

## Igraph Network Analysis Software

Fundamentals of Big Data Network Analysis for Research and Industry Hyunjong Lee, "Institute of Green Technology, Yonsei University, Republic of Korea" Il Sohn, "Material Science and Engineering, " "Yonsei University, Republic of Korea" Presents the methodology of big data analysis using examples from research and industry There are large amounts of data everywhere, and the ability to pick out crucial information is increasingly important. Contrary to popular belief, not all information is useful; big data network analysis assumes that data is not only large, but also meaningful, and this book focuses on the fundamental techniques required to extract essential information from vast datasets. Featuring case studies drawn largely from the iron and steel industries, this book offers practical guidance which will enable readers to easily understand big data network analysis. Particular attention is paid to the methodology of network analysis, offering information on the method of data collection, on research design and analysis, and on the interpretation of results. A variety of programs including UCINET, NetMiner, R, NodeXL, and Gephi for network analysis are covered in detail. "Fundamentals of Big Data Network Analysis" "for Research and Industry" looks at big data from a fresh perspective, and provides a new approach to data analysis. "This book" Explains the basic concepts in understanding big data and filtering meaningful data Presents big data analysis within the networking perspective Features methodology applicable to research and industry Describes in detail the social relationship between big data and its implications Provides insight into identifying patterns and relationships between seemingly unrelated big data "Fundamentals of Big Data Network Analysis" "for Research and Industry" will prove a valuable resource for analysts, research engineers, industrial engineers, marketing professionals, and any individuals dealing with accumulated large data whose interest is to analyze and identify potential relationships among data sets.

Gain sharp insights into your data and solve real-world data science problems with R—from data munging to modeling and visualization About This Book Handle your data with precision and care for optimal business intelligence Restructure and transform your data to inform decision-making Packed with practical advice and tips to help you get to grips with data mining Who This Book Is For If you are a data scientist or R developer who wants to explore and optimize your use of R's advanced features and tools, this is the book for you. A basic knowledge of R is required, along with an understanding of database logic. What You Will Learn Connect to and load data from R's range of powerful databases Successfully fetch and parse structured and unstructured data Transform and restructure your data with efficient R packages Define and build complex statistical models with glm Develop and train machine learning algorithms Visualize social networks and graph data Deploy supervised and unsupervised classification algorithms Discover how to visualize spatial data with R In Detail R is an essential language for sharp and successful data analysis. Its numerous features and ease of use make it a powerful way of mining, managing, and interpreting large sets of data. In a world where understanding big data has become key, by mastering R you will be able to deal with your data effectively and efficiently. This book will give you the guidance you need to build and develop your knowledge and expertise. Bridging the gap between theory and practice, this book will help you to understand and use data for a competitive advantage. Beginning with taking you through essential data mining and management tasks such as munging, fetching, cleaning, and restructuring, the book then explores different model designs and the core components of effective analysis. You will then discover how to optimize your use of machine learning algorithms for classification and recommendation systems beside the traditional and more recent statistical methods. Style and approach Covering the essential tasks and skills within data science, Mastering Data Analysis provides you with solutions to the challenges of data science. Each section gives you a theoretical overview before demonstrating how to put the theory to work with real-world use cases and hands-on examples.

This book uses social network analysis to explore the various effects that social networks have on religious belief and practice.

Air Route Networks Through Complex Networks Theory connects theory research with network connectivity analysis, providing practitioners with the tools they need to develop more efficient, resilient and profitable air route networks. The book helps airline route planners and executives create more robust route networks that are less vulnerable to disruptions, such as node isolation. The book further explores errors and attacks in complex networks, strategies for detecting critical nodes and cascading failure models to assess and maximize robustness. The book explains how to measure air route network connectivity with complex network representations. Air transport is among the most dynamic and toughest competition industries in today's global economy. The quality of air route network design is a key strategic factor in an airline's viability. These robust networks provide for more stable and secure carrier operations vs. those based simply on existing supply and demand volumes. Node-specific and network-specific representations are covered, along with in-depth coverage of connectivity in special and temporal networks. These collective tools serve as a guide for practitioners seeking to apply complex network theory to the airline industry. Presents complex networks theory research results applied to airline transportation networks Examines airline network robustness in the face of disruptions, providing strategies for detecting critical nodes of air transport networks Provides historical perspective on the economic, political, technical, and geographical constraints that influence airline route portfolios Connects data from valuable tools, such as navpoints, area control centers (ACC), and flight information centers, with air network modeling Studies spreading-related phenomena, such as rumors, and disease contagions, and how these affect the airline industry

