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Relational and XML Data Exchange

Relational And Xml Data Exchange Pablo Barcelo

**Marina Barsky,Alex Thomo,Ulrike
Stege**



Relational And Xml Data Exchange Pablo Barcelo:

Relational and XML Data Exchange Marcelo Arenas, Pablo Barcelo, Leonid Libkin, Filip Murlak, 2010-04-04 Data exchange is the problem of finding an instance of a target schema given an instance of a source schema and a specification of the relationship between the source and the target Such a target instance should correctly represent information from the source instance under the constraints imposed by the target schema and it should allow one to evaluate queries on the target instance in a way that is semantically consistent with the source data Data exchange is an old problem that re emerged as an active research topic recently due to the increased need for exchange of data in various formats often in e business applications In this lecture we give an overview of the basic concepts of data exchange in both relational and XML contexts We give examples of data exchange problems and we introduce the main tasks that need to be addressed We then discuss relational data exchange concentrating on issues such as relational schema mappings materializing target instances including canonical solutions and cores query answering and query rewriting After that we discuss metadata management i e handling schema mappings themselves We pay particular attention to operations on schema mappings such as composition and inverse Finally we describe both data exchange and metadata management in the context of XML We use mappings based on transforming tree patterns and we show that they lead to a host of new problems that did not arise in the relational case but they need to be addressed for XML These include consistency issues for mappings and schemas as well as imposing tighter restrictions on mappings and queries to achieve tractable query answering in data exchange

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Overview Relational Mappings and Data Exchange Metadata Management XML Mappings and Data Exchange

Foundations of Query Answering in Relational Data Exchange André Hernich, 2010 Relational data exchange is the problem of translating relational data according to a given specification It is one of the many tasks that arise in information integration A fundamental issue is how to answer queries that are posed against the result of the data exchange so that the answers are semantically consistent with the source data For monotonic queries the certain answers semantics by Fagin Kolaitis Miller and Popa 2003 yields good answers For many non monotonic queries however this semantics was shown to yield counter intuitive answers This dissertation deals with the problem of computing the certain answers to monotonic queries on the one hand On the other hand it presents and compares semantics for answering non monotonic queries and investigates how hard it is to evaluate non monotonic queries under these semantics

Foundations of Data Exchange Marcelo Arenas, Pablo Barceló, Leonid Libkin, Filip Murlak, 2014-03-06 The problem of exchanging data between different databases with different schemas is an area of immense importance Consequently data exchange has been one of the most active research topics in databases over the past decade Foundational questions related to data exchange largely revolve around three key problems how to build target solutions how to answer queries over target solutions and how to manipulate schema mappings themselves The last question is also known under the name metadata management since mappings

represent metadata rather than data in the database In this book the authors summarize the key developments of a decade of research Part I introduces the problem of data exchange via examples both relational and XML Part II deals with exchanging relational data Part III focuses on exchanging XML data and Part IV covers metadata management *Data Exploration*

Using Example-Based Methods Matteo Lissandrini, Davide Mottin, Themis Palpanas, Yannis Velegrakis, 2022-06-01 Data usually comes in a plethora of formats and dimensions rendering the exploration and information extraction processes challenging Thus being able to perform exploratory analyses in the data with the intent of having an immediate glimpse on some of the data properties is becoming crucial Exploratory analyses should be simple enough to avoid complicate declarative languages such as SQL and mechanisms and at the same time retain the flexibility and expressiveness of such languages Recently we have witnessed a rediscovery of the so called example based methods in which the user or the analyst circumvents query languages by using examples as input An example is a representative of the intended results or in other words an item from the result set Example based methods exploit inherent characteristics of the data to infer the results that the user has in mind but may not be able to easily express They can be useful in cases where a user is looking for information in an unfamiliar dataset when the task is particularly challenging like finding duplicate items or simply when they are exploring the data In this book we present an excursus over the main methods for exploratory analysis with a particular focus on example based methods We show how that different data types require different techniques and present algorithms that are specifically designed for relational textual and graph data The book presents also the challenges and the new frontiers of machine learning in online settings which recently attracted the attention of the database community The lecture concludes with a vision for further research and applications in this area **Non-Volatile Memory Database Management Systems**

