

Avigdor Gal

Uncertain Schema Matching

Uncertain Schema Matching Avigdor Gal

**Daniel C. M. de Oliveira, Ji Liu, Esther
Pacitti**



Uncertain Schema Matching Avigdor Gal:

Uncertain Schema Matching Avigdor Gal,2011-03-01 Schema matching is the task of providing correspondences between concepts describing the meaning of data in various heterogeneous distributed data sources Schema matching is one of the basic operations required by the process of data and schema integration and thus has a great effect on its outcomes whether these involve targeted content delivery view integration database integration query rewriting over heterogeneous sources duplicate data elimination or automatic streamlining of workflow activities that involve heterogeneous data sources Although schema matching research has been ongoing for over 25 years more recently a realization has emerged that schema matchers are inherently uncertain Since 2003 work on the uncertainty in schema matching has picked up along with research on uncertainty in other areas of data management This lecture presents various aspects of uncertainty in schema matching within a single unified framework We introduce basic formulations of uncertainty and provide several alternative representations of schema matching uncertainty Then we cover two common methods that have been proposed to deal with uncertainty in schema matching namely ensembles and top K matchings and analyze them in this context We conclude with a set of real world applications Table of Contents Introduction Models of Uncertainty Modeling Uncertain Schema Matching Schema Matcher Ensembles Top K Schema Matchings Applications Conclusions and Future Work **Uncertain Schema**

Matching Avigdor Gal,2022-05-31 Schema matching is the task of providing correspondences between concepts describing the meaning of data in various heterogeneous distributed data sources Schema matching is one of the basic operations required by the process of data and schema integration and thus has a great effect on its outcomes whether these involve targeted content delivery view integration database integration query rewriting over heterogeneous sources duplicate data elimination or automatic streamlining of workflow activities that involve heterogeneous data sources Although schema matching research has been ongoing for over 25 years more recently a realization has emerged that schema matchers are inherently uncertain Since 2003 work on the uncertainty in schema matching has picked up along with research on uncertainty in other areas of data management This lecture presents various aspects of uncertainty in schema matching within a single unified framework We introduce basic formulations of uncertainty and provide several alternative representations of schema matching uncertainty Then we cover two common methods that have been proposed to deal with uncertainty in schema matching namely ensembles and top K matchings and analyze them in this context We conclude with a set of real world applications Table of Contents Introduction Models of Uncertainty Modeling Uncertain Schema Matching Schema Matcher Ensembles Top K Schema Matchings Applications Conclusions and Future Work Query Processing over Uncertain Databases Lei Chen,Xiang Lian,2022-05-31 Due to measurement errors transmission lost or injected noise for privacy protection uncertainty exists in the data of many real applications However query processing techniques for deterministic data cannot be directly applied to uncertain data because they do not have mechanisms to handle data

uncertainty Therefore efficient and effective manipulation of uncertain data is a practical yet challenging research topic In this book we start from the data models for imprecise and uncertain data move on to defining different semantics for queries on uncertain data and finally discuss the advanced query processing techniques for various probabilistic queries in uncertain databases The book serves as a comprehensive guideline for query processing over uncertain databases Table of Contents Introduction Uncertain Data Models Spatial Query Semantics over Uncertain Data Models Spatial Query Processing over Uncertain Databases Conclusion

Business Processes Tova Milo, Daniel Deutsch, 2022-06-01 While classic data management focuses on the data itself research on Business Processes also considers the context in which this data is generated and manipulated namely the processes users and goals that this data serves This provides the analysts a better perspective of the organizational needs centered around the data As such this research is of fundamental importance Much of the success of database systems in the last decade is due to the beauty and elegance of the relational model and its declarative query languages combined with a rich spectrum of underlying evaluation and optimization techniques and efficient implementations Much like the case for traditional database research elegant modeling and rich underlying technology are likely to be highly beneficiary for the Business Process owners and their users both can benefit from easy formulation and analysis of the processes While there have been many important advances in this research in recent years there is still much to be desired specifically there have been many works that focus on the processes behavior flow and many that focus on its data but only very few works have dealt with both the state of the art in a database approach to Business Process modeling and analysis the progress towards a holistic flow and data framework for these tasks and highlight the current gaps and research directions Table of Contents Introduction Modeling Querying Business Processes Other Issues Conclusion

