Tutorial 2: Mobile and Wireless Database Access for Pervasive Computing

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We are in the midst of a wireless and mobile revolution. In the near future, a typical computing environment — business, personal, scientific or educational — will provide wireless network connectivity between powerful data servers and mobile, sometimes disconnected, computers and devices. This has created exciting opportunities for developing a wide range of innovative database applications and systems. However, an open question remains: What kind of system will be capable of offering scalable data services and exhibit scalable performance? Besides advances in communications and hardware, does achieving pervasive mobile computing require innovative theories and paradigms in data management or new data engineering techniques?

The objective of this tutorial is to provide an answer to the above questions by presenting the current state-of-the-research and contrasting it with the state-of-the-practice. Towards this, it will provide an overview of the commercial-state-of-the-art for supporting mobile database access and present a summary of the significant research advances in theories and techniques for mobile and wireless data access. It will also discuss some future directions in the context of pervasive and invisible computing applications.

Tentative Outline

- Motivating application(s)
- Overview of enabling technologies
- Location tracking and moving objects
- Mobile access to data servers (db serves, data warehouses, Web servers)
- Software architectures (multi-tier architectures, mobile agents, adaptability)
- Data consistency, data caching, replication and views
- Query processing and data dissemination by broadcast
- Transactions, recovery and mobility
- Triggers and event handling
- Standards: Wireless Application Protocol (WAP), W3C Mobile Access Activity
- Research systems: Coda, Bayou, Odyssey, Rover, Pro-motion, Rome
- Products: Oracle, SQL Anywhere, UDB2, Odysseysoftware, PalmPilot data products.

Bio

Evaggelia Pitoura received her BSc from the Department of Computer Science and Engineering of the University of Patras, Greece in 1990 and her MSc and Ph.D. in Computer Science from Purdue University in 1993 and 1995 respectively. Since September 1995, she has been on the faculty of the Department of Computer Science of the University of Ioannina, Greece. Her main research interests are data management for mobile computing and multidatabases. Her publications include several journal and conference articles and a recently published book on mobile computing. She received the best paper award in the IEEE ICDE 1999 for her work on mobile agents. Evaggelia Pitoura has served on a number of program committees and was program co-chair of the MobiDE workshop held in conjunction with MobiCom'99.

Panos K. Chrysanthis is currently an Associate Professor of Computer Science at the University of Pittsburgh and a Visiting Professor at Carnegie Mellon University. He received his B.S. from the University of Athens, Greece, in 1982 and his M.S. and Ph.D. from the University of Massachusetts at Amherst, in 1986 and 1991 respectively. His current research focus is on network-centric data management that includes mobile and disconnected database operations, scalability and consistency in wide-area networked data servers and intelligent workflow management systems. In 1995, he was a recipient of the U.S. National Science Foundation CAREER Award for his investigation on the management of data for mobile and wireless computing. Besides journal and conference articles, his publications include a book and book chapters on advances in transaction processing and on consistency in distributed databases and multidatabases. He has served as a guest editor for a number of journals and on program committees of several Database and Distributed Computing Conferences. In 1999, he was the program co-chair for two workshops on databases and mobility, the ACM MobiDE and the DEXA MDDS'99.