

# **Next Generation of Transportation Systems, Distributed Computing, and Data Mining**

**Speaker:**

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## **Abstract**

This tutorial will present an overview of how data intensive networked transportation systems work and the emerging role of decision support systems in this domain. The subject matter of this tutorial will be based on the existing academic work in this area and the speaker's experience in building a commercially successful system in this area. The tutorial will particularly focus on commercial vehicle telematic systems that operate in the mobile resource management vertical. These systems are distributed and comprised of complex network of mobile and static heterogeneous computing nodes. These environments are also often data rich with information generated by sensors like GPS devices, vehicle performance data bus (e.g. onboard diagnostic data--OBD-II/J1708), and RFID sensors tracking equipments, just to name a few. Decision support systems in such environments require paying close attention to the distributed nature of the data and computing sources. Since many of the nodes in such environments are usually connected over limited bandwidth wireless networks, conventional centralized data management and mining applications for decision support do not work well. This tutorial will explain how lessons from distributed systems and algorithms can be used to build commercial-grade distributed data mining systems for the next generation of transportation applications. The presentation will offer the algorithmic foundation and a case study using the MineFleet® vehicle performance data mining system developed by Agnik. The tutorial will also identify several new avenues for research and in-vehicle distributed applications that require advanced decision support.

## **About the Speaker**

Hillol Kargupta is a Professor in the Department of Computer Science and Electrical Engineering, University of Maryland, Baltimore County. He received the PhD degree in computer science from the University of Illinois at Urbana-Champaign in 1996. He is also a co-founder of Agnik LLC, a data analytics company for distributed, mobile, and embedded environments. His research interests include distributed and ubiquitous data mining, privacy issues in mining, data stream mining for resource-constrained devices, and peer-to-peer data mining. He is also interested in information, communication, and social interaction.

Dr. Kargupta won a US National Science Foundation CAREER award in 2001 for his research on ubiquitous and distributed data mining. He along with his coauthors received the best paper award at the 2003 IEEE International Conference on Data Mining for a paper on privacy-preserving data mining. He won the 2000 TRW Foundation Award and the 1997 Los

Alamos Award for Outstanding Technical Achievement. His research has been funded by the US National Science Foundation, US Air Force, Department of Homeland Security, NASA, and various other organizations. He has published more than 80 peer-reviewed articles in journals, conferences, and books. He has co-edited two books: *Advances in Distributed and Parallel Knowledge Discovery*, AAAI/MIT Press, and *Data Mining: Next Generation Challenges and Future Directions*, AAAI/MIT Press. He is an associate editor of the *IEEE Transactions on Knowledge and Data Engineering*, *IEEE Transactions on Systems, Man, and Cybernetics, Part B* and *Statistical Analysis and Data Mining Journal*. He was the program-co-chair of the 2005 SIAM Data Mining Conference, Program vice-chair of 2005 PKDD Conference, Program vice-chair of 2005 IEEE International Data Mining Conference, Program Vice Chair for 2005 Euro-PAR Conference, Associate General Chair of the 2003 ACM SIGKDD Conference, and chair of the 2002 NSF Next Generation Data Mining Workshop among others. He regularly serves in the organizing and program committee of many data mining conferences. More information about him can be found at <http://www.cs.umbc.edu/~hillol>.