Ultimate Performance Analysis Tool (uPATO)

Implementation of Network Measures Based on Adjacency Matrices for Team Sports

Seascape Ecology

Quick Start Guide

Python for Graph and Network Analysis

Economics with Heterogeneous Interacting Agents

This textbook describes recent advances in genomics and bioinformatics and provides numerous examples of genome data analysis that illustrate its relevance to real world problems and will improve the reader's bioinformatics skills. Basic data preprocessing with normalization and filtering, primary pattern analysis, and machine learning algorithms using R and Python are demonstrated for gene-expression microarrays, genotyping microarrays, next-generation sequencing data, epigenomic data, and biological network and semantic analyses. In addition, detailed attention is devoted to integrative genomic data analysis, including multivariate data projection, gene-metabolic pathway mapping, automated biomolecular annotation, text mining of factual and literature databases, and integrated management of biomolecular databases. The textbook is primarily intended for life scientists, medical scientists, statisticians, data processing researchers, engineers, and other beginners in bioinformatics who are experiencing difficulty in approaching the field. However, it will also serve as a simple guideline for experts unfamiliar with the new, developing subfield of genomic analysis within bioinformatics.

This book *A Beginner's Guide to Learning Analytics* is designed to meet modern educational trends' needs. It is addressed to readers who have no prior knowledge of learning analytics and functions as an introductory text to learning analytics for those who want to do more with evaluation/assessment in their organizations. The book is useful to all who need to evaluate their learning and teaching strategies. It aims to bring greater efficiency and deeper engagement to individual students, learning communities, and educators. Covered here are the key concepts linked to learning analytics for researchers and practitioners interested in learning analytics. This book helps those who want to apply analytics to learning and development programs and helps educational institutions to identify learners who require support and provide a more personalized learning experience. Like chapters show diverse uses of learning analytics to enhance student and faculty performance. It presents a coherent framework for the effective translation of learning analytics research for educational practice to its practical application in different educational domains. This book provides educators and researchers with the tools and frameworks to effectively make sense of and use data and analytics in their everyday practice. This book will be a valuable addition to researchers' bookshelves.

This book introduces the ultimate performance analysis tool (uPATO) as a new software to compute social network metrics in the scope of team sports analysis. The reader will identify the algorithms to test the general properties of the team, the co-dependencies and the centrality levels of players, i.e. to evaluate the individual, sub-group, and team performance analysis. As uPATO tool implements the metrics for all options, namely for unweighted graphs, weighted graphs, unweighted digraphs and weighted digraphs, it is also useful for network analysis into other areas beyond team sports. The book assists the reader to compute the metrics and to use it in different scenarios.

Mutualistic interactions among plants and animals have played a paramount role in shaping biodiversity. Yet the majority of studies on mutualistic interactions have involved only a few species, as opposed to broader mutual connections between communities of organisms. *Mutualistic Networks* is the first book to comprehensively explore this burgeoning field. Integrating different approaches, from the statistical description of network structures to the development of new analytical frameworks, Jordi Bascompte and Pedro Jordano describe the architecture of these mutualistic networks and show their importance for the robustness of biodiversity and the coevolutionary process. Making a case for why we should care about mutualisms and their complex networks, this book offers a new perspective on the study and synthesis of this growing area for ecologists and evolutionary biologists. It will serve as the standard reference for all future work on mutualistic interactions in biological communities.

Trends, Approaches, Graph Theory, and Algorithms

Fundamentals of Big Data Network Analysis for Research and Industry

*A Beginner's Guide to Learning Analytics*

Digital Transformation and Global Society

Research Anthology on Digital Transformation, Organizational Change, and the Impact of Remote Work