Data-Intensive Workflow Management Daniel C. M. de Oliveira, Ji Liu, Esther Pacitti, 2022-06-01 Workflows may be defined as abstractions used to model the coherent flow of activities in the context of an in silico scientific experiment They are employed in many domains of science such as bioinformatics astronomy and engineering Such workflows usually present a considerable number of activities and activations i e tasks associated with activities and may need a long time for execution Due to the continuous need to store and process data efficiently making them data intensive workflows high performance computing environments allied to parallelization techniques are used to run these workflows At the beginning of the 2010s cloud technologies emerged as a promising environment to run scientific workflows By using clouds scientists have expanded beyond single parallel computers to hundreds or even thousands of virtual machines More recently Data Intensive Scalable Computing DISC frameworks e g Apache Spark and Hadoop and environments emerged and are being used to execute data intensive workflows DISC environments are composed of processors and disks in large commodity computing clusters connected using high speed communications switches and networks The main advantage of DISC frameworks is that they support and grant efficient in memory data management for large scale applications such as data intensive workflows

However the execution of workflows in cloud and DISC environments raise many challenges such as scheduling workflow activities and activations managing produced data collecting provenance data etc Several existing approaches deal with the challenges mentioned earlier This way there is a real need for understanding how to manage these workflows and various big data platforms that have been developed and introduced As such this book can help researchers understand how linking workflow management with Data Intensive Scalable Computing can help in understanding and analyzing scientific big data In this book we aim to identify and distill the body of work on workflow management in clouds and DISC environments We start by discussing the basic principles of data intensive scientific workflows Next we present two workflows that are executed in a single site and multi site clouds taking advantage of provenance Afterward we go towards workflow management in DISC environments and we present in detail solutions that enable the optimized execution of the workflow using frameworks such as Apache Spark and its extensions

P2P Techniques for Decentralized Applications Esther Pacitti, Reza Akbaranian, Manal El-Dick, 2022-06-01 As an alternative to traditional client server systems Peer to Peer P2P systems provide major advantages in terms of scalability autonomy and dynamic behavior of peers and decentralization of control Thus they are well suited for large scale data sharing in distributed environments Most of the existing P2P approaches for data sharing rely on either structured networks e g DHTs for efficient indexing or unstructured networks for ease of deployment or some combination However these approaches have some limitations such as lack of freedom for data placement in DHTs and high latency and high network traffic in unstructured networks To address these limitations gossip protocols which are easy to deploy and scale well can be exploited In this book we will give an overview of these different P2P techniques and architectures discuss their trade offs and illustrate their use for decentralizing several large scale data sharing applications

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Databases on Modern Hardware Anastasia Ailamaki, Erietta Liarou, Pınar Tözün, Danica Porobic, Iraklis Psaroudakis, 2022-06-01 Data management systems enable various influential applications from high performance online services e g social networks like Twitter and Facebook or financial markets to big data analytics e g scientific exploration sensor networks business intelligence As a result data management systems have been one of the main drivers for innovations in the database and computer architecture communities for several decades Recent hardware trends require software to take advantage of the abundant parallelism existing in modern and future hardware The traditional design of the data management systems however faces inherent scalability problems due to its tightly coupled components In addition it cannot exploit the full capability of the aggressive micro architectural features of modern processors As a result today s most commonly used server types remain largely underutilized leading to a huge waste of hardware resources and energy In this book we shed light on the challenges present while running DBMS on modern multicore hardware We divide the material into two dimensions of scalability implicit vertical and explicit horizontal The first part of the book focuses on

the vertical dimension it describes the instruction and data level parallelism opportunities in a core coming from the hardware and software side In addition it examines the sources of under utilization in a modern processor and presents insights and hardware software techniques to better exploit the microarchitectural resources of a processor by improving cache locality at the right level of the memory hierarchy The second part focuses on the horizontal dimension i e scalability bottlenecks of database applications at the level of multicore and multsocket multicore architectures It first presents a systematic way of eliminating such bottlenecks in online transaction processing workloads which is based on minimizing unbounded communication and shows several techniques that minimize bottlenecks in major components of database management systems Then it demonstrates the data and work sharing opportunities for analytical workloads and reviews advanced scheduling mechanisms that are aware of nonuniform memory accesses and alleviate bandwidth saturation

