

Wil M. P. van der Aalst

# Process Mining

Discovery, Conformance and Enhancement of Business Processes



Springer

# Process Mining Discovery Conformance And Enhancement Of Business Processes

**Gabriela Prostean, Juan José Lavios  
Villahoz, Laura Brancu, Gyula Bakacsi**

## **Process Mining Discovery Conformance And Enhancement Of Business Processes:**

*Process Mining* Wil M. P. van der Aalst,2016-04-15 This is the second edition of Wil van der Aalst s seminal book on process mining which now discusses the field also in the broader context of data science and big data approaches It includes several additions and updates e g on inductive mining techniques the notion of alignments a considerably expanded section on software tools and a completely new chapter of process mining in the large It is self contained while at the same time covering the entire process mining spectrum from process discovery to predictive analytics After a general introduction to data science and process mining in Part I Part II provides the basics of business process modeling and data mining necessary to understand the remainder of the book Next Part III focuses on process discovery as the most important process mining task while Part IV moves beyond discovering the control flow of processes highlighting conformance checking and organizational and time perspectives Part V offers a guide to successfully applying process mining in practice including an introduction to the widely used open source tool ProM and several commercial products Lastly Part VI takes a step back reflecting on the material presented and the key open challenges Overall this book provides a comprehensive overview of the state of the art in process mining It is intended for business process analysts business consultants process managers graduate students and BPM researchers

Process Mining Wil van der Aalst,2014-10-07 More and more information about business processes is recorded by information systems in the form of so called event logs Despite the omnipresence of such data most organizations diagnose problems based on fiction rather than facts Process mining is an emerging discipline based on process model driven approaches and data mining It not only allows organizations to fully benefit from the information stored in their systems but it can also be used to check the conformance of processes detect bottlenecks and predict execution problems Wil van der Aalst delivers the first book on process mining It aims to be self contained while covering the entire process mining spectrum from process discovery to operational support In Part I the author provides the basics of business process modeling and data mining necessary to understand the remainder of the book Part II focuses on process discovery as the most important process mining task Part III moves beyond discovering the control flow of processes and highlights conformance checking and organizational and time perspectives Part IV guides the reader in successfully applying process mining in practice including an introduction to the widely used open source tool ProM Finally Part V takes a step back reflecting on the material presented and the key open challenges Overall this book provides a comprehensive overview of the state of the art in process mining It is intended for business process analysts business consultants process managers graduate students and BPM researchers

Process Mining Techniques for Pattern Recognition Vikash Yadav,Anil Kumar Dubey,Harivans Pratap Singh,Gaurav Dubey,Erma Suryani,2022-02-27 This book focuses on the theory practice and concepts of process mining techniques in detail especially pattern recognition in diverse society science medicine engineering and business The book deliberates several perspectives on process mining techniques in the broader context of data science and

big data approaches Process Mining Techniques for Pattern Recognition Concepts Theory and Practice provides an introduction to process mining techniques and pattern recognition After that it delivers the fundamentals of process modelling and mining essential to comprehend the book The text emphasizes discovery as an important process mining task and includes case studies as well as real life examples to guide users in successfully applying process mining techniques for pattern recognition in practice Intended to be an introduction to process mining and pattern recognition for students academics and practitioners this book is perfect for those who want to learn the basics and also gain an understanding of the concepts on a deeper level

**Production at the Leading Edge of Technology** Bernd-Arno Behrens,Alexander Brosius,Welf-Guntram Drossel,Wolfgang Hintze,Steffen Ihlenfeldt,Peter Nyhuis,2021-09-04 This congress proceedings provides recent research on leading edge manufacturing processes The aim of this scientific congress is to work out diverse individual solutions of production at the leading edge of technology and transferable methodological approaches In addition guest speakers with different backgrounds will give the congress participants food for thoughts interpretations views and suggestions The manufacturing industry is currently undergoing a profound structural change which on the one hand produces innovative solutions through the use of high performance communication and information technology and on the other hand is driven by new requirements for goods especially in the mobility and energy sector With the social discourse on how we should live and act primarily according to guidelines of sustainability structural change is gaining increasing dynamic It is essential to translate politically specified sustainability goals into socially accepted and marketable technical solutions Production research is meeting this challenge and will make important contributions and provide innovative solutions from different perspectives

