

Graph Databases

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The Digital Journey of Banking and Insurance, Volume III - Volker Liermann
2021-10-27

This book, the third one of three volumes, focuses on data and the actions around data, like storage and processing. The angle shifts over the volumes from a business-driven approach in “Disruption and DNA” to a strong technical focus in “Data Storage, Processing and Analysis”, leaving “Digitalization and Machine Learning Applications” with the business and technical aspects in-

between. In the last volume of the series, “Data Storage, Processing and Analysis”, the shifts in the way we deal with data are addressed.

Neo4j in Action - Tareq Abedrabbo 2014-12-05

Summary Neo4j in Action is a comprehensive guide to Neo4j, aimed at application developers and software architects. Using hands-on examples, you'll learn to model graph domains naturally with Neo4j graph structures. The book explores the full power of native Java APIs for graph data manipulation and querying.

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Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Much of the data today is highly connected—from social networks to supply chains to software dependency management—and more connections are continually being uncovered. Neo4j is an ideal graph database tool for highly connected data. It is mature, production-ready, and unique in enabling developers to simply and efficiently model and query connected data. About the Book Neo4j in Action is a comprehensive guide to designing, implementing, and querying graph data using Neo4j. Using hands-on examples, you'll learn to model graph domains naturally with Neo4j graph structures. The book explores the full power of native Java APIs for graph data manipulation and querying. It also covers Cypher, Neo4j's graph query language. Along the way, you'll learn how to integrate Neo4j into your domain-driven app using

Spring Data Neo4j, as well as how to use Neo4j in standalone server or embedded modes. Knowledge of Java basics is required. No prior experience with graph data or Neo4j is assumed. What's Inside Graph database patterns How to model data in social networks How to use Neo4j in your Java applications How to configure and set up Neo4j About the Authors Aleksa Vukotic is an architect specializing in graph data models. Nicki Watt, Dominic Fox, Tareq Abedrabbo, and Jonas Partner work at OpenCredo, a Neo Technology partner, and have been involved in many projects using Neo4j. Table of Contents PART 1 INTRODUCTION TO NEO4J A case for a Neo4j database Data modeling in Neo4j Starting development with Neo4j The power of traversals Indexing the data PART 2 APPLICATION DEVELOPMENT WITH NEO4J Cypher: Neo4j query language Transactions Traversals in depth Spring Data Neo4j PART 3 NEO4J IN PRODUCTION Neo4j: embedded versus server mode

Querying Graphs - Angela Bonifati 2018-10-01

Graph data modeling and querying arises in many practical application domains such as social and biological networks where the primary focus is on concepts and their relationships and the rich patterns in these complex webs of interconnectivity. In this book, we present a concise unified view on the basic challenges which arise over the complete life cycle of formulating and processing queries on graph databases. To that purpose, we present all major concepts relevant to this life cycle, formulated in terms of a common and unifying ground: the property graph data model—the pre-dominant data model adopted by modern graph database systems. We aim especially to give a coherent and in-depth perspective on current graph querying and an outlook for future developments. Our presentation is self-contained, covering the relevant topics from: graph data models, graph query languages and graph

query specification, graph constraints, and graph query processing. We conclude by indicating major open research challenges towards the next generation of graph data management systems.

Computer Information Systems and Industrial Management - Khalid Saeed 2015-09-17

This book constitutes the proceedings of the 14th IFIP TC 8 International Conference on Computer Information Systems and Industrial Management, CISIM 2015, held in Warsaw, Poland, in September 2015. The 47 papers presented in this volume were carefully reviewed and selected from about 80 submissions. The main topics covered are biometrics, security systems, multimedia, classification and clustering with applications, and industrial management.

NoSQL for Mere Mortals - Dan Sullivan 2015-04-06

The Easy, Common-Sense Guide to Solving Real Problems with NoSQL The Mere Mortals® tutorials have earned worldwide praise as the

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clearest, simplest way to master essential database technologies. Now, there's one for today's exciting new NoSQL databases. NoSQL for Mere Mortals guides you through solving real problems with NoSQL and achieving unprecedented scalability, cost efficiency, flexibility, and availability. Drawing on 20+ years of cutting-edge database experience, Dan Sullivan explains the advantages, use cases, and terminology associated with all four main categories of NoSQL databases: key-value, document, column family, and graph databases. For each, he introduces pragmatic best practices for building high-value applications. Through step-by-step examples, you'll discover how to choose the right database for each task, and use it the right way. Coverage includes --Getting started: What NoSQL databases are, how they differ from relational databases, when to use them, and when not to Data management principles and design criteria:

Essential knowledge for creating any database solution, NoSQL or relational --Key-value databases: Gaining more utility from data structures -- Document databases: Schemaless databases, normalization and denormalization, mutable documents, indexing, and design patterns --Column family databases: Google's BigTable design, table design, indexing, partitioning, and Big Data Graph databases: Graph/network modeling, design tips, query methods, and traps to avoid Whether you're a database developer, data modeler, database user, or student, learning NoSQL can open up immense new opportunities. As thousands of database professionals already know, For Mere Mortals is the fastest, easiest route to mastery.