Transaction Processing on Modern Hardware Mohammad Sadoghi, Spyros Blanas, 2022-05-31 The last decade has brought groundbreaking developments in transaction processing This resurgence of an otherwise mature research area has spurred from the diminishing cost per GB of DRAM that allows many transaction processing workloads to be entirely memory resident This shift demanded a pause to fundamentally rethink the architecture of database systems The data storage lexicon has now expanded beyond spinning disks and RAID levels to include the cache hierarchy memory consistency models cache coherence and write invalidation costs NUMA regions and coherence domains New memory technologies promise fast non volatile storage and expose uncharted trade offs for transactional durability such as exploiting byte addressable hot and cold storage through persistent programming that promotes simpler recovery protocols In the meantime the plateauing single threaded processor performance has brought massive concurrency within a single node first in the form of multi core and now with many core and heterogeneous processors The exciting possibility to reshape the storage transaction logging and recovery layers of next generation systems on emerging hardware have prompted the database research community to vigorously debate the trade offs between specialized kernels that narrowly focus on transaction processing performance vs designs that permit transactionally consistent data accesses from decision support and analytical workloads In this book we aim to classify and distill the new body of work on transaction processing that has surfaced in the last decade to navigate researchers and practitioners through this intricate research subject

Data Management in the Cloud Divyakant Agrawal, Sudipto Das, Amr El Abbadi, 2022-05-31 Cloud computing has emerged as a successful paradigm of service oriented computing and has revolutionized the way computing infrastructure is used This success has seen a proliferation in the number of applications that are being deployed in various cloud platforms There has also been an increase in the scale of the data generated as well as consumed by such applications Scalable database management systems form a critical part of the cloud infrastructure The attempt to address the challenges posed by the management of big data has led to a plethora of systems This book aims to clarify some of the important concepts in the design space of scalable data management in cloud

computing infrastructures Some of the questions that this book aims to answer are the appropriate systems for a specific set of application requirements the research challenges in data management for the cloud and what is novel in the cloud for database researchers We also aim to address one basic question whether cloud computing poses new challenges in scalable data management or it is just a reincarnation of old problems We provide a comprehensive background study of state of the art systems for scalable data management and analysis We also identify important aspects in the design of different systems and the applicability and scope of these systems A thorough understanding of current solutions and a precise characterization of the design space are essential for clearing the cloudy skies of data management and ensuring the success of DBMSs in the cloud thus emulating the success enjoyed by relational databases in traditional enterprise settings

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Transactions on Blockchain Suyash Gupta,Jelle Hellings,Mohammad Sadoghi,2022-06-01 Since the introduction of Bitcoin the first widespread application driven by blockchain the interest of the public and private sectors in blockchain has skyrocketed In recent years blockchain based fabrics have been used to address challenges in diverse fields such as trade food production property rights identity management aid delivery health care and fraud prevention This widespread interest follows from fundamental concepts on which blockchains are built that together embed the notion of trust upon which blockchains are built

- 1 Blockchains provide data transparency Data in a blockchain is stored in the form of a ledger which contains an ordered history of all the transactions This facilitates oversight and auditing
- 2 Blockchains ensure data integrity by using strong cryptographic primitives This guarantees that transactions accepted by the blockchain are authenticated by its issuer are immutable and cannot be repudiated by the issuer This ensures accountability
- 3 Blockchains are decentralized democratic and resilient They use consensus based replication to decentralize the ledger among many independent participants Thus it can operate completely decentralized and does not require trust in a single authority

Additions to the chain are performed by consensus in which all participants have a democratic voice in maintaining the integrity of the blockchain Due to the usage of replication and consensus blockchains are also highly resilient to malicious attacks even when a significant portion of the participants are malicious It further increases the opportunity for fairness and equity through democratization These fundamental concepts and the technologies behind them a generic ledger based data model cryptographically ensured data integrity and consensus based replication prove to be a powerful and inspiring combination a catalyst to promote computational trust In this book we present an in depth study of blockchain unraveling its revolutionary promise to instill computational trust in society all carefully tailored to a broad audience including students researchers and practitioners We offer a comprehensive overview of theoretical limitations and practical usability of consensus protocols while examining the diverse landscape of how blockchains are manifested in their permissioned and permissionless forms

