

Guest Editorial

This special issue on “Advances in Querying Non-Conventional Data Sources” of the Journal of Digital Information Management is focused on highlighting latest research results and novel challenges on the issue of querying non-conventional data sources beyond relational databases.

Non-conventional data sources arise in many fields: Web/XML data in massive Web repositories (e.g., B2B and B2C e-commerce systems), RDF data in ontological databases, text data in digital libraries, peer-to-peer data in innovative scenarios drawn from Web and Grid service-based architectures, data streams and RFID data in emerging sensor network applications, DW/OLAP data in very-large data warehouses, spatial data in advanced GIS applications, temporal data in sequence and genomic databases, spatio-temporal data in mobile computing applications, log-data in data and process mining tools, scientific data in e-science applications, biological data in bio-banks etc. In these contexts, traditional DBMS query technologies are inadequate, so that novel models, algorithms and paradigms are necessary in order to efficiently support query answering against non-conventional data sources. Despite some recent advancements, various aspects need to be further investigated, among which: formal foundations, advanced query models and techniques, design of innovative query algorithms, query optimization models and techniques, query translation solutions, query re-writing schemes, view-based query answering, design and implementation of advanced query operators/predicates, indexing strategies for efficient query answering, imprecise/incomplete query answering, complex query result visualization techniques, multiple query result fusion techniques, security/privacy-preserving issues in query answering etc.

This special issue contains three papers, which have gone through two rigorous review rounds before being accepted for the final inclusion.

The first paper, titled “Storage and Indexing of Relational OLAP Views with Mixed Categorical and Continuous Dimensions”, by Oliver Baltzer, Andrew Rau-Chaplin and Norbert Zeh, proposes a technique for representing and indexing relational OLAP views with mixed categorical and continuous data. Specifically, the proposed method builds on top of an established mechanism for standard OLAP and exploits characteristic properties of space-filling curves, thus allowing mixed categorical and continuous data to be represented and indexed effectively. In addition to this, the proposed method is also capable of dynamically adapting to changes in dimension cardinality during updates. In order to demonstrate the validity of their proposed method, authors experimentally probe build, update, and query times of storage and indexing methods against both synthetic and real datasets, and analytically demonstrate that their approach offers significant performance advantages, especially for view updates.

The second paper, titled “Anomaly Detection Through Quasi-Functional Dependency Analysis”, by Giulia Bruno, Paolo Garza, Elisa Quintarelli and Rosalba Rossato, focuses on the issue of anomaly detection in databases, which is indeed relevant for several application domains ranging from machine learning to knowledge discovery and logic programming. Specifically, the proposed method founds on data mining algorithms, and allows the “normal behavior” of objects to be inferred via extracting frequent “rules” from a given dataset. These rules are described in the form of *quasi-functional dependencies*, and mined from the dataset by using association rules. Authors also show that their approach is capable of consequently analyzing anomalies with respect to the previously-inferred dependencies, thus discovering anomalies of a given quasi-functional dependency via querying either the original database or the previously-stored association rules. This allows the presence of erroneous data to be derived, or, similarly, novel information, modeled in terms of significant exceptions to frequent rules, to be highlighted. Finally, authors validate the applicability of the proposed approach through a set of experiments on several XML databases.

In the third paper, titled “Querying Unstructured and Structured Peer-to-Peer Networks: Models, Issues, Algorithms”, by Alfredo Cuzzocrea, author starts from traditional functionalities of first-generation P2P systems, such as information sharing primitives and lookup mechanisms of data objects located on peers, and puts in evidence their unsuitability to the requirements of modern P2P systems, which, contrarily to the former, strictly demand for more complex query functionalities beyond capabilities of DBMS-inspired models and algorithms. Then, author proposes a survey on models, issues and algorithms for querying unstructured and structured P2P systems, by also highlighting similarities and differences of state-of-the-art proposals appearing in literature, with critical discussion, and providing a rigorous taxonomy of P2P query strategies. Finally, author completes his analytical contribution with a discussion concerning future directions in this research field.

The editor would like to thank very much the editors-in-chief of the Journal of Digital Information Management, Pit Pichappan and Daisy Jacobs, for accepting his proposal of a special issue focused on advances in querying non-conventional data sources, and for assisting him whenever required, with particular emphasis on Pit Pichappan. The editor would also like to thank all the reviewers who worked within a very tight schedule and whose detailed and constructive feedback to the authors contributed to substantial improvement in the quality of the final papers. The complete International Program Committee of this special issue is listed next. Last but not least, the editor is grateful to the authors who submitted papers to this special issue. The editor truly appreciates their patience and understanding throughout the review process.

International Program Committee of the Special Issue on “Advances in Querying Non-Conventional Data Sources” of the Journal of Digital Information Management

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Guest Editor Biography



Alfredo Cuzzocrea received the Laurea Degree in Computer Science Engineering on April 2001 and the PhD Degree in Computer Science and Systems Engineering on February 2005, both from the University of Calabria. Presently, he is a Researcher at the Institute of High Performance Computing and Networking of the Italian National Research Council, and Contract Professor at the Department of Electronics, Computer Science and Systems of the University of Calabria, where he is a member of the Database Research Group. His research interests include multidimensional data modeling and querying, data stream modeling and querying, data warehousing and OLAP, XML data management, Web information systems modeling and engineering, knowledge representation and management models and techniques, Grid and P2P computing. He is author or co-author of more than 60 papers in referred international conferences (including SSDBM, DEXA, DaWaK, DOLAP, IDEAS, SEKE, WISE, FQAS, SAC) and journals (including JIIS, DKE,

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