*A Practical Guide to Agent-Based Modeling*

As the use of remote work has recently skyrocketed, digital transformation within the workplace has gone under a microscope; it has become abundantly clear that the incorporation of new technologies in the workplace is the future of business. These technologies keep businesses up to date with their capabilities to perform remote work and make processes more efficient and effective than ever before. In understanding digital transformation in the workplace there needs to be advanced research on technology, organizational change, and the impacts of remote work on the business, the employees, and day-to-day work practices. This advancement to a digital work culture and remote work is rapidly undergoing major advancements, and research needed to keep up with both the positives and negatives to this transformation. The *Research Anthology on Digital Transformation, Organizational Change, and the Impact of Remote Work* contains hand-selected, previously published research that explores the impacts of remote work on business workplaces while also focusing on digital transformation for improving efficiency of work. While highlighting work technologies, digital practices, business management, organizational change, and the effects of remote work on employees, this book is an all-encompassing research work intended for managers, business owners, specialists, executives, practitioners, stakeholders, researchers, academicians, and students interested in how digital transformation and remote work is affecting workplaces.

This book constitutes refereed proceedings of the 8th Conference on Information and Communication Technologies of Ecuador (TICEC 2020), held in November 2020. Due to the COVID-19 pandemic the conference was held online. The 36 full and 7 short papers were carefully reviewed and selected from 117 qualified submissions. The papers are organized according to the following topical sections: biomedical sensors and wearables systems; data science; ICT's applications; industry 4.0; smart cities; software development; technology and environment.

This brief textbook explains the principles of social network analysis. The book goes beyond theoretical concepts and gives the reader complete knowledge about how to apply analytical techniques using Pajek to perform a large-scale network analysis. The book covers the topic in 2 sections – the first detailing fundamentals of research design and the next one about methods and applications. Readers can then apply the techniques in this book to other online communities, such as Facebook and Twitter. The book is intended for networking students and general readers who want to learn the basics without going deep into mathematical methods. It is also useful for researchers and professionals from other fields seeking to understand the basics of large-scale

network analysis.

Social network analysis is used to investigate the inter-relationship between entities. Examples of network structures, include social media networks, friendship networks and collaboration networks. This book provides a quick start guide to network analysis and visualization in R. You'll learn, how to: - Create static and interactive network graphs using modern R packages. - Change layout of network graphs. - Detect important or central entities in a network graph. - Detect community (or cluster) in a network.

Mutualistic Networks

Algorithm, Security and Application

Network Science In Education

Genome Data Analysis

Examples and Case Studies

Biological Network Analysis

**The withdrawal of correspondent banking relationships (CBRs) remains a concern for the international community because, in affected jurisdictions, the decline could have potential adverse consequences on international trade, growth, financial inclusion, and the stability and integrity of the financial system. Building on existing initiatives and IMF technical assistance, this paper discusses a framework that can be readily used by central banks and supervisory authorities to effectively monitor the developments of CBRs in their jurisdiction. The working paper explains the monitoring framework and includes the necessary reporting templates and an analytical tool for the collection of data and analysis of CBRs.**

**Graph data is powerful, thanks to its ability to model arbitrary relationship between objects and is encountered in a range of real-world applications in fields such as bioinformatics, traffic network, scientific collaboration, world wide web and social networks. Graph data mining is used to discover useful information and knowledge from graph data. The complications of nodes, links and the semi-structure form present challenges in terms of the computation tasks, e.g., node classification, link prediction, and graph classification. In this context, various advanced techniques, including graph embedding and graph neural networks, have recently been proposed to improve the performance of graph data mining. This book provides a state-of-the-art review of graph data mining methods. It addresses a current hot topic--the security of graph data mining-- and proposes a series of detection methods to identify adversarial samples in graph data. In addition, it introduces readers to graph augmentation and subgraph networks to further enhance the models, i.e., improve their accuracy and robustness. Lastly, the book describes the applications of these advanced techniques in various scenarios, such as traffic networks, social and technical networks, and blockchains. .**

**Knowledge Discovery in the Social Sciences helps readers find valid, meaningful, and useful information. It is written for researchers and data analysts as well as students who have no prior experience in statistics or computer science. Suitable for a variety of classes—including upper-division courses for undergraduates, introductory courses for graduate students, and courses in data management and advanced statistical methods—the book guides readers in the application of data mining techniques and illustrates the significance of newly discovered knowledge. Readers will learn to: • appreciate the role of data mining in scientific research • develop an understanding of fundamental concepts of data mining and knowledge discovery • use software to carry out data mining tasks • select and assess appropriate models to ensure findings are valid and meaningful • develop basic skills in data preparation, data mining, model selection, and validation • apply concepts with end-of-chapter exercises and review summaries**

