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Intelligent information processing in Mobile Data Access Environment

The conventional notion of timely and reliable access to global information sources is rapidly changing. Users have become much more demanding in that they desire and sometimes even require access to information “anytime, anywhere.” The extensive diversity in the range of information that is accessible to a user at any given time is also growing at a rapid rate. Furthermore, rapidly expanding technology is making available a wide breadth of devices with different memory, storage, network, power, and display requirements to access this diverse data set.

Classical distributed database systems monolithically offer distribution transparency and higher performance. However, with the advances in technologies this monolithic approach is insufficient. In the new computational environment data distribution issue has been evolved to the data integration from heterogeneous data sources. Multidatabases are designed to deal with the data integration issue. They are designed to allow timely and reliable access to large amount of heterogeneous and autonomous data sources in an environment that is characterized as “sometime, somewhere.” However, the concept of *mobility*, where a user accesses data through a remote connection with a portable device, has introduced additional complexities and restrictions in a multidatabase system. These include:

- A reduced capacity network connection,
- Processing and resource restrictions, and
- Effectively locating and accessing information from a multitude of sources.

An extended multidatabase system (MDBS) that facilitates “anytime, anywhere” access to the information is called a mobile data access system (MDAS). Within the scope of MDAS, we distinguish three classes of services:

- Broadcast based services,
- On-demand based services, and
- Pervasive based services.

This talk, within the scope of information processing, highlights research challenges in MDAS and discusses potential solutions to these challenges. Finally, it will focus on the application of software agents as a means to satisfy On-demand based services.

Short Bio: **A.R. Hurson** is a professor of Computer Science and Engineering Faculty at The Pennsylvania State University. His research for the past 26 years has been directed toward the design and analysis of general as well as special purpose computer architectures. His research has been supported by NSF, NCR Corp., DARPA, IBM, Lockheed Martin, ONR, Ben Franklin foundation, and Penn State University. He has published over 260 technical papers in areas including database systems, multidatabases, global information sharing, application of mobile agent technology, object oriented databases, Mobile databases, mobile computing, computer architecture parallel and distributed processing. Dr. Hurson served as the Guest Co-Editor of special issues of the *IEEE Proceedings on Supercomputing Technology*, the *Journal of Parallel and Distributed Computing on Load Balancing and Scheduling*, the *journal of integrated computer-aided engineering on multidatabase and interoperable systems*, *IEEE Transactions on Computers on Parallel Architectures and Compilation Techniques*, *Journal of Multimedia Tools and Applications*, and *Journal of Pervasive and Mobile Computing*. He is the co-author of the *IEEE Tutorials on Parallel Architectures for Database Systems*, *Multidatabase systems: An advanced solution for global information sharing*, *Parallel architectures for data/knowledge base*

systems, and Scheduling and Load Balancing in Parallel and Distributed Systems. He is also the guest Editor of advances in computers for Parallel, Distributed, and Pervasive Computing.

Professor Hurson has been active in various IEEE/ACM Conferences and has given tutorials for various conferences on global information sharing, dataflow processing, database management systems, supercomputer technology, data/knowledge-based systems, scheduling and load balancing, and parallel computing. He served as a member of the IEEE Computer Society Press Editorial Board, an IEEE Distinguished speaker, and editor of IEEE transactions on computers. Currently, he is serving as an ACM lecturer, editor of Journal of Pervasive and Mobile Computing, and editor of The CSI Journal of Computer Science and Engineering. Hurson can be reached at hurson@cse.psu.edu.