Mathematics of Big Data -
Jeremy Kepner 2018-08-07

The first book to present the common mathematical foundations of big data analysis across a range of applications and technologies. Today, the

volume, velocity, and variety of data are increasing rapidly across a range of fields, including Internet search, healthcare, finance, social media, wireless devices, and cybersecurity. Indeed, these data are growing at a rate beyond our capacity to analyze them. The tools—including spreadsheets, databases, matrices, and graphs—developed to address this challenge all reflect the need to store and operate on data as whole sets rather than as individual elements. This book presents the common mathematical foundations of these data sets that apply across many applications and technologies. Associative arrays unify and simplify data, allowing readers to look past the differences among the various tools and leverage their mathematical similarities in order to solve the hardest big data challenges. The book first introduces the concept of the associative array in practical terms, presents the associative array manipulation system D4M (Dynamic Distributed

Dimensional Data Model), and describes the application of associative arrays to graph analysis and machine learning. It provides a mathematically rigorous definition of associative arrays and describes the properties of associative arrays that arise from this definition. Finally, the book shows how concepts of linearity can be extended to encompass associative arrays. Mathematics of Big Data can be used as a textbook or reference by engineers, scientists, mathematicians, computer scientists, and software engineers who analyze big data.

Learning Neo4j - Rik Van Bruggen 2014-08-25

This book is for developers who want an alternative way to store and process data within their applications. No previous graph database experience is required; however, some basic database knowledge will help you understand the concepts more easily.

[Comparison of Graph Databases and the Join Core](#) - Kavya Narne 2016

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We are now in an era where the technology has rapidly become democratized. The restrictions of relational databases to address the requirements of contemporary application domains, such as semantic web and social networking, where data has an inherited graph structure underlying in it, leads to the development of new technology called Graph Databases. Graph databases can be defined as those in which data structures for the schema and instances are modeled as graphs and data manipulation is expressed by graph-traversal operations. On the other hand, the Complexity involved in the relational model to process large queries quickly involving complex join operations leads to the development of the Join-Core. The Join Core consists of a set of tables that store the relationships of data. With join core, no relations or intermediate results need to be retrieved, generated, or transferred, only query results need to be transferred over the networks. In this study, an

overview and comparison of current graph database models like AllegroGraph, FlockDB, Neo4j, Sones, DEX etc. is presented. The comparison shows that Neo4j is the most popular and highly recommended among all graph databases. Also the experimental results of Join Core against Neo4j graph database shows that join core performance is more efficient than Neo4j when the query has complex join operations involved in it.

GRAPH DATABASES - IAN. ROBINSON 2016

Databases Theory and Applications - Renata Borovica-Gajic 2020-01-21

This book constitutes the refereed proceedings of the 31th Australasian Database Conference, ADC 2019, held in Melbourne, VIC, Australia, in February 2020. The 14 full and 5 short papers presented were carefully reviewed and selected from 30 submissions. The Australasian Database Conference is an annual international forum for sharing

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the latest research advancements and novel applications of database systems, data driven applications and data analytics between researchers and practitioners from around the globe, particularly Australia, New Zealand and in the World.

Graph Databases, 2nd Edition - Ian Robinson. Jim Webber. Emil Eifrem 2015

Graph Databases - Jacob Mason 2017-06-03

Discover how graph databases can help you manage and query highly connected data. With this practical book, you'll learn how to design and implement a graph database that brings the power of graphs to bear on a broad range of problem domains. Whether you want to speed up your response to user queries or build a database that can adapt as your business evolves, this book shows you how to apply the schema-free graph model to real-world problems.

Graph Algorithms - Mark Needham 2019-05-16

Discover how graph algorithms

can help you leverage the relationships within your data to develop more intelligent solutions and enhance your machine learning models. You'll learn how graph analytics are uniquely suited to unfold complex structures and reveal difficult-to-find patterns lurking in your data. Whether you are trying to build dynamic network models or forecast real-world behavior, this book illustrates how graph algorithms deliver value—from finding vulnerabilities and bottlenecks to detecting communities and improving machine learning predictions. This practical book walks you through hands-on examples of how to use graph algorithms in Apache Spark and Neo4j—two of the most common choices for graph analytics. Also included: sample code and tips for over 20 practical graph algorithms that cover optimal pathfinding, importance through centrality, and community detection. Learn how graph analytics vary from conventional statistical analysis

Understand how classic graph

algorithms work, and how they are applied Get guidance on which algorithms to use for different types of questions Explore algorithm examples with working code and sample datasets from Spark and Neo4j See how connected feature extraction can increase machine learning accuracy and precision Walk through creating an ML workflow for link prediction combining Neo4j and Spark

Handbook of Graphs and Networks in People Analytics - Keith McNulty 2022-06-19 Handbook of Graphs and Networks in People Analytics: With Examples in R and Python covers the theory and practical implementation of graph methods in R and Python for the analysis of people and organizational networks. Starting with an overview of the origins of graph theory and its current applications in the social sciences, the book proceeds to give in-depth technical instruction on how to construct and store graphs from data, how to visualize those graphs compellingly and

how to convert common data structures into graph-friendly form. The book explores critical elements of network analysis in detail, including the measurement of distance and centrality, the detection of communities and cliques, and the analysis of assortativity and similarity. An extension chapter offers an introduction to graph database technologies. Real data sets from various research contexts are used for both instruction and for end of chapter practice exercises and a final chapter contains data sets and exercises ideal for larger personal or group projects of varying difficulty level. Key features: Immediately implementable code, with extensive and varied illustrations of graph variants and layouts. Examples and exercises across a variety of real-life contexts including business, politics, education, social media and crime investigation. Dedicated chapter on graph visualization methods. Practical walkthroughs of common

methodological uses: finding influential actors in groups, discovering hidden community structures, facilitating diverse interaction in organizations, detecting political alignment, determining what influences connection and attachment. Various downloadable data sets for use both in class and individual learning projects. Final chapter dedicated to individual or group project examples.