**The new edition of this book provides an easily accessible introduction to the statistical analysis of network data using R. It has been fully revised and can be used as a stand-alone resource in which multiple R packages are used to illustrate how to conduct a wide range of network analyses, from basic manipulation and visualization, to summary and characterization, to modeling of network data. The central package is igraph, which provides extensive capabilities for studying network graphs in R. The new edition of this book includes an overhaul to recent changes in igraph. The material in this book is organized to flow from descriptive statistical methods to topics centered on modeling and inference with networks, with the latter separated into two sub-areas, corresponding first to the modeling and inference of networks themselves, and then, to processes on networks. The book begins by covering tools for the manipulation of network data. Next, it addresses visualization and characterization of networks. The book then examines mathematical and statistical network modeling. This is followed by a special case of network modeling wherein the network topology must be inferred. Network processes, both static and dynamic are addressed in the subsequent chapters. The book concludes by featuring chapters on network flows, dynamic networks, and networked experiments. Statistical Analysis of Network Data with R, 2nd Ed. has been written at a level aimed at graduate students and researchers in quantitative disciplines engaged in the statistical analysis of network data, although advanced undergraduates already comfortable with R should find the book fairly accessible as well.**

**8th Conference, TICEC 2020, Guayaquil, Ecuador, November 25–27, 2020, Proceedings**

**Graph Theoretic Approaches for Analyzing Large-Scale Social Networks**

**Ties that Bind, Loose, Build-up, and Tear Down**

**Methods and Models**

**Air Route Networks Through Complex Networks Theory**

This book offers a detailed overview of translational bioinformatics together with real-case applications. Translational bioinformatics integrates the areas of basic bioinformatics, clinical informatics, statistical genetics and informatics in order to further our understanding of the molecular basis of diseases. By analyzing voluminous amounts of molecular and clinical data, it also provides clinical information, which can then be applied. Filling the gap between clinic research and informatics, the book is a valuable resource for human geneticists, clinicians, health educators and policy makers, as well as graduate students majoring in biology, biostatistics, and bioinformatics.

In recent years there has been an explosion of network data – that is, measurements that are either of or from a system conceptualized as a network – from seemingly all corners of science. The combination of an increasingly pervasive interest in scientific analysis at a systems level and the ever-growing capabilities for high-throughput data collection in various fields has fueled this trend. Researchers from biology and bioinformatics

to physics, from computer science to the information sciences, and from economics to sociology are more and more engaged in the collection and statistical analysis of data from a network-centric perspective. Accordingly, the contributions to statistical methods and modeling in this area have come from a similarly broad spectrum of areas, often independently of each other. Many books already have been written addressing network data and network problems in specific individual disciplines. However, there is at present no single book that provides a modern treatment of a core body of knowledge for statistical analysis of network data that cuts across the various disciplines and is organized rather according to a statistical taxonomy of tasks and techniques. This book seeks to fill that gap and, as such, it aims to contribute to a growing trend in recent years to facilitate the exchange of knowledge across the pre-existing boundaries between those disciplines that play a role in what is coming to be called 'network science'.

Metabolomics and proteomics allow deep insights into the chemistry and physiology of biological systems. This book expounds open-source programs, platforms and programming tools for analysing metabolomics and proteomics mass spectrometry data. In contrast to commercial software, open-source software is created by the academic community, which facilitates the direct interaction between users and developers and accelerates the implementation of new concepts and ideas. The first section of the book covers the basics of mass spectrometry, experimental strategies, data operations, the open-source philosophy, metabolomics, proteomics and statistics/ data mining. In the second section, active programmers and users describe available software packages. Included tutorials, datasets and code examples can be used for training and for building custom workflows. Finally, every reader is invited to participate in the open science movement.

