

WIL M. P. van der Aalst

## Process Mining

Discovery, Conformance and Enhancement of Business Processes

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 factors 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 correct flow of processes and highlights conformance checking, and organizational and user 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, the 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.

### Features and Benefits

- First book on process mining, bridging the gap between business process modeling and business intelligence
- Written by one of the most influential and most cited computer scientists and the best known BPM researcher
- Self-contained and comprehensive overview for a broad audience in academia and industry
- The reader can put process mining into practice immediately due to the applicability of the techniques and the availability of the open source process mining software ProM.

Computer Science

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Process Mining

Wil M. P. van der Aalst

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Discovery, Conformance and  
Enhancement of Business Processes

Springer

# Process Mining Springer

**Kathleen Armour**



## **Process Mining Springer:**

**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.

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.

Handbook on Digital Twin and Artificial Intelligence Techniques for Rail Applications Maksym Spiriyagin, Stefano Bruni, Colin Cole, 2025-06-17 With contributions from experts from around the world, this handbook aims to systemize the existing experience and knowledge that can be used to the development of more efficient and controlled railway systems. As a result, this handbook showcases the modern methods, methodologies, and frameworks for the development of DT and AI architectures and apparatus in the area of the existing railway systems and transport engineering tasks. The chapters cover such varied and specialized topics as the processes related to the transformation of a physical twin into a digital twin, the

application of data driven and physics based simulation approaches in the development of digital twins asset management application tasks with the implementation of DT and AI and the experimental and field applications of the DT and AI concepts and technologies in railway transport system design and predictive maintenance tasks Handbook on Digital Twin and Artificial Intelligence Techniques for Rail Applications is essential reading for engineers practitioners and researchers involved in the development of railway transport and transit systems

**Process Mining** Wil van der Aalst,2011-07-16 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 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

[Encyclopedia of Business Analytics and Optimization](#) Wang, John,2014-02-28 As the age of Big Data emerges it becomes necessary to take the five dimensions of Big Data volume variety velocity volatility and veracity and focus these dimensions towards one critical emphasis value The Encyclopedia of Business Analytics and Optimization confronts the challenges of information retrieval in the age of Big Data by exploring recent advances in the areas of knowledge management data visualization interdisciplinary communication and others Through its critical approach and practical application this book will be a must have reference for any professional leader analyst or manager interested in making the most of the knowledge resources at their disposal

**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

*Recent Trends in Intensive Computing* M. Rajesh, K. Vengatesan, M. Gnanasekar, Sitharthan R, A.B. Pawar, P.N. Kalvadekar, P. Saiprasad, 2021-12-15 In a world where computer science is now an essential element in all of our lives a new opportunity to disseminate the latest research and trends is always welcome This book presents the proceedings of the first International Conference on Recent Trends in Computing ICRTC 2021 which was held as a virtual event on 21 22 May 2021 at Sanjivani College of Engineering Kopergaon India due to the restrictions of the COVID 19 pandemic This online conference aimed at facilitating academic exchange among researchers enabled experts and scholars around from around the globe to gather for the discussion of the latest advanced research in the field despite the extensive travel restrictions still in place The book contains 134 papers selected from 329 submitted papers after a rigorous peer review process and topics covered include advanced computing networking informatics security and privacy and other related fields The book will be of interest to all those eager to find the latest trends and most recent developments in computer science

*A Primer on Process Mining* Diogo R. Ferreira, 2017-06-19 The main goal of this book is to explain the core ideas of process mining and to demonstrate how they can be implemented using just some basic tools that are available to any computer scientist or data scientist It describes how to analyze event logs in order to discover the behavior of real world business processes The end result can often be visualized as a graph and the book explains how to use Python and Graphviz to render these graphs intuitively Overall it enables the reader to implement process mining techniques on his or her own independently of any specific process mining tool An introduction to two popular process mining tools namely Disco and ProM is also provided The book will be especially valuable for self study or as a precursor to a more advanced text Practitioners and students will be able to follow along on their own even if they have no prior knowledge of the topic After reading this book they will be able to more confidently proceed to the research literature if needed

**Applied Semantic Web Technologies** Vijayan

Sugumaran, Jon Atle Gulla, 2011-08-12 The rapid advancement of semantic web technologies along with the fact that they are at various levels of maturity has left many practitioners confused about the current state of these technologies Focusing on the most mature technologies Applied Semantic Web Technologies integrates theory with case studies to illustrate the history current state and future direction of the semantic web It maintains an emphasis on real world applications and examines the technical and practical issues related to the use of semantic technologies in intelligent information management The book starts with an introduction to the fundamentals reviewing ontology basics ontology languages and research related to ontology alignment mediation and mapping Next it covers ontology engineering issues and presents a collaborative ontology engineering tool that is an extension of the Semantic MediaWiki Unveiling a novel approach to data and knowledge engineering the text Introduces cutting edge taxonomy aware algorithms Examines semantics based service composition in transport logistics Offers ontology alignment tools that use information visualization techniques Explains how to enrich the representation of entity semantics in an ontology Addresses challenges in tackling the content creation bottleneck Using case studies the book provides authoritative insights and highlights valuable lessons learned by the authors information systems veterans with decades of experience They explain how to create social ontologies and present examples of the application of semantic technologies in building automation logistics ontology driven business process intelligence decision making and energy efficiency in smart homes