Learning Neo4j 3.x - Jerome Baton 2017-10-20

Run blazingly fast queries on complex graph datasets with the power of the Neo4j graph database About This Book Get acquainted with graph database systems and apply them in real-world use cases Use Cypher query language, APOC and other Neo4j extensions to derive meaningful analysis from complex data sets. A practical guide filled with ready to use examples on querying, graph processing and visualizing information to build smarter spatial applications. Who This Book Is For This book is for

developers who want an alternative way to store and process data within their applications. No previous graph database experience is required; however, some basic database knowledge will help you understand the concepts more easily. What You Will Learn Understand the science of graph theory, databases and its advantages over traditional databases. Install Neo4j, model data and learn the most common practices of traversing data Learn the Cypher query language and tailor-made procedures to analyze and derive meaningful representations of data Improve graph techniques with the help of precise procedures in the APOC library Use Neo4j advanced extensions and plugins for performance optimization. Understand how Neo4j's new security features and clustering architecture are used for large scale deployments. In Detail Neo4j is a graph database that allows traversing huge amounts of data with ease. This book aims at quickly getting you started

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with the popular graph database Neo4j. Starting with a brief introduction to graph theory, this book will show you the advantages of using graph databases along with data modeling techniques for graph databases. You'll gain practical hands-on experience with commonly used and lesser known features for updating graph store with Neo4j's Cypher query language. Furthermore, you'll also learn to create awesome procedures using APOC and extend Neo4j's functionality, enabling integration, algorithmic analysis, and other advanced spatial operation capabilities on data. Through the course of the book you will come across implementation examples on the latest updates in Neo4j, such as in-graph indexes, scaling, performance improvements, visualization, data refactoring techniques, security enhancements, and much more. By the end of the book, you'll have gained the skills to design and implement modern spatial applications, from graphing data to

unraveling business capabilities with the help of real-world use cases. Style and approach A step-by-step approach of adopting Neo4j, the world's leading graph database. This book includes a lot of background information, helps you grasp the fundamental concepts behind this radical new way of dealing with connected data, and will give you lots of examples of use cases and environments where a graph database would be a great fit

[A Scalable Graph-coarsening Based Index for Dynamic Graph Databases](#) - Akshay Kansal 2017

"Graph is a commonly used data structure for modeling complex data such as chemical molecules, images, social networks, and XML documents. This complex data is stored using a set of graphs, known as graph database D. To speed up query answering on graph databases, indexes are commonly used. State-of-the-art graph database indexes do not adapt or scale well to dynamic graph database use;

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they are static, and their ability to prune possible search responses to meet user needs worsens over time as databases change and grow. Users can re-mine indexes to gain some improvement, but it is time consuming. Users must also tune numerous parameters on an ongoing basis to optimize performance and can inadvertently worsen the query response time if they do not choose parameters wisely. Recently, a one-pass algorithm has been developed to enhance the performance of these indexes in part by using the algorithm to update them regularly. However, there are some drawbacks, most notably the need to make updates as the query workload changes. We propose a new index based on graph-coarsening to speed up query answering time in dynamic graph databases. Our index is parameter-free, query-independent, scalable, small enough to store in the main memory, and is simpler and less costly to maintain for database updates. We conducted an extensive sets of

experiments on two types of databases, i.e., chemical and social network databases, to compare our graph-coarsening based index vs. hybrid-indexes as follows. First, we considered no database updates or query workload changes (static graph databases) and compared the indexes according to query vi answering time and index size for different minSup values. Second, we compared the indexes in the case of dynamic graph databases, i.e. when graphs are added to or removed from the database. Third, we compared the indexes with regard to query workload changes. Fourth, we studied the scalability of our index vs. hybrid-indexes. Experimental results show that our index outperforms hybrid-indexes (i.e. indexes updated with one-pass) for query answering time in the case of social network databases, and is comparable with these indexes for frequent and infrequent queries on chemical databases. Our graph-coarsening index can be updated up to 60 times faster

in comparison to one-pass on dynamic graph databases. Moreover, our index is independent of the query workload for index update and is up to 15 times better after hybrid indexes are attuned to query workload for social network databases. This work is also published in 26th ACM International Conference on Information and Knowledge Management (CIKM) held in Singapore[18]."--Boise State University ScholarWorks.