**Biological Network Analysis: Trends, Approaches, Graph Theory, and Algorithms** considers three major biological networks, including Gene Regulatory Networks (GRN), Protein-Protein Interaction Networks (PPIN), and Human Brain Connectomes. The book's authors discuss various graph theoretic and data analytics approaches used to analyze these networks with respect to available tools, technologies, standards, algorithms and databases for generating, representing and analyzing graphical data. As a wide variety of algorithms have been developed to analyze and compare networks, this book is a timely resource. Presents recent advances in biological network analysis, combining Graph Theory, Graph Analysis, and various network models Discusses three major biological networks, including Gene Regulatory Networks (GRN), Protein-Protein Interaction Networks (PPIN) and Human Brain Connectomes Includes a discussion of various graph theoretic and data analytics approaches

**Transformational Approaches in Teaching and Learning**

**For Medicine and Life Science**

**Translational Bioinformatics and Its Application**

**Machine Learning and Systems Biology in Genomics and Health**

**Advances in Cartography and GIScience**

**Networks**

This book offers a practical guide to Agent Based economic modeling, adopting a "learning by doing" approach to help the reader master the fundamental tools needed to create and analyze Agent Based models. After providing them with a basic "toolkit" for Agent Based modeling, it presents and discusses didactic models of real financial and economic systems in detail. While stressing the main features and advantages of the bottom-up perspective inherent to this approach, the book also highlights the logic and practical steps that characterize the model building procedure. A detailed description of the underlying codes, developed using R and C, is also provided. In addition, each didactic model is accompanied by exercises and applications designed to promote active learning on the part of the reader. Following the same approach, the book also presents several complementary tools required for the analysis and validation of the models, such as sensitivity experiments, calibration exercises, economic network and statistical distributions analysis. By the end of the book, the reader will have gained a deeper understanding of the Agent Based methodology and be prepared to use the fundamental techniques required to start developing their own economic models. Accordingly, "Economics with Heterogeneous Interacting Agents" will be of particular interest to graduate and postgraduate students, as well as to academic institutions and lecturers interested in including an overview of the AB approach to economic modeling in their courses.

This book presents a selection of manuscripts submitted to the 2017 International Cartographic Conference held in Washington, DC at the beginning of July and made available at the conference. These manuscripts have been selected by the Scientific Program Committee and represent the wide-range of research that is done in the discipline. It also forms an important international collection representing research from at least 30-40 countries.

This book presents a range of qualitative and quantitative analyses in areas such as cybersecurity, sustainability, multivariate analysis, customer satisfaction, parametric programming, software reliability growth modeling, and blockchain technology, to name but a few. It also highlights integrated methods and practices in the areas of machine learning and genetic algorithms. After discussing applications in supply chains and logistics, cloud computing, six sigma, production management, big data analysis, satellite imaging, game theory, biometric systems, quality, and system performance, the book examines the latest developments and breakthroughs in the field of science and technology, and provides novel problem-solving methods. The themes discussed in the book link contributions by researchers and practitioners from different branches of engineering and management, and hailing from around the globe. These contributions provide scholars with a platform to derive maximum utility in the area of analytics by subscribing to the idea of managing business through system sciences, operations, and management. Managers and decision-makers can learn a great deal from the respective chapters, which will help them devise their own business strategies and find real-world solutions to complex industrial problems.

This research monograph provides the means to learn the theory and practice of graph and network analysis using the Python programming language. The social network analysis techniques, included, will help readers to efficiently analyze social data from Twitter, Facebook, LiveJournal, GitHub and many

others at three levels of depth: ego, group, and community. They will be able to analyse militant and revolutionary networks and candidate networks during elections. For instance, they will learn how the Ebola virus spread through communities. Practically, the book is suitable for courses on social network analysis in all disciplines that use social methodology. In the study of social networks, social network analysis makes an interesting interdisciplinary research area, where computer scientists and sociologists bring their competence to a level that will enable them to meet the challenges of this fast-developing field. Computer scientists have the knowledge to parse and process data while sociologists have the experience that is required for efficient data editing and interpretation. Social network analysis has successfully been applied in different fields such as health, cyber security, business, animal social networks, information retrieval, and communications.