Joy Arulraj, Andrew Pavlo, 2022-06-01 This book explores the implications of non volatile memory NVM for database management systems DBMSs The advent of NVM will fundamentally change the dichotomy between volatile memory and durable storage in DBMSs These new NVM devices are almost as fast as volatile memory but all writes to them are persistent even after power loss Existing DBMSs are unable to take full advantage of this technology because their internal architectures are predicated on the assumption that memory is volatile With NVM many of the components of legacy DBMSs are unnecessary and will degrade the performance of data intensive applications We present the design and implementation of DBMS architectures that are explicitly tailored for NVM The book focuses on three aspects of a DBMS 1 logging and recovery 2 storage and buffer management and 3 indexing First we present a logging and recovery protocol that enables the DBMS to support near instantaneous recovery Second we propose a storage engine architecture and buffer management policy that leverages the durability and byte addressability properties of NVM to reduce data duplication and data migration Third the book presents the design of a range index tailored for NVM that is latch free yet simple to implement All together the work described in this book illustrates that rethinking the fundamental algorithms and data structures employed in a

DBMS for NVM improves performance and availability reduces operational cost and simplifies software development

Generating Plans from Proofs Michael Benedikt, Julien Leblay, Balder ten Cate, Efthymia Tsamoura, 2022-06-01 Query reformulation refers to a process of translating a source query a request for information in some high level logic based language into a target plan that abides by certain interface restrictions Many practical problems in data management can be seen as instances of the reformulation problem For example the problem of translating an SQL query written over a set of base tables into another query written over a set of views the problem of implementing a query via translating to a program calling a set of database APIs the problem of implementing a query using a collection of web services In this book we approach query reformulation in a very general setting that encompasses all the problems above by relating it to a line of research within mathematical logic For many decades logicians have looked at the problem of converting implicit definitions into explicit definitions using an approach known as interpolation We will review the theory of interpolation and explain its close connection with query reformulation We will give a detailed look at how the interpolation based approach is used to generate translations between logic based queries over different vocabularies and also how it can be used to go from logic based queries to programs

Scalable Processing of Spatial-Keyword Queries Ahmed R. Mahmood, Walid G.

Aref, 2022-05-31 Text data that is associated with location data has become ubiquitous A tweet is an example of this type of data where the text in a tweet is associated with the location where the tweet has been issued We use the term spatial keyword data to refer to this type of data Spatial keyword data is being generated at massive scale Almost all online transactions have an associated spatial trace The spatial trace is derived from GPS coordinates IP addresses or cell phone tower locations Hundreds of millions or even billions of spatial keyword objects are being generated daily Spatial keyword data has numerous applications that require efficient processing and management of massive amounts of spatial keyword data This book starts by overviewing some important applications of spatial keyword data and demonstrates the scale at which spatial keyword data is being generated Then it formalizes and classifies the various types of queries that execute over spatial keyword data Next it discusses important and desirable properties of spatial keyword query languages that are needed to express queries over spatial keyword data As will be illustrated existing spatial keyword query languages vary in the types of spatial keyword queries that they can support There are many systems that process spatial keyword queries Systems differ from each other in various aspects e g whether the system is batch oriented or stream based and whether the system is centralized or distributed Moreover spatial keyword systems vary in the types of queries that they support Finally systems vary in the types of indexing techniques that they adopt This book provides an overview of the main spatial keyword data management systems SKDMSs and classifies them according to their features Moreover the book describes the main approaches adopted when indexing spatial keyword data in the centralized and distributed settings Several case studies of SKDMSs are presented along with the applications and query types that these SKDMSs are targeted for and the indexing

techniques they utilize for processing their queries Optimizing the performance and the query processing of SKDMSs still has many research challenges and open problems The book concludes with a discussion about several important and open research problems in the domain of scalable spatial keyword processing