A Librarian's Guide to Graphs, Data and the Semantic Web - James Powell
2015-07-09

Graphs are about connections, and are an important part of our connected and data-driven world. A Librarian's Guide to Graphs, Data and the Semantic Web is geared toward library and information science professionals, including librarians, software developers and information systems architects who want to understand the fundamentals of graph theory, how it is used to represent and explore data, and how it relates to the

semantic web. This title provides a firm grounding in the field at a level suitable for a broad audience, with an emphasis on open source solutions and what problems these tools solve at a conceptual level, with minimal emphasis on algorithms or mathematics. The text will also be of special interest to data science librarians and data professionals, since it introduces many graph theory concepts by exploring data-driven networks from various scientific disciplines. The first two chapters consider graphs in theory and the science of networks, before the following chapters cover networks in various disciplines. Remaining chapters move on to library networks, graph tools, graph analysis libraries, information problems and network solutions, and semantic graphs and the semantic web. Provides an accessible introduction to network science that is suitable for a broad audience Devotes several chapters to a survey of how graph theory has been used in a number of scientific

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data-driven disciplines
Explores how graph theory could aid library and information scientists
Graph Databases - Ian Robinson 2013-06-10
Discover how graph databases can help you manage and query highly connected data. With this practical book, you'll learn how to design and implement a graph database that brings the power of graphs to bear on a broad range of problem domains. Whether you want to speed up your response to user queries or build a database that can adapt as your business evolves, this book shows you how to apply the schema-free graph model to real-world problems. Learn how different organizations are using graph databases to outperform their competitors. With this book's data modeling, query, and code examples, you'll quickly be able to implement your own solution. Model data with the Cypher query language and property graph model Learn best practices and common pitfalls when modeling with graphs

Plan and implement a graph database solution in test-driven fashion Explore real-world examples to learn how and why organizations use a graph database Understand common patterns and components of graph database architecture Use analytical techniques and algorithms to mine graph database information

Learning MySQL and MariaDB - Russell J.T. Dyer
2015-03-30

"With an easy, step-by-step approach, this guide shows beginners how to install, use, and maintain the world's most popular open source database: MySQL. You'll learn through real-world examples and many practical tips, including information on how to improve database performance. Database systems such as MySQL help data handling for organizations large and small handle data, providing robust and efficient access in ways not offered by spreadsheets and other types of data stores. This book is also useful for web developers and programmers interested in adding MySQL to

their skill sets. Topics include: Installation and basic administration ; Introduction to databases and SQL ; Functions, subqueries, and other query enhancements ; Improving database performance ; Accessing MySQL from popular languages"--

Graph Databases - Ian

Robinson 2015-06-10

Discover how graph databases can help you manage and query highly connected data. With this practical book, you'll learn how to design and implement a graph database that brings the power of graphs to bear on a broad range of problem domains. Whether you want to speed up your response to user queries or build a database that can adapt as your business evolves, this book shows you how to apply the schema-free graph model to real-world problems. This second edition includes new code samples and diagrams, using the latest Neo4j syntax, as well as information on new functionality. Learn how different organizations are using graph databases to

outperform their competitors. With this book's data modeling, query, and code examples, you'll quickly be able to implement your own solution. Model data with the Cypher query language and property graph model Learn best practices and common pitfalls when modeling with graphs Plan and implement a graph database solution in test-driven fashion Explore real-world examples to learn how and why organizations use a graph database Understand common patterns and components of graph database architecture Use analytical techniques and algorithms to mine graph database information

Practical Neo4j - Gregory

Jordan 2014-12-29

Why have developers at places like Facebook and Twitter increasingly turned to graph databases to manage their highly connected big data? The short answer is that graphs offer superior speed and flexibility to get the job done. It's time you added skills in graph databases to your toolkit. In Practical Neo4j,

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database expert Greg Jordan guides you through the background and basics of graph databases and gets you quickly up and running with Neo4j, the most prominent graph database on the market today. Jordan walks you through the data modeling stages for projects such as social networks, recommendation engines, and geo-based applications. The book also dives into the configuration steps as well as the language options used to create your Neo4j-backed applications. Neo4j runs some of the largest connected datasets in the world, and developing with it offers you a fast, proven NoSQL database option. Besides those working for social media, database, and networking companies of all sizes, academics and researchers will find Neo4j a powerful research tool that can help connect large sets of diverse data and provide insights that would otherwise remain hidden. Using Practical Neo4j, you will learn how to harness that power and create

elegant solutions that address complex data problems. This book: Explains the basics of graph databases Demonstrates how to configure and maintain Neo4j Shows how to import data into Neo4j from a variety of sources Provides a working example of a Neo4j-based application using an array of language of options including Java, .Net, PHP, Python, Spring, and Ruby As you'll discover, Neo4j offers a blend of simplicity and speed while allowing data relationships to maintain first-class status. That's one reason among many that such a wide range of industries and fields have turned to graph databases to analyze deep, dense relationships. After reading this book, you'll have a potent, elegant tool you can use to develop projects profitably and improve your career options.