Decision Analytics Applications in Industry

Statistical Analysis of Network Data with R

A Data Mining Approach

Practical Social Network Analysis with Python

Graph Data Mining

Selections from the International Cartographic Conference 2017

**R and Data Mining introduces researchers, post-graduate students, and analysts to data mining using R, a free software environment for statistical computing and graphics. The book provides practical methods for using R in applications from academia to industry to extract knowledge from vast amounts of data. Readers will find this book a valuable guide to the use of R in tasks such as classification and prediction, clustering, outlier detection, association rules, sequence analysis, text mining, social network analysis, sentiment analysis, and more. Data mining techniques are growing in popularity in a broad range of areas, from banking to insurance, retail, telecom, medicine, research, and government. This book focuses on the modeling phase of the data mining process, also addressing data exploration and model evaluation. With three in-depth case studies, a quick reference guide, bibliography, and links to a wealth of online resources, R and Data Mining is a valuable, practical guide to a powerful method of analysis. Presents an introduction into using R for data mining applications, covering most popular data mining techniques Provides code examples and data so that readers can easily learn the techniques Features case studies in real-world applications to help readers apply the techniques in their work**

**Artificial intelligence (AI) has become pervasive in most areas of research and applications. While computation can significantly reduce mental efforts for complex problem solving, effective computer algorithms allow continuous improvement of AI tools to handle complexity—in both time and memory requirements—for machine learning in large datasets. Meanwhile, data science is an evolving scientific discipline that strives to overcome the hindrance of traditional skills that are too limited to enable scientific discovery when leveraging research outcomes. Solutions to many problems in medicine and life science, which cannot be answered by these conventional approaches, are urgently needed for society. This edited book attempts to report recent advances in the complementary domains of AI, computation, and data science with applications in medicine and life science. The benefits to the reader are manifold as researchers from similar or different fields can be aware of advanced developments and novel applications that can be useful for either immediate implementations or future scientific pursuit. Features: Considers recent advances in AI, computation, and data science for solving complex problems in medicine, physiology, biology, chemistry, and biochemistry Provides recent developments in three evolving key areas and their complementary combinations: AI, computation, and data science Reports on applications in medicine and physiology, including cancer, neuroscience, and digital pathology Examines applications in life science, including systems biology, biochemistry, and even food technology This unique book, representing research from a team of international contributors, has not only real utility in academia for those in the medical and life sciences communities, but also a much wider readership from industry, science, and other areas of technology and education.**

**Suitable for a one- or two-semester course for undergraduate and graduate students, this interdisciplinary textbook explains the diverse aspects of innovation and social networks, which occupy a central place in business and policy agendas. Its unified approach presents networks as nested systems that can span organisations, industries, regions, and markets, giving students a holistic perspective and reducing the amount of effort required to learn the theoretical framework for each layer. With engaging real-world examples, the text also provides a practical guide on how to manage networks to increase innovation and improve performance. Topics covered include forming teams to foster creativity, selecting partners and leveraging partnerships for learning, managing organisational change, and sponsoring technologies in communities. Students will learn the metrics used in social network analysis and how they are interpreted and applied. Suggested reading lists and online resources offer opportunities for further review and practice.**

**Seascape Ecology provides a comprehensive look at the state-of-the-science in the application of landscape ecology to the seas and provides guidance for future research priorities. The first book devoted exclusively to this rapidly emerging and increasingly important discipline, it is comprised of contributions from researchers at the forefront of seascape ecology working around the world. It presents the principles, concepts, methodology, and techniques informing seascape ecology and reports on the latest developments in the application of the approach to marine ecology and management. A growing number of marine scientists, geographers, and marine managers are asking questions about the marine environment that are best addressed with a landscape ecology perspective. Seascape Ecology represents the first serious effort to fill the gap in the literature on the subject. Key topics and features of interest include: The origins and history of seascape ecology and various approaches to spatial patterning in the sea The links between seascape patterns and ecological processes, with special attention paid to the roles played by seagrasses and salt marshes and animal movements through seascapes Human influences on seascape ecology—includes models for assessing human-seascape interactions A special epilogue in which three eminent scientists who have been instrumental in shaping the course of landscape ecology offer their insights and perspectives Seascape Ecology is a must-read for researchers and professionals in an array of disciplines, including marine biology, environmental science, geosciences, marine and coastal management, and environmental protection. It is also an excellent supplementary text for university courses in those fields.**

**Combinatorial Scientific Computing**

**An Introduction**

**Advances in Artificial Intelligence, Computation, and Data Science**

**R and Data Mining****Social Networks: Analysis and Case Studies****Business Process Management**

Statistical Analysis of Network Data with RSpringer

This book brings together advances in mathematics, physics, computer science, biology and social network analysis to present a comprehensive picture of the scientific study of networks. The book includes discussion of computer networks, social networks, biological networks, and others, and an introduction to the mathematics of network theory.

