsiang Lu
Purdue University

Abstract

Millions of network cameras have been deployed. Many of these cameras provide publicly available data, continuously streaming live views of national parks, city halls, streets, highways, and shopping malls. A person may see multiple tourist attractions through these cameras, without leaving home. Researchers may observe the weather in different cities. Using the data, it is possible to observe natural disasters at a safe distance. News reporters may obtain instant views of an unfolding event. A spectator may watch a celebration parade from multiple locations using street cameras. Despite the many promising applications, the opportunities of using global network cameras for creating multimedia content have not fully exploited. The opportunities also bring forth many challenges. Managing the large amount of data would require fundamentally new thinking. The data from network cameras are unstructured and have few metadata describing the content. Searching the relevant content would be a challenge. Because network cameras continuously produce data, processing must be able to handle the streaming data. This imposes stringent requirements of the performance.

In this presentation, I will share the experience building a software system that aims to explore the opportunities using the data from global network cameras. CAM2 (Continuous Analysis of Many CAMeras) is cloud-based system for studying the worldwide phenomena using network cameras. CAM2 provides an event-based API (application programming interface) and is open to researchers to analyze the data for their studies. The web interface allows users to select the cameras for analysis. The cloud computing engine can scale in response to the needs of analysis programs.

Biography

Yung-Hsiang Lu is an associate professor in the School of Electrical and Computer Engineering and (by courtesy) the Department of Computer Science of Purdue University. He is an ACM
distinguished scientist (2013) and ACM distinguished speaker (2013–2016). His research areas include computer systems, mobile and cloud computing, and image processing. He is an organizing member of the IEEE Rebooting Computing Working Group. He obtained the Ph.D. from the Department of Electrical Engineering at Stanford University.
Big Graph Processing in Cloud

Prof. Xuemin Lin
UNSW

Abstract

Graphs are very important parts of Big Data and widely used for modeling complex structured data with a broad spectrum of applications such as bioinformatics, web search, social network, road network, etc. Over the last decade, tremendous research efforts have been devoted to many fundamental problems in managing and analyzing graph data. In this talk, I will present our recent research efforts in processing big graphs in Cloud, including system framework, and scalable processing theory and techniques.

Biography

Xuemin Lin is a UNSW Scientia Professor in the school of computer science and engineering at UNSW. Currently, he is the head of database group in the school. Xuemin’s research interests lie in databases, algorithms, and complexities. Specifically, he is working in the areas of graph data, spatial-temporal data, streaming data, uncertain data, text data, etc. Xuemin was an associate editor of ACM TODS (2008-2014) and IEEE TKDE (Feb 2013- Jan 2015), respectively. Currently, he is associate editor-in-Chief of TKDE (2013-) and associate editor of WWW Journal.