*ICT for an Inclusive World* Youcef Baghdadi,Antoine Harfouche,Marta Musso,2020-01-30 This book discusses the impact of information and communication technologies ICTs on organizations and on society as a whole Specifically it examines how such technologies improve our life and work making them more inclusive through smart enterprises The book focuses on how actors understand Industry 4 0 as well as the potential of ICTs to support organizational and societal activities and how they adopt and adapt these technologies to achieve their goals Gathering papers from various areas of organizational strategy such as new business models competitive strategies and knowledge management the book covers a number of topics including how innovative technologies improve the life of the individuals organizations and societies how social media can drive fundamental business changes as their innovative nature allows for interactive communication between customers and businesses and how developing countries can use these technologies in an innovative way It also explores the impact of organizations on society through sustainable development and social responsibility and how ICTs use social media networks in the process of value co creation addressing these issues from both private and public sector perspectives and on national and international levels mainly in the context of technology innovations

**Research Handbook on Health Information Systems** Kathleen Gray,Reeva Lederman,2025-02-12 This

Research Handbook provides comprehensive explanations and examples of theoretical frameworks and practical methods to support the design and conduct of high quality health information systems research

**Parallel and Distributed Computing, Applications and Technologies** Jong Hyuk Park,Hong Shen,Yunsick Sung,Hui Tian,2019-02-07 This book constitutes the refereed proceedings of the 19th International Conference on CParallel and Distributed Computing Applications and Technologies PDCAT 2018 held in Jeju Island South Korea in August 2018 The 35 revised full papers presented along with the 14 short papers and were carefully reviewed and selected from 150 submissions The papers of this volume are organized in topical sections on wired and wireless communication systems high dimensional data representation and processing networks and information security computing techniques for efficient networks design electronic circuits for communication systems

*Using Subsequence Mining to Identify Business Processes in Data Networks* Felix Kuhr,2017-01-13 Master s Thesis from the year 2016 in the subject Computer Science Commercial Information Technology grade Hamburg University of Technology TUHH Universit t zu L beck language English abstract To manage business processes companies must previously define configure implement and enact them Analysts try to identify companies business processes However large companies might have complex business processs BPs and consist of many business units Therefore classical business process modelling hardly scales Both companies and analysts are interested in automated approaches for business process modelling saving time and money Today s business process analysts often use process mining techniques to extract company s business processes by analyzing event logs of applications This technique has its limitations and is strongly dependent on the kind of log files of deployed applications By designing our mission oriented network analysis MONA approach using algorithms having polynomial complexity we show that identification of business processes is tractable Identification of related tasks which constitute business processes is based on analysis of communication patterns in network traffic We assume that today s business processes are based on network aided applications Our software presents identified business processes using business process modelling notation

Innovation in Sustainable Management and Entrepreneurship Gabriela Prostean,Juan José Lavios Villahoz,Laura Brancu,Gyula Bakacsi,2020-05-29 This book analyses state of the art techniques in business process management as drivers of advanced entrepreneurship financial management supply chain management and sustainability management The role of management in a rapidly changing environment and the use of innovative methods and techniques to address and solve key management problems are also explored

**Soft Computing and Its Engineering Applications** Kanubhai K. Patel,KC Santosh,Gabriel Gomes de Oliveira,Atul Patel,Ashish Ghosh,2025-05-17 The two volume proceedings set CCIS 2430 2431 constitutes the revised selected papers of the 6th International Conference on Soft Computing and its Engineering Applications icSoftComp 2024 held in Bangkok Thailand during December 10 12 2024 The 58 full papers and 3 short papers included in this book were carefully reviewed and selected from 501 submissions They were organized in topical sections as follows Part I Theory and Methods Part II Theory

and Methods Systems and Applications Hybrid Techniques Soft Computing for Smart World Industry 5.0 Yousaf Bin Zikria, Vinod Kumar Shukla, Pradeep Nijalingappa, Manoj Kumar M V, Ali Kashif Bashir, 2025-06-16 The new paradigm Industry 5.0 promises great shifts not only in industry but also in business and consumption models With the help of data science and internet of things manufacturers focus on delivering in real time and customers will benefit from personalized products Robots and cobots will collaborate with the humans This book explains various facets of Industry 5.0 focusing on its applications on medical research and manufacturing

**Digital Identity in the New Era of Personalized Medicine** Vasiliu-Feltes, Ingrid, Mysore, Indira, 2022-11-18 Within the past decade we have witnessed an increased adoption of emerging technologies as well as the exponential pace of scientific discoveries within all industries The level of digital innovation and digital transformation experienced in healthcare and life sciences has been markedly accelerated by the COVID 19 pandemic There is a new sense of urgency to design and develop a new global health ecosystem that is more suitable for the digital era and future generations Deploying precision medicine solutions that can redefine the way we diagnose and treat disease as well as shift the focus towards a customized human centered approach such as those offered by personalized medicine can be a viable sustainable model Digital Identity in the New Era of Personalized Medicine highlights the latest trends in precision medicine and the important role digital identity plays in upholding ethical values safeguarding human rights and practicing responsible personalized medicine It provides an overview of the current healthcare legal and regulatory landscapes as well as some of the major challenges and opportunities we face in this digital virtual and precision medicine powered era Covering topics such as data centric compliance global health and identity management this book is an essential resource for doctors healthcare administration academicians clinicians health and bio tech executives researchers medical professionals medical engineers medical students and government officials looking for a resource that addresses challenges in healthcare including trust privacy data integrity and ownership