This book focuses on social network analysis from a computational perspective, introducing readers to the fundamental aspects of network theory by discussing the various metrics used to measure the social network. It covers different forms of graphs and their analysis using techniques like filtering, clustering and rule mining, as well as important theories like small world phenomenon. It also presents methods for identifying influential nodes in the network and information dissemination models. Further, it uses examples to explain the tools for visualising large-scale networks, and explores emerging topics like big data and deep learning in the context of social network analysis. With the Internet becoming part of our everyday lives, social networking tools are used as the primary means of communication. And as the volume and speed of such data is increasing rapidly, there is a need to apply computational techniques to interpret and understand it. Moreover, relationships in molecular structures, co-authors in scientific journals, and developers in a software community can also be understood better by visualising them as networks. This book brings together the theory and practice of social network analysis and includes mathematical concepts, computational techniques and examples from the real world to offer readers an overview of this domain.

Networks have permeated everyday life through everyday realities like the Internet, social networks, and viral marketing. As such, network analysis is an important growth area in the quantitative sciences, with roots in social network analysis going back to the 1930s and graph theory going back centuries. Measurement and analysis are integral components of network research. As a result, statistical methods play a critical role in network analysis. This book is the first of its kind in network research. It can be used as a stand-alone resource in which multiple R packages are used to illustrate how to conduct a wide range of network analyses, from basic manipulation and visualization, to summary and characterization, to modeling of network data. The central package is igraph, which provides extensive capabilities for studying network graphs in R. This text builds on Eric D. Kolaczyk's book Statistical Analysis of Network Data (Springer, 2009).

First International Conference, DTGS 2016, St. Petersburg, Russia, June 22-24, 2016, Revised Selected Papers

Mastering Data Analysis with R

Network Analysis and Visualization in R

Social Network Analysis: An Introduction with an Extensive Implementation to a Large-Scale Online Network Using Pajek

Knowledge Discovery in the Social Sciences

Strategic Management of Innovation Networks

*Combinatorial Scientific Computing explores the latest research on creating algorithms and software tools to solve key combinatorial problems on large-scale high-performance computing architectures. It includes contributions from international researchers who are pioneers in designing software and applications for high-performance computing systems. The book offers a state-of-the-art overview of the latest research, tool development, and applications. It focuses on load balancing and parallelization on high-performance computers, large-scale optimization, algorithmic differentiation of numerical simulation code, sparse matrix software tools, and combinatorial challenges and applications in large-scale social networks. The authors unify these seemingly disparate areas through a common set of abstractions and algorithms based on combinatorics, graphs, and hypergraphs. Combinatorial algorithms have long played a crucial enabling role in scientific and engineering computations and their importance continues to grow with the demands of new applications and advanced architectures. By addressing current challenges in the field, this volume sets the stage for the accelerated development and deployment of fundamental enabling technologies in high-performance scientific computing.*

*"This book provides an in-depth analysis of attrition modeling relevant to business planning and management, offering insightful and detailed explanation of best practices, tools, and theory surrounding churn prediction and the integration of analytic tools"--Provided by publisher.*

*Social networking is a concept that has existed for a long time; however, with the explosion of the Internet, social networking has become a tool for people to connect and communicate in ways that were impossible in the past. The recent development of Web 2.0 has provided many new applications, such as Myspace, Facebook, and LinkedIn. The purpose of Handbook of Social Network Technologies and Applications is to provide comprehensive guidelines on the current and future trends in social network technologies and applications in the field of Web-based Social Networks. This handbook includes contributions from world experts in the field of social networks from both academia and private industry. A number of crucial topics are covered including Web and software technologies and communication technologies for social networks. Web-mining techniques, visualization techniques, intelligent social networks, Semantic Web, and many other topics are covered. Standards for social networks, case studies, and a variety of applications are covered as well.*

*Social network analysis has created novel opportunities within the field of data science. The complexity of these networks requires new techniques to optimize the extraction of useful information. Graph Theoretic Approaches for Analyzing Large-Scale Social Networks is a pivotal reference source for the latest academic research on emerging algorithms and methods for the analysis of social networks. Highlighting a range of pertinent topics such as influence maximization, probabilistic exploration, and distributed memory, this book is ideally designed for academics, graduate students, professionals, and practitioners actively involved in the field of data science.*