Visualizing Graph Data - Corey Lanum 2016-11-23
Summary Visualizing Graph Data teaches you not only how to build graph data structures, but also how to create your own dynamic and interactive

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visualizations using a variety of tools. This book is loaded with fascinating examples and case studies to show you the real-world value of graph visualizations. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Assume you are doing a great job collecting data about your customers and products. Are you able to turn your rich data into important insight? Complex relationships in large data sets can be difficult to recognize. Visualizing these connections as graphs makes it possible to see the patterns, so you can find meaning in an otherwise over-whelming sea of facts. About the Book Visualizing Graph Data teaches you how to understand graph data, build graph data structures, and create meaningful visualizations. This engaging book gently introduces graph data visualization through fascinating examples and compelling case studies. You'll discover simple, but effective,

techniques to model your data, handle big data, and depict temporal and spatial data. By the end, you'll have a conceptual foundation as well as the practical skills to explore your own data with confidence. What's Inside Techniques for creating effective visualizations Examples using the Gephi and KeyLines visualization packages Real-world case studies About the Reader No prior experience with graph data is required. About the Author Corey Lanum has decades of experience building visualization and analysis applications for companies and government agencies around the globe. Table of Contents PART 1 - GRAPH VISUALIZATION BASICS Getting to know graph visualization Case studies An introduction to Gephi and KeyLines PART 2 VISUALIZE YOUR OWN DATA Data modeling How to build graph visualizations Creating interactive visualizations How to organize a chart Big data: using graphs when there's too

much data Dynamic graphs:
how to show data over time
Graphs on maps: the where of
graph visualization

Graph Data Modeling for NoSQL and SQL - Thomas

Frisendal 2016-09-09

Master a graph data modeling
technique superior to
traditional data modeling for
both relational and NoSQL
databases (graph, document,
key-value, and column),
leveraging cognitive
psychology to improve big data
designs. From Karen Lopez's
Foreword: In this book,
Thomas Frisendal raises
important questions about the
continued usefulness of
traditional data modeling
notations and approaches: Are
Entity Relationship Diagrams
(ERDs) relevant to analytical
data requirements? Are ERDs
relevant in the new world of
Big Data? Are ERDs still the
best way to work with business
users to understand their
needs? Are Logical and
Physical Data Models too
closely coupled? Are we
correct in using the same
notations for communicating

with business users and
developers? Should we refine
our existing notations and tools
to meet these new needs, or
should we start again from a
blank page? What new
notations and approaches will
we need? How will we use
those to build enterprise
database systems? Frisendal
takes us through the history of
data modeling, enterprise data
models and traditional
modeling methods. He points
out, quite contentiously, where
he feels we have gone wrong
and in a few places where we
got it right. He then maps out
the psychology of meaning and
context, while identifying
important issues about where
data modeling may or may not
fit in business modeling. The
main subject of this work is a
proposal for a new exploration-
driven modeling approach and
new modeling notations for
business concept models,
business solutions models, and
physical data models with
examples on how to leverage
those for implementing into
any target database or
datastore. These new notations

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are based on a property graph approach to modeling data.

[Beginning Neo4j](#) - Chris Kemper 2015-12-30

Beginning Neo4j is your introduction in the world of graph databases, and the benefits they can bring to your applications. Neo4j is the most established graph database on the market, and it's always improving to bring more of its benefits to you. This book will take you from the installation of Neo4j through to building a full application with Neo4j at its heart, and everything in between. Using this book, you'll get everything up and running, and then learn how to use Neo4j to build up recommendations, relationships, and calculate the shortest route between two locations. With example data models, best practices, and an application putting everything together, this book will give you everything you need to really get started with Neo4j. Neo4j is being used by social media and ecommerce industry giants. You can take advantage of Neo4j's powerful features

and benefits - add Beginning Neo4j to your library today.

[Graph Databases in Action](#) - Josh Perryman 2020-10-17

Graph Databases in Action introduces you to graph database concepts by comparing them with relational database constructs. You'll learn just enough theory to get started, then progress to hands-on development.

Discover use cases involving social networking, recommendation engines, and personalization. Summary Relationships in data often look far more like a web than an orderly set of rows and columns. Graph databases shine when it comes to revealing valuable insights within complex, interconnected data such as demographics, financial records, or computer networks. In Graph Databases in Action, experts Dave Bechberger and Josh Perryman illuminate the design and implementation of graph databases in real-world applications. You'll learn how to choose the right database solutions for your tasks, and

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how to use your new knowledge to build agile, flexible, and high-performing graph-powered applications! Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Isolated data is a thing of the past! Now, data is connected, and graph databases—like Amazon Neptune, Microsoft Cosmos DB, and Neo4j—are the essential tools of this new reality. Graph databases represent relationships naturally, speeding the discovery of insights and driving business value. About the book Graph Databases in Action introduces you to graph database concepts by comparing them with relational database constructs. You'll learn just enough theory to get started, then progress to hands-on development. Discover use cases involving social networking, recommendation engines, and personalization. What's inside Graph databases vs. relational databases Systematic graph

data modeling Querying and navigating a graph Graph patterns Pitfalls and antipatterns About the reader For software developers. No experience with graph databases required. About the author Dave Bechberger and Josh Perryman have decades of experience building complex data-driven systems and have worked with graph databases since 2014. Table of Contents PART 1 - GETTING STARTED WITH GRAPH DATABASES 1 Introduction to graphs 2 Graph data modeling 3 Running basic and recursive traversals 4 Pathfinding traversals and mutating graphs 5 Formatting results 6 Developing an application PART 2 - BUILDING ON GRAPH DATABASES 7 Advanced data modeling techniques 8 Building traversals using known walks 9 Working with subgraphs PART 3 - MOVING BEYOND THE BASICS 10 Performance, pitfalls, and anti-patterns 11 What's next: Graph analytics, machine learning, and resources Neo4j Graph Data Modeling -

Mahesh Lal 2015-07-27

Neo4j is a graph database that allows you to model your data as a graph and find solutions to complex real-world problems that are difficult to solve using any other type of database.