**Robust Process Mining with Guarantees** Sander J. J. Leemans, 2022-03-25 This book presents techniques for process discovery conformance checking and enhancement For process discovery it introduces the Inductive Miner framework a recursive skeleton for discovery techniques that in itself provides several guarantees The framework is instantiated in several concrete discovery techniques each of which targets a specific challenge of process discovery such as incompleteness of information or noisy behavior For conformance checking it introduces the Projected Conformance Checking framework which focuses on speed but nevertheless provides several guarantees such as that for certain classes of models it can decide language equivalence For enhancement it introduces the Inductive visual Miner a well polished end user focused tool that includes process discovery conformance checking and that can visualize performance on a discovered model all without any user input

Process Mining Handbook Wil M. P. van der Aalst, Josep Carmona, 2022-06-27 This is an open access book This book comprises all the single courses given as part of the First Summer School on Process Mining PMSS 2022 which was held in Aachen Germany

during July 4 8 2022 This volume contains 17 chapters organized into the following topical sections Introduction process discovery conformance checking data preprocessing process enhancement and monitoring assorted process mining topics industrial perspective and applications and closing **Robust Process Mining with Guarantees** Sander J. J. Leemans,2022-03-29 This book presents techniques for process discovery conformance checking and enhancement For process discovery it introduces the Inductive Miner framework a recursive skeleton for discovery techniques that in itself provides several guarantees The framework is instantiated in several concrete discovery techniques each of which targets a specific challenge of process discovery such as incompleteness of information or noisy behavior For conformance checking it introduces the Projected Conformance Checking framework which focuses on speed but nevertheless provides several guarantees such as that for certain classes of models it can decide language equivalence For enhancement it introduces the Inductive visual Miner a well polished end user focused tool that includes process discovery conformance checking and that can visualize performance on a discovered model all without any user input **Conformance Checking and Diagnosis in Process Mining** Jorge Munoz-Gama,2016-11-22 Process mining techniques can be used to discover analyze and improve real processes by extracting models from observed behavior The aim of this book is conformance checking one of the main areas of process mining In conformance checking existing process models are compared with actual observations of the process in order to assess their quality Conformance checking techniques are a way to visualize the differences between assumed process represented in the model and the real process in the event log pinpointing possible problems to address and the business process management results that rely on these models This book combines both application and research perspectives It provides concrete use cases that illustrate the problems addressed by the techniques in the book but at the same time it contains complete conceptualization and formalization of the problem and the techniques and through evaluations on the quality and the performance of the proposed techniques Hence this book brings the opportunity for business analysts willing to improve their organization processes and also data scientists interested on the topic of process oriented data science [Applications and Developments in Semantic Process Mining](#) Okoye, Kingsley,2020-04-10 As technology becomes increasingly intelligent various factors within the field of data science are seeing significant transformation Process analysis is one area that is undergoing substantial development due to the implementation of semantic reasoning and web technologies The congruence of these two systems has created various applications and developments in data processing and analysis across several professional fields Applications and Developments in Semantic Process Mining is an essential reference source that discusses the improvement of process mining algorithms through the implementation of semantic modeling and representation Featuring research on topics such as domain ontologies fuzzy modeling and information extraction the book takes into account the different stages of process mining and its application in real time and then expounds the classical process mining techniques to semantical preparation of the extracted models for

further analysis and querying at a more abstract level The book provides a wide ranging idea of the application and development of semantic process mining that is expected to be beneficial and used by professionals software and data engineers software developers IT experts business owners and entrepreneurs and process analysts

**Process Mining in Action** Lars Reinkemeyer,2020-03-14 This book describes process mining use cases and business impact along the value chain from corporate to local applications representing the state of the art in domain know how Providing a set of industrial case studies and best practices it complements academic publications on the topic Further the book reveals the challenges and failures in order to offer readers practical insights and guidance on how to avoid the pitfalls and ensure successful operational deployment The book is divided into three parts Part I provides an introduction to the topic from fundamental principles to key success factors and an overview of operational use cases As a holistic description of process mining in a business environment this part is particularly useful for readers not yet familiar with the topic Part II presents detailed use cases written by contributors from a variety of functions and industries Lastly Part III provides a brief overview of the future of process mining both from academic and operational perspectives Based on a solid academic foundation process mining has received increasing interest from operational businesses with many companies already reaping the benefits As the first book to present an overview of successful industrial applications it is of particular interest to professionals who want to learn more about the possibilities and opportunities this new technology offers It is also a valuable resource for researchers looking for empirical results when considering requirements for enhancements and further developments

