Preface

These proceedings represent the second International Database Engineering and Applications Symposium (IDEAS '98) held at Cardiff University, Cardiff, UK. This volume contains 28 papers, selected from 6.5 submissions. In addition, the 5 short papers provide summaries of poster presentations.

Temporal issues are addressed in the first four papers. In “Stratum Approaches to Temporal DBMS Implementation,” Torp, Jensen and Snodgrass explore approaches to implement a temporal DBMS as a layer on top of an existing non-temporal DBMS; in this way it reuses much of the functionality of the underlying DBMS. Tryfona and Hadzilacos define, in “Logical Data Modeling of Spatio Temporal Information Systems: Definitions and a Model,” the ontologies of spatiotemporal information systems. They extend the basic concepts of objects, attributes and relationships with spatial and temporal aspects including the operations on them. They also propose logical modeling tools based on their specifications. In “Dealing with Version Pertinence to Design an Efficient Schema Evolution Framework,” Benatallah and Tari address the design of a framework for schema evolution that allows efficient management of object versions. Their approach is based on schema modifications and versioning. Schwarz, Türker and Saake analyze a set of orthogonal transaction dependencies in “Transitive Dependencies in Transaction Closures.”

The session on the emerging domain of Data Mining includes three timely presentations. In “Scalable Mining for Classification Rules in Relational Database,” Wang, Iyer and Vitter propose an algorithm for classification which eliminates the in-memory structure of size O(n) and reduces I-O cost with an insignificant increase in CPU cost. In “Mining Association Rules with Weighted Items,” Cai, Fu, Cheng and Kwong generalize the weighting rules to items in a database basket and introduce algorithms to address the problems. Albrecht and Lehner focus on performance issues of on-line analytical processing and propose an architectural framework for a distributed OLAP in their paper, “On-Line Analytical Processing in Distributed Data Warehouses.”

The challenges of using the World Wide Web continue to attract database researchers and practitioners. In “Query Translation for Distributed Information Gathering on the Web,” Chidlovskii and Borghoff tackle the heterogeneity of information on the Web and the impact of this non-uniformity to the task of processing user queries. Montebello, Gray and Hurley, in “Evolvable Intelligent User Interface for WWW Knowledge-Based Systems” are involved in perfecting techniques and tools to reduce users information overload while improving the effectiveness of on-line access. Access to documents over a network and the control of their version occupies the attention of Noronha, Golendziner and Santos in “Extending a Structured Document Model with Version Control.”

The section on advanced database applications deals with mobile computing, multimedia digital libraries, data compression and retrieval algorithms. In “A Transaction Model for Mobile Computing,” Madria and Bhargava investigate ‘pre-write’ before a ‘write’ to improve data availability during frequent disconnections which are the norm in mobile computing. An algorithm to manage, index and serve multi-media content of a digital library is discussed in “The Design and Implementation of an Infrastructure for Multimedia Digital Libraries” by de Vries, Eberman and Kovalcin. Cockshott, McGregor, Kotsis and Wilson address, in “Data Compression in Database Systems,” the question of improving the efficiency of storage and processing operations in DBMS by using information-theoretically-derived compact representations. Another approach, based on conceptual graphs, is presented in “A Promising Retrieval Algorithm for Systems Based on the Conceptual Graphs Formalism” by Ounis and Pasca.

Performance issues and support for derived classes are topics of the session on object database systems. Holtman, van der Stok and Willers examine the issues of clustering and its performance for very large databases in “Automatic Reclustering of Objects in Very Large Databases for High Energy Physics.” Clustering also forms the topic of the paper “VERSANT Architecture: Supporting High-Performance Object Databases” by Wietrzyk and Orgun. The definition of derived classes and the issues of their integration and modifications with existing and new classes form the subject of the paper “Definition of Derived Classes in OODBs” by Samos, Saltor and Sistac.
Taniar and Rahayu, re-examine their algorithm for collection equi-join and introduce a new algorithm for parallel sort-hash in “Parallel Collection-Equi Join Algorithms for Object-Oriented Databases.”

The section on the related areas of modeling and CASE tools reflects a wide range of current concerns. The first two papers provide contrasting bottom-up and top-down approaches to database engineering. Modeling based on triplets, each consisting of an elements name, identifier and data values and/or elements, is proposed in “A Flexible Kernel Data Model for Bottom-Up Databases and Management of Relationships” by Hochin, Nakata and Tsuji. In contrast, Orlandic, in “Foundations of a Methodology of DBMS Decoupling for Evolutionary Component DBMS Design,” lays out the foundations of a methodology of DBMS decoupling. The other two papers respectively address CASE tools engineering, and distribution of deductive databases. Gray and Ryan examine a new approach to the construction of platform independent CASE tools in “Technologies and Techniques for Rapid CASE Tool Development.” A horizontal fragmentation method based on minimal-model forest is the topic of the paper “A Model-Forest Based Horizontal Fragmentation Approach for Disjunctive Deductive Databases” by Seetharaman and Ng.

The two papers in the schema semantics section address the inverse problems of discovering the semantics of existing schemas, and designing new schemas to represent specific semantics. In “Semi-Automatic, Semantic Discovery of Properties from Database Schemes,” Palopoli, Sacè and Ursino describes a method for deducing schema semantic using a tool for discovering possible synonyms, homonyms and inclusions. In “Implementation of Object-Oriented Association Relationships in Relational Databases,” Rahayu, Chang and Dillon present a practical solution for the implementation of different types of object-oriented associations via relational tables.

The workflow and CSCW section is made up of four papers. In their paper “Temporal Database Support for Cooperative Creative Work,” Eaglestone, Desai, Holton and Gulatee present a data modeling approach to computer support of cooperative work using a historical data model. In “Realization of Computer Supported Cooperative Work Environments Using the Object Deputy Model,” Peng and Kambayashi extend the object deputy model to allow CSCW to have any number of environments. Tagg and Lelatanavit propose, in their paper “Using an Active DBMS to Implement a Workflow Engine,” a lightweight server to provide an economical Web based inter-organizational workflow. In “The Integration of Product Data and Workflow Management Systems in a Large Scale Engineering Database Application,” McClatchey et al investigates the integration of product data management with workflow management to support data related to a product over its life-span from design through to production.

The final section contains a collection of short papers. These summarize the poster presentations. The papers in this section describe practical uses of database technologies for a range of new and demanding applications. In “WWW in DSM: Collaborative Caching on the Web,” Saravanan, Peters and Barker present a model that applies WWW to the problem of distributed systems management and provides, in this way, distributed shared memory across a network linked by browsers and servers. Kamp et al present their approach to integrate spatio-temporal aspects in the persistent object system SHORE. Mao and Bell take up the challenge of content-based retrieval of large collections of images from the World Wide Web in “Interactive Query for Image Contents by Semantic Descriptors and Multi-Agent.” Interface changes for investigative systems used in criminal and military intelligence applications are the focus of the paper “Storage Sub-Systems to Support Large Functional Databases” by Maller and Sheldrake. In the last paper in this series, Faulconbridge delves on “The Implementation of DESCRIBE,” a design system that allows design engineers to re-use or adapt old designs.

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