This book is designed to help you understand the intricacies of modeling a graph for any domain. The book starts with an example of a graph problem and then introduces you to modeling non-graph problems using Neo4j. Concepts such as the evolution of your database, chains, access control, and recommendations are addressed, along with examples and are modeled in a graph. Throughout the book, you will discover design choices and trade-offs, and understand how and when to use them. By the end of the book, you will be able to effectively use Neo4j to model your database for efficiency and flexibility.

Graph-Powered Machine Learning - Alessandro Negro
2021-10-05

Upgrade your machine learning models with graph-

based algorithms, the perfect structure for complex and interlinked data. Summary In Graph-Powered Machine Learning, you will learn: The lifecycle of a machine learning project Graphs in big data platforms Data source modeling using graphs Graph-based natural language processing, recommendations, and fraud detection techniques Graph algorithms Working with Neo4J Graph-Powered Machine Learning teaches to use graph-based algorithms and data organization strategies to develop superior machine learning applications. You'll dive into the role of graphs in machine learning and big data platforms, and take an in-depth look at data source modeling, algorithm design, recommendations, and fraud detection. Explore end-to-end projects that illustrate architectures and help you optimize with best design practices. Author Alessandro Negro's extensive experience shines through in every chapter, as you learn from examples and concrete

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scenarios based on his work with real clients! Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Identifying relationships is the foundation of machine learning. By recognizing and analyzing the connections in your data, graph-centric algorithms like K-nearest neighbor or PageRank radically improve the effectiveness of ML applications. Graph-based machine learning techniques offer a powerful new perspective for machine learning in social networking, fraud detection, natural language processing, and recommendation systems. About the book Graph-Powered Machine Learning teaches you how to exploit the natural relationships in structured and unstructured datasets using graph-oriented machine learning algorithms and tools. In this authoritative book, you'll master the architectures and design practices of graphs, and avoid common pitfalls.

Author Alessandro Negro explores examples from real-world applications that connect GraphML concepts to real world tasks. What's inside Graphs in big data platforms Recommendations, natural language processing, fraud detection Graph algorithms Working with the Neo4J graph database About the reader For readers comfortable with machine learning basics. About the author Alessandro Negro is Chief Scientist at GraphAware. He has been a speaker at many conferences, and holds a PhD in Computer Science. Table of Contents PART 1 INTRODUCTION 1 Machine learning and graphs: An introduction 2 Graph data engineering 3 Graphs in machine learning applications PART 2 RECOMMENDATIONS 4 Content-based recommendations 5 Collaborative filtering 6 Session-based recommendations 7 Context-aware and hybrid recommendations PART 3 FIGHTING FRAUD 8 Basic approaches to graph-powered

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fraud detection 9 Proximity-based algorithms 10 Social network analysis against fraud
PART 4 TAMING TEXT WITH GRAPHS 11 Graph-based natural language processing 12 Knowledge graphs

The Global Findex Database

2017 - Asli Demirguc-Kunt
2018-04-19

In 2011 the World Bank—with funding from the Bill and Melinda Gates

Foundation—launched the Global Findex database, the world's most comprehensive data set on how adults save, borrow, make payments, and manage risk. Drawing on survey data collected in collaboration with Gallup, Inc., the Global Findex database covers more than 140 economies around the world. The initial survey round was followed by a second one in 2014 and by a third in 2017. Compiled using nationally representative surveys of more than 150,000 adults age 15 and above in over 140 economies, The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech

Revolution includes updated indicators on access to and use of formal and informal financial services. It has additional data on the use of financial technology (or fintech), including the use of mobile phones and the Internet to conduct financial transactions. The data reveal opportunities to expand access to financial services among people who do not have an account—the unbanked—as well as to promote greater use of digital financial services among those who do have an account. The Global Findex database has become a mainstay of global efforts to promote financial inclusion. In addition to being widely cited by scholars and development practitioners, Global Findex data are used to track progress toward the World Bank goal of Universal Financial Access by 2020 and the United Nations Sustainable Development Goals. The database, the full text of the report, and the underlying country-level data for all figures—along with the questionnaire, the survey

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methodology, and other relevant materials—are available at www.worldbank.org/globalfind ex.

Graph Databases - Elliott Edling 2017-05-18

Discover how graph databases can help you manage and query highly connected data. With this practical book, you'll learn how to design and implement a graph database that brings the power of graphs to bear on a broad range of problem domains. Whether you want to speed up your response to user queries or build a database that can adapt as your business evolves, this book shows you how to apply the schema-free graph model to real-world problems.