Instant Recovery with Write-Ahead Logging Goetz Graefe, Wey Guy, Caetano Sauer, 2022-11-10 Traditional theory and practice of write ahead logging and of database recovery techniques revolve around three failure classes transaction failures resolved by rollback system failures typically software faults resolved by restart with log analysis redo and undo phases and media failures typically hardware faults resolved by restore operations that combine multiple types of backups and log replay The recent addition of single page failures and single page recovery has opened new opportunities far beyond its original aim of immediate lossless repair of single page wear out in novel or traditional storage hardware In the contexts of system and media failures efficient single page recovery enables on demand incremental redo and undo as part of system restart or media restore operations This can give the illusion of practically instantaneous restart and restore instant restart permits processing new queries and updates seconds after system reboot and instant restore permits resuming queries and updates on empty replacement media as if those were already fully recovered In addition to these instant recovery techniques the discussion introduces much faster offline restore operations without slowdown in backup operations and with hardly any slowdown in log archiving operations The new restore techniques also render differential and incremental backups obsolete complete backup commands on the database server practically instantly and even permit taking full backups without imposing any load on the database server Table of Contents Preface Acknowledgments Introduction Related Prior Work Single Page Recovery Applications of Single Page Recovery Instant Restart after a System Failure Single Pass Restore Applications of Single Pass Restore Instant Restore after a Media Failure Multiple Failures Conclusions References Author Biographies

Big Data Integration Xin Luna Dong, Divesh Srivastava, 2022-05-31 The big data era is upon us data are being generated analyzed and used at an unprecedented scale and data driven decision making is sweeping through all aspects of society Since the value of data explodes when it can be linked and fused with other data addressing the big data integration BDI challenge is critical to realizing the promise of big data BDI differs from traditional data integration along the dimensions of volume velocity variety and veracity First not only can data sources contain a huge volume of data but also the number of data sources is now in the millions Second because of the rate at which newly collected data are made available many of the data sources are very dynamic and the number of data sources is also rapidly exploding Third data sources are extremely heterogeneous in their structure and content exhibiting considerable variety even for substantially similar entities Fourth the data sources are of widely differing qualities with significant differences in the coverage accuracy and timeliness of data provided This book explores the progress that has been made by the data integration community on the topics of schema alignment record linkage and data fusion in addressing these novel challenges faced by big data integration Each of these topics is covered in a systematic way first starting with a quick tour of the topic in the context of traditional data integration followed by a detailed example driven exposition of recent innovative techniques that have been proposed to address the BDI challenges of volume velocity variety and veracity Finally it presents merging topics and opportunities that

are specific to BDI identifying promising directions for the data integration community 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

Perspectives on Business Intelligence Raymond T. Ng,Patricia C. Arocena,Denilson Barbosa,Giuseppe Carenini,Luiz Gomes,Stephan Jou,Anthony Leung,Evangelos Milios,Renée J. Miller,John Mylopoulos,Rachel A Pottinger,Frank Tompa,Eric Yu,2022-05-31 In the 1980s traditional Business Intelligence BI systems focused on the delivery of reports that describe the state of business activities in the past such as for questions like How did our sales perform during the last quarter A decade later there was a shift to more interactive content that presented how the business was performing at the present time answering questions like How are we doing right now Today the focus of BI users are looking into the future Given what I did before and how I am currently doing this quarter how will I do next quarter Furthermore fuelled by the demands of Big Data BI systems are going through a time of incredible change Predictive analytics high volume data unstructured data social data mobile consumable analytics and data visualization are all examples of demands and capabilities that have become critical within just the past few years and are growing at an unprecedented pace This book introduces research problems and solutions on various aspects central to next generation BI systems It begins with a chapter on an industry perspective on how BI has evolved and discusses how game changing trends have drastically reshaped the landscape of BI One of the game changers is the shift toward the consumerization of BI tools As a result for BI tools to be successfully used by business users

rather than IT departments the tools need a business model rather than a data model One chapter of the book surveys four different types of business modeling However even with the existence of a business model for users to express queries the data that can meet the needs are still captured within a data model The next chapter on vivification addresses the problem of closing the gap which is often significant between the business and the data models Moreover Big Data forces BI systems to integrate and consolidate multiple and often wildly different data sources One chapter gives an overview of several integration architectures for dealing with the challenges that need to be overcome While the book so far focuses on the usual structured relational data the remaining chapters turn to unstructured data an ever increasing and important component of Big Data One chapter on information extraction describes methods for dealing with the extraction of relations from free text and the web Finally BI users need tools to visualize and interpret new and complex types of information in a way that is compelling intuitive but accurate The last chapter gives an overview of information visualization for decision support and text