Full-Text (Substring) Indexes in External Memory Marina Barsky,Alex Thomo,Ulrike Stege,2022-05-31 Nowadays textual databases are among the most rapidly growing collections of data Some of these collections contain a new type of data that differs from classical numerical or textual data These are long sequences of symbols not divided into well separated small tokens words The most prominent among such collections are databases of biological sequences which are experiencing today an unprecedented growth rate Starting in 2008 the 1000 Genomes Project has been launched with the ultimate goal of collecting sequences of additional 1 500 Human genomes 500 each of European African and East Asian origin This will produce an extensive catalog of Human genetic variations The size of just the raw sequences in this catalog would be about 5 terabytes Querying strings without well separated tokens poses a different set of challenges typically addressed by building full text indexes which provide effective structures to index all the substrings of the given strings Since full text indexes occupy more space than the raw data it is often necessary to use disk space for their construction However until recently the construction of full text indexes in secondary storage was considered impractical due to excessive I O costs Despite this algorithms developed in the last decade demonstrated that efficient external construction of full text indexes is indeed possible This book is about large scale construction and usage of full text indexes We focus mainly on suffix trees and show efficient algorithms that can convert suffix trees to other kinds of full text indexes and vice versa There are four parts in this book They are a mix of string searching theory with the reality of external memory constraints The first part introduces general concepts of full text indexes and shows the relationships between them The second part presents the first series of external memory construction algorithms that can handle the construction of full text indexes for moderately large strings in the order of few gigabytes The third part presents algorithms that scale for very large strings The final part examines queries that can be facilitated by disk resident full text indexes Table of Contents Structures for Indexing Substrings External Construction of Suffix Trees Scaling Up When the Input Exceeds the Main Memory Queries for Disk based Indexes Conclusions and Open Problems

Answering Queries Using Views, Second Edition Foto Afrati,Rada Chirkova,2022-05-31 The topic of using views to answer queries has been popular for a few decades now as it cuts across domains such as query optimization information integration data warehousing website design and recently database as a service and data placement in cloud systems This book assembles foundational work on answering queries using views in a self contained manner with an effort to choose material that constitutes the backbone of the research It presents efficient algorithms and covers the following problems query containment rewriting queries using views in various logical languages equivalent rewritings and maximally contained rewritings and computing certain answers in the data integration and data exchange settings Query languages that are

considered are fragments of SQL in particular select project join queries also called conjunctive queries with or without arithmetic comparisons or negation and aggregate SQL queries This second edition includes two new chapters that refer to tree like data and respective query languages Chapter 8 presents the data model for XML documents and the XPath query language and Chapter 9 provides a theoretical presentation of tree like data model and query language where the tuples of a relation share a tree structured schema for that relation and the query language is a dialect of SQL with evaluation techniques appropriately modified to fit the richer schema

The Four Generations of Entity Resolution George Papadakis, Ekaterini Ioannou, Emanouil Thanos, Themis Palpanas, 2022-06-01 Entity Resolution ER lies at the core of data integration and cleaning and thus a bulk of the research examines ways for improving its effectiveness and time efficiency The initial ER methods primarily target Veracity in the context of structured relational data that are described by a schema of well known quality and meaning To achieve high effectiveness they leverage schema expert and or external knowledge Part of these methods are extended to address Volume processing large datasets through multi core or massive parallelization approaches such as the MapReduce paradigm However these early schema based approaches are inapplicable to Web Data which abound in voluminous noisy semi structured and highly heterogeneous information To address the additional challenge of Variety recent works on ER adopt a novel loosely schema aware functionality that emphasizes scalability and robustness to noise Another line of present research focuses on the additional challenge of Velocity aiming to process data collections of a continuously increasing volume The latest works though take advantage of the significant breakthroughs in Deep Learning and Crowdsourcing incorporating external knowledge to enhance the existing works to a significant extent This synthesis lecture organizes ER methods into four generations based on the challenges posed by these four Vs For each generation we outline the corresponding ER workflow discuss the state of the art methods per workflow step and present current research directions The discussion of these methods takes into account a historical perspective explaining the evolution of the methods over time along with their similarities and differences The lecture also discusses the available ER tools and benchmark datasets that allow expert as well as novice users to make use of the available solutions

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1. What is matter? Matter is everything around us. Matter is anything that has mass and takes up space. What ...
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 Write the other sentences in order below ... Writing Worksheet For Headway Plus Pre-Intermediate ... Oxford University
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