[Random Walks and Diffusions on Graphs and Databases](#) - Philipp Blanchard 2011-05-26

Most networks and databases that humans have to deal with contain large, albeit finite number of units. Their structure, for maintaining functional consistency of the components, is essentially not random and calls for a precise

quantitative description of relations between nodes (or data units) and all network components. This book is an introduction, for both graduate students and newcomers to the field, to the theory of graphs and random walks on such graphs. The methods based on random walks and diffusions for exploring the structure of finite connected graphs and databases are reviewed (Markov chain analysis). This provides the necessary basis for consistently discussing a number of applications such diverse as electric resistance networks, estimation of land prices, urban planning, linguistic databases, music, and gene expression regulatory networks.

Hands-On Graph Analytics with Neo4j - Estelle Scifo 2020-08-21

To start with you will cover the basics of graph analytics, Cypher querying language, components of graph architecture, and more. You will implement Neo4j techniques to understand various graph analytics

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methods to reveal complex relationships in data. You will understand how machine learning can be used to perform smarter graph analytics.

The Practitioner's Guide to Graph Data - Denise Gosnell
2020-03-20

Graph data closes the gap between the way humans and computers view the world. While computers rely on static rows and columns of data, people navigate and reason about life through relationships. This practical guide demonstrates how graph data brings these two approaches together. By working with concepts from graph theory, database schema, distributed systems, and data analysis, you'll arrive at a unique intersection known as graph thinking. Authors Denise Koessler Gosnell and Matthias Broecheler show data engineers, data scientists, and data analysts how to solve complex problems with graph databases. You'll explore templates for building with graph technology, along with

examples that demonstrate how teams think about graph data within an application. Build an example application architecture with relational and graph technologies Use graph technology to build a Customer 360 application, the most popular graph data pattern today Dive into hierarchical data and troubleshoot a new paradigm that comes from working with graph data Find paths in graph data and learn why your trust in different paths motivates and informs your preferences Use collaborative filtering to design a Netflix-inspired recommendation system

Graph Databases in Action - Dave Bechberger 2020-11-24

Graph Databases in Action introduces you to graph database concepts by comparing them with relational database constructs. You'll learn just enough theory to get started, then progress to hands-on development. Discover use cases involving social networking, recommendation engines, and personalization. Summary

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Relationships in data often look far more like a web than an orderly set of rows and columns. Graph databases shine when it comes to revealing valuable insights within complex, interconnected data such as demographics, financial records, or computer networks. In *Graph Databases in Action*, experts Dave Bechberger and Josh Perryman illuminate the design and implementation of graph databases in real-world applications. You'll learn how to choose the right database solutions for your tasks, and how to use your new knowledge to build agile, flexible, and high-performing graph-powered applications! Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Isolated data is a thing of the past! Now, data is connected, and graph databases—like Amazon Neptune, Microsoft Cosmos DB, and Neo4j—are the essential tools of this new reality. Graph databases

represent relationships naturally, speeding the discovery of insights and driving business value. About the book *Graph Databases in Action* introduces you to graph database concepts by comparing them with relational database constructs. You'll learn just enough theory to get started, then progress to hands-on development. Discover use cases involving social networking, recommendation engines, and personalization. What's inside Graph databases vs. relational databases Systematic graph data modeling Querying and navigating a graph Graph patterns Pitfalls and antipatterns About the reader For software developers. No experience with graph databases required. About the author Dave Bechberger and Josh Perryman have decades of experience building complex data-driven systems and have worked with graph databases since 2014. Table of Contents PART 1 - GETTING STARTED WITH GRAPH DATABASES 1 Introduction to graphs 2 Graph

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data modeling 3 Running basic and recursive traversals 4 Pathfinding traversals and mutating graphs 5 Formatting results 6 Developing an application PART 2 - BUILDING ON GRAPH DATABASES 7 Advanced data modeling techniques 8 Building traversals using known walks 9 Working with subgraphs PART 3 - MOVING BEYOND THE BASICS 10 Performance, pitfalls, and anti-patterns 11 What's next: Graph analytics, machine learning, and resources

Graph Data Management - Sherif Sakr 2012

"This book is a central reference source for different data management techniques for graph data structures and their applications, discussing graphs for modeling complex structured and schemaless data from the Semantic Web, social networks, protein networks, chemical compounds, and multimedia databases"--Provided by publisher.

Graph Data Management - George Fletcher 2018-10-31

This book presents a comprehensive overview of fundamental issues and recent advances in graph data management. Its aim is to provide beginning researchers in the area of graph data management, or in fields that require graph data management, an overview of the latest developments in this area, both in applied and in fundamental subdomains. The topics covered range from a general introduction to graph data management, to more specialized topics like graph visualization, flexible queries of graph data, parallel processing, and benchmarking. The book will help researchers put their work in perspective and show them which types of tools, techniques and technologies are available, which ones could best suit their needs, and where there are still open issues and future research directions. The chapters are contributed by leading experts in the relevant areas, presenting a coherent overview of the state of the art in the field. Readers should

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have a basic knowledge of data management techniques as they are taught in computer science MSc programs.

A First Course in Graph Theory

- Gary Chartrand 2013-05-20

Written by two prominent figures in the field, this comprehensive text provides a remarkably student-friendly approach. Its sound yet accessible treatment emphasizes the history of graph theory and offers unique examples and lucid proofs. 2004 edition.