**Digital Personalized Health and Medicine** Christian Lovis, Inge Cort Madsen, Patrick Weber, Per Hostrup Nielsen, Philip Scott, 2020-06-15 Digital health and medical informatics have grown in importance in recent years and have now become central to the provision of effective healthcare around the world This book presents the proceedings of the 30th Medical Informatics Europe conference MIE This edition of the conference hosted by the European Federation for Medical Informatics EFMI since the 1970s was due to be held in Geneva Switzerland in April 2020 but as a result of measures to prevent the spread of the Covid19 pandemic the conference itself had to be cancelled Nevertheless because this collection of papers offers a wealth of knowledge and experience across the full spectrum of digital health and medicine it was decided to publish the submissions accepted in the review process and confirmed by the Scientific Program Committee for publication and these are published here as planned The 232 papers are themed under 6 section headings biomedical data tools and methods supporting care delivery health and prevention precision medicine and public health human factors and citizen centered digital health and ethics legal and societal aspects A 7th section deals with the Swiss personalized health network and section 8 includes the 125 posters accepted for the conference Offering an overview of current trends and developments in digital health and medical informatics the book provides a valuable information resource for researchers and health practitioners alike

**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

**Value-Driven Business Process Management: The Value-Switch for Lasting Competitive Advantage** Peter Franz, Mathias Kirchmer, 2012-02-22 Value Driven Business Process Management gives business leaders in any industry the rationale and methods for using BPM to gain clarity on how their business operates and develop the ability to put new ideas into action quickly Readers learn how to redirect their focus from a method and tool view of BPM to a more broadly informed view of BPM as a management approach and put it to practical use to initiate action within their organization

**Transactions of the American Institute of Mining Engineers**, 1891

**DATA&KNOWLEDGE ENGINEERING**, 2002

Conformance Checking Josep Carmona, Boudewijn van Dongen, Andreas Solti, Matthias Weidlich, 2018-11-11

This book introduces readers to the field of conformance checking as a whole and outlines the fundamental relation between modelled and recorded behaviour Conformance checking interrelates the modelled and recorded behaviour of a given process and provides techniques and methods for comparing and analysing observed instances of a process in the presence of a model independent of the model's origin Its goal is to provide an overview of the essential techniques and methods in this field at an intuitive level together with precise formalisations of its underlying principles The book is divided into three parts that are meant to cover different perspectives of the field of conformance checking Part I presents a comprehensive yet accessible overview of the essential concepts used to interrelate modelled and recorded behaviour It also serves as a reference for assessing how conformance checking efforts could be applied in specific domains Next Part II provides readers with detailed insights into algorithms for conformance checking including the most commonly used formal notions and their instantiation for specific analysis questions Lastly Part III highlights applications that help to make sense of conformance checking results thereby providing a necessary next step to increase the value of a given process model They help to interpret the outcomes of conformance checking and incorporate them by means of enhancement and repair techniques Providing the core building blocks of conformance checking and

describing its main applications this book mainly addresses students specializing in business process management researchers entering process mining and conformance checking for the first time and advanced professionals whose work involves process evaluation modelling and optimization **Information Resources Management** ,2010-01-01 This work is a comprehensive four volume reference addressing major issues trends and areas for advancement in information management research containing chapters investigating human factors in IT management as well as IT governance outsourcing and diffusion Provided by publisher Encyclopedia of data warehousing and mining John Wang,2008 **The Northwest Mining Review** ,1895 *Mining and Petroleum Standard and American Gas-light Journal* ,1882

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## **Table of Contents Process Mining Springer**

1. Understanding the eBook Process Mining Springer
  - The Rise of Digital Reading Process Mining Springer
  - Advantages of eBooks Over Traditional Books
2. Identifying Process Mining Springer
  - 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 Process Mining Springer
  - User-Friendly Interface
4. Exploring eBook Recommendations from Process Mining Springer
  - Personalized Recommendations
  - Process Mining Springer User Reviews and Ratings
  - Process Mining Springer and Bestseller Lists
5. Accessing Process Mining Springer Free and Paid eBooks
  - Process Mining Springer Public Domain eBooks
  - Process Mining Springer eBook Subscription Services
  - Process Mining Springer Budget-Friendly Options

6. Navigating Process Mining Springer eBook Formats
  - ePub, PDF, MOBI, and More
  - Process Mining Springer Compatibility with Devices
  - Process Mining Springer Enhanced eBook Features
7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Process Mining Springer
  - Highlighting and Note-Taking Process Mining Springer
  - Interactive Elements Process Mining Springer
8. Staying Engaged with Process Mining Springer
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Process Mining Springer
9. Balancing eBooks and Physical Books Process Mining Springer
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Process Mining Springer
10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
11. Cultivating a Reading Routine Process Mining Springer
  - Setting Reading Goals Process Mining Springer
  - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Process Mining Springer
  - Fact-Checking eBook Content of Process Mining Springer
  - 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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