Theory and Applications

Statistical Analysis of Network Data

Networks and Religion

Developing Churn Models Using Data Mining Techniques and Social Network Analysis

Understanding Correspondent Banking Trends: A Monitoring Framework

A Practical Guide

**This book constitutes the refereed proceedings of the First International Conference on Digital Transformation**

and Global Society, DTGS 2016, held in St. Petersburg, Russia, in June 2016. The 43 revised full papers and 15 revised short papers, presented together with 3 poster papers and an invited paper were carefully reviewed and selected from 157 submissions. The papers are organized in topical sections on eSociety: New Social Media Studies; eSociety: eGovernment and eParticipation: Perspectives on ICTs in Public Administration and Democracy; eKnowledge: ICTs in Learning and Education Management; eCity: ICTs for Better Urban (Rural) Planning and Living; eHealth: ICTs in Healthcare; eScience: Big Data Complex Calculations.

The present volume provides a comprehensive resource for practitioners and researchers alike-both those new to the field as well as those who already have some experience. The work covers Social Network Analysis theory and methods with a focus on current applications and case studies applied in various domains such as mobile networks, security, machine learning and health. With the increasing popularity of Web 2.0, social media has become a widely used communication platform. Parallel to this development, Social Network Analysis gained in importance as a research field, while opening up many opportunities in different application domains. Forming a bridge between theory and applications makes this work appealing to both academics and practitioners as well as graduate students.

Around the globe, there is an increasingly urgent need to provide opportunities for learners to embrace complexity; to develop the many skills and habits of mind that are relevant to today's complex and interconnected world; and to make learning more connected to our rapidly changing workplace and society. This presents an opportunity to (1) leverage new paradigms for understanding the structure and function of teaching and learning communities, and (2) to promote new approaches to developing methods, curricular materials, and resources.

Network science - the study of connectivity - can play an important role in these activities, both as an important subject in teaching and learning and as a way to develop interconnected curricula. Since 2010, an international community of network science researchers and educators has come together to raise the global level of network literacy by applying ideas from network science to teaching and learning. Network Science in Education - which refers to both this community and to its activities - has evolved in response to the escalating activity in the field of network science and the need for people to be able to access the field through education channels. Network Science In Education: Transformational Approaches in Teaching and Learning appeals to both instructors and professionals, while offering case studies from a wide variety of activities that have been developed around the globe: the creation of entirely new courses and degree programs; tools for K-20 learners, teachers, and the general public; and in-depth analysis of selected programs. As network-based pedagogy and the community of practice continues to grow, we hope that the book's readers will join this vibrant network education community to build on these nascent ideas and help deepen the understanding of networks for all learners.

Business Process Management (BPM) has been in existence for decades. It uses, complements, integrates and extends theories, methods and tools from other scientific disciplines like: strategic management, information technology, managerial accounting, operations management etc. During this period the main focus themes of researchers and professionals in BPM were: business process modeling, business process analysis, activity based costing, business process simulation, performance measurement, workflow management, the link between information technology and BPM for process automation etc. More recently the focus moved to subjects like Knowledge Management, Enterprise Resource Planning (ERP) Systems, Service Oriented Architectures (SOAs), Process Intelligence (PI) and even Social Networks. In this collection of papers we present a review of the work and the outcomes achieved in the classic BPM fields as well as a deeper insight on recent advances in BPM. We present a review of business process modeling and analysis and we elaborate on issues like business process quality and process performance measurement as well as their link to all other organizational aspects like human resources management, strategy, information technology (being SOA, PI or ERP), other managerial systems, job descriptions etc. We also present recent advances to BPR tools with special focus on information technology, workflow, business process modeling and human resources management tools. Other chapters elaborate on the aspect of business process and organizational costing and their relationship to business process analysis, organizational change and reorganization. In the final chapters we present some new approaches that use fuzzy cognitive maps and a recently developed software tool for scenario creation and simulation in strategic management, business process management, performance measurement and social networking. The audience of this book is quite wide. The first chapters can be read by professionals, academics and students who want to get some basic insight into the BPM field whereas the remaining present more elaborate and state of the art concepts methodologies and tools for an audience of a more advanced level.

Processing Metabolomics and Proteomics Data with Open Software

Handbook of Social Network Technologies and Applications

Information and Communication Technologies