Efficient and scalable graph view maintenance for deductive graph databases based on generalized

discrimination networks -

Beyhl, Thomas 2016-01-12

Graph databases provide a natural way of storing and querying graph data. In contrast to relational databases, queries over graph databases enable to refer directly to the graph structure of such graph data. For example, graph pattern matching can be employed to formulate queries over graph data. However, as for relational

databases running complex queries can be very time-consuming and ruin the interactivity with the database.

One possible approach to deal with this performance issue is to employ database views that consist of pre-computed answers to common and often stated queries. But to ensure that database views yield consistent query results in comparison with the data from which they are derived, these database views must be updated before queries make use of these database views.

Such a maintenance of database views must be performed efficiently, otherwise the effort to create and maintain views may not pay off in comparison to processing the queries directly on the data from which the database views are derived. At the time of writing, graph databases do not support database views and are limited to graph indexes that index nodes and edges of the graph data for fast query evaluation, but do not enable to maintain pre-computed answers of

complex queries over graph data. Moreover, the maintenance of database views in graph databases becomes even more challenging when negation and recursion have to be supported as in deductive relational databases. In this technical report, we present an approach for the efficient and scalable incremental graph view maintenance for deductive graph databases. The main concept of our approach is a generalized discrimination network that enables to model nested graph conditions including negative application conditions and recursion, which specify the content of graph views derived from graph data stored by graph databases. The discrimination network enables to automatically derive generic maintenance rules using graph transformations for maintaining graph views in case the graph data from which the graph views are derived change. We evaluate our approach in terms of a case study using multiple data sets derived from open source

projects.

CouchDB: The Definitive Guide

- J. Chris Anderson 2010-01-19

Three of CouchDB's creators show you how to use this document-oriented database as a standalone application framework or with high-volume, distributed applications. With its simple model for storing, processing, and accessing data, CouchDB is ideal for web applications that handle huge amounts of loosely structured data. That alone would stretch the limits of a relational database, yet CouchDB offers an open source solution that's reliable, scales easily, and responds quickly. CouchDB works with self-contained data that has loose or ad-hoc connections. It's a model that fits many real-world items, such as contacts, invoices, and receipts, but you'll discover that this database can easily handle data of any kind. With this book, you'll learn how to work with CouchDB through its RESTful web interface, and become familiar with key features such as simple

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document CRUD (create, read, update, delete), advanced MapReduce, deployment tuning, and more. Understand the basics of document-oriented storage and manipulation Interact with CouchDB entirely through HTTP using its RESTful interface Model data as self-contained JSON documents Handle evolving data schemas naturally Query and aggregate data in CouchDB using MapReduce views Replicate data between nodes Tune CouchDB for increased performance and reliability

Spatio-Temporal Graph Data Analytics - Venkata M. V. Gunturi 2017-12-15

This book highlights some of the unique aspects of spatio-temporal graph data from the perspectives of modeling and developing scalable algorithms. The authors discuss in the first part of this book, the semantic aspects of spatio-temporal graph data in two application domains, viz., urban transportation and social networks. Then the authors present representational

models and data structures, which can effectively capture these semantics, while ensuring support for computationally scalable algorithms. In the first part of the book, the authors describe algorithmic development issues in spatio-temporal graph data. These algorithms internally use the semantically rich data structures developed in the earlier part of this book. Finally, the authors introduce some upcoming spatio-temporal graph datasets, such as engine measurement data, and discuss some open research problems in the area. This book will be useful as a secondary text for advanced-level students entering into relevant fields of computer science, such as transportation and urban planning. It may also be useful for researchers and practitioners in the field of navigational algorithms.

Graph Data Processing with Cypher - Ravindranatha Anthapu 2022-12-16

Get acquainted with Cypher in a guided manner quickly and learn how to query the graph

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databases with efficient and performant queries Key Features Work with Cypher syntax and semantics while building graph traversal queries Get up and running with advanced Cypher concepts like List, Maps, OPTIONAL MATCH Master best practices in writing effective queries leveraging data modeling and patterns Book Description While it is easy to learn and understand the Cypher declarative language for querying graph databases, it can be very difficult to master it. As graph databases are becoming more mainstream, there is a dearth of content and guidance for developers to leverage database capabilities fully. This book fills the information gap by describing graph traversal patterns in a simple and readable way. This book provides a guided tour of Cypher from understanding the syntax, building a graph data model, and loading the data into graphs to building queries and profiling the queries for best performance. It introduces

APOC utilities that can augment Cypher queries to build complex queries. You'll also be introduced to visualization tools such as Bloom to get the most out of the graph when presenting the results to the end users. After having worked through this book, you'll have become a seasoned Cypher query developer with a good understanding of the query language and how to use it for the best performance. What you will learn Write Cypher queries from basic to advanced level Map the source data to the graph data model in an iterative fashion Load the data into a graph using LOAD CSV, APOC, and client drivers Map the business questions to graph queries effectively Identify query performance issues and fix them Extend capabilities of Cypher using APOC utilities Work with graph visualization tools like Bloom and Browser Who this book is for This book is targeted at Database Administrator, Database Developers, Graph Database Developers, and Graph

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Database Architects. This book will also help someone migrate from a DBA role to a graph data engineer or data scientist. If you are working with graph databases and need to learn

Cypher, or are a basic Cypher developer who wants to get better at data modeling and tuning queries to build performant Cypher queries, then this is the book for you.