**Process Mining Techniques in Business Environments** Andrea Burattin,2015-05-12 After a brief presentation of the state of the art of process mining techniques Andrea Burratin proposes different scenarios for the deployment of process mining projects and in particular a characterization of companies in terms of their process awareness The approaches proposed in this book belong to two different computational paradigms first to classic batch process mining and second to more recent online process mining The book encompasses a revised version of the author s PhD thesis which won the Best Process Mining Dissertation Award in 2014 awarded by the IEEE Task Force on Process Mining

**Incremental Process Discovery** Daniel Schuster,2025-04-05 This book constitutes the revised version of the award winning PhD dissertation written by the author at RWTH Aachen Germany It presents a framework for incremental process discovery that allows users to learn and refine process models from event data iteratively Next to process discovery and event data handling it also contributes to conformance checking a further fundamental process mining task Eventually it presents Cortado an open source process mining software tool that implements the algorithms and techniques proposed in an integrated and comprehensive fashion This part also includes a case study applying Cortado and therefore the various contributions of this thesis in a real life scenario In 2024 this PhD dissertation won the Best Process Mining PhD Dissertation Award by the IEEE Task Force for Process Mining granted to outstanding PhD theses in this field



The Top Books of the Year Process Mining Discovery Conformance And Enhancement Of Business Processes The year 2023 has witnessed a noteworthy surge in literary brilliance, with numerous compelling novels captivating the hearts of readers worldwide. Lets delve into the realm of top-selling books, exploring the fascinating narratives that have captivated audiences this year. The Must-Read : Colleen Hoover's "It Ends with Us" This poignant tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover expertly weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can triumph. Uncover the Best : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This spellbinding historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids absorbing storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Discover the Magic : Delia Owens "Where the Crawdads Sing" This mesmerizing coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens weaves a tale of resilience, survival, and the transformative power of nature, entrancing readers with its evocative prose and mesmerizing setting. These top-selling novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of engaging stories waiting to be discovered. The novel begins with Richard Papan, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a brilliant and thrilling novel that will keep you speculating until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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## **Table of Contents Process Mining Discovery Conformance And Enhancement Of Business Processes**

1. Understanding the eBook Process Mining Discovery Conformance And Enhancement Of Business Processes
  - The Rise of Digital Reading Process Mining Discovery Conformance And Enhancement Of Business Processes
  - Advantages of eBooks Over Traditional Books
2. Identifying Process Mining Discovery Conformance And Enhancement Of Business Processes
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an eBook Platform
  - User-Friendly Interface
4. Exploring eBook Recommendations from Process Mining Discovery Conformance And Enhancement Of Business Processes
  - Personalized Recommendations
  - eBook Recommendations User Reviews and Ratings
  - eBook Recommendations and Bestseller Lists
5. Accessing Process Mining Discovery Conformance And Enhancement Of Business Processes Free and Paid eBooks
  - eBook Recommendations Public Domain eBooks
  - eBook Recommendations eBook Subscription Services
  - eBook Recommendations Budget-Friendly Options
6. Navigating eBook Formats
  - ePub, PDF, MOBI, and More
  - eBook Recommendations Compatibility with Devices
  - eBook Recommendations Enhanced eBook Features
7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of eBook Recommendations
  - Highlighting and Note-Taking eBook Recommendations

- Interactive Elements Process Mining Discovery Conformance And Enhancement Of Business Processes
- 8. Staying Engaged with Process Mining Discovery Conformance And Enhancement Of Business Processes
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Process Mining Discovery Conformance And Enhancement Of Business Processes
- 9. Balancing eBooks and Physical Books Process Mining Discovery Conformance And Enhancement Of Business Processes
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Process Mining Discovery Conformance And Enhancement Of Business Processes
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Process Mining Discovery Conformance And Enhancement Of Business Processes
  - Setting Reading Goals Process Mining Discovery Conformance And Enhancement Of Business Processes
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Process Mining Discovery Conformance And Enhancement Of Business Processes
  - Fact-Checking eBook Content of Process Mining Discovery Conformance And Enhancement Of Business Processes
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
- 14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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