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

Foundations of Data Quality Management Wenfei Fan, Floris Geerts, 2022-05-31 Data quality is one of the most important problems in data management A database system typically aims to support the creation maintenance and use of large amount of data focusing on the quantity of data However real life data are often dirty inconsistent duplicated inaccurate incomplete or stale Dirty data in a database routinely generate misleading or biased analytical results and decisions and lead to loss of revenues credibility and customers With this comes the need for data quality management In contrast to traditional data management tasks data quality management enables the detection and correction of errors in the data syntactic or semantic in order to improve the quality of the data and hence add value to business processes While data quality has been a longstanding problem for decades the prevalent use

of the Web has increased the risks on an unprecedented scale of creating and propagating dirty data. This monograph gives an overview of fundamental issues underlying central aspects of data quality: namely, data consistency, data deduplication, data accuracy, data currency, and information completeness. We promote a uniform logical framework for dealing with these issues based on data quality rules. The text is organized into seven chapters focusing on relational data. Chapter One introduces data quality issues. A conditional dependency theory is developed in Chapter Two for capturing data inconsistencies. It is followed by practical techniques in Chapter 2b for discovering conditional dependencies and for detecting inconsistencies and repairing data based on conditional dependencies. Matching dependencies are introduced in Chapter Three as matching rules for data deduplication. A theory of relative information completeness is studied in Chapter Four, revising the classical Closed World Assumption and the Open World Assumption to characterize incomplete information in the real world. A data currency model is presented in Chapter Five to identify the current values of entities in a database and to answer queries with the current values in the absence of reliable timestamps. Finally, interactions between these data quality issues are explored in Chapter Six. Important theoretical results and practical algorithms are covered, but formal proofs are omitted. The bibliographical notes contain pointers to papers in which the results were presented and proven, as well as references to materials for further reading. This text is intended for a seminar course at the graduate level. It is also to serve as a useful resource for researchers and practitioners who are interested in the study of data quality. The fundamental research on data quality draws on several areas including mathematical logic, computational complexity, and database theory. It has raised as many questions as it has answered and is a rich source of questions and vitality.

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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

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

Data

Exploration Using Example-Based Methods Matteo Lissandrini,Davide Mottin,Themis Palpanas,Yannis

Velegarakis,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 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

Declarative Networking Boon Thau Loo, Wenchao Zhou, 2022-05-31 Declarative Networking is a programming methodology that enables developers to concisely specify network protocols and services which are directly compiled to a dataflow framework that executes the specifications Declarative networking proposes the use of a declarative query language for specifying and implementing network protocols and employs a dataflow framework at runtime for communication and maintenance of network state The primary goal of declarative networking is to greatly simplify the process of specifying implementing deploying and evolving a network design In addition declarative networking serves as an important step towards an extensible evolvable network architecture that can support flexible secure and efficient deployment of new network protocols This book provides an introduction to basic issues in declarative networking including language design optimization and dataflow execution The methodology behind declarative programming of networks is presented including roots in Datalog extensions for networked environments and the semantics of long running queries over network state The book focuses on a representative declarative networking language called Network Datalog NDlog which is based on extensions to the Datalog recursive query language An overview of declarative network protocols written in NDlog is provided and its usage is illustrated using examples from routing protocols and overlay networks This book also describes the implementation of a declarative networking engine and NDlog execution strategies that provide eventual consistency semantics with significant flexibility in execution Two representative declarative networking systems P2 and its successor RapidNet are presented Finally the book highlights recent advances in declarative networking and new declarative approaches to related problems

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Uncover the mysteries within Crafted by is enigmatic creation, Embark on a Mystery with **Uncertain Schema Matching Avigdor Gal** . This downloadable ebook, shrouded in suspense, is available in a PDF format (*). Dive into a world of uncertainty and anticipation. Download now to unravel the secrets hidden within the pages.

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