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Process Modeling and Management for Healthcare **Leveraging Applications of Formal Methods, Verification and Validation. Industrial Practice** *Building Continents of Knowledge in Oceans of Data: The Future of Co-Created EHealth* **Enabling Flexibility in Process-Aware Information Systems** *Process Mining Enterprise, Business-Process and Information Systems Modeling* **Anomaly Detection and Complex Event Processing Over IoT Data Streams** *Evidence-Based Health Informatics* **Health Information Science** **MEDINFO 2021: One World, One Health — Global Partnership for Digital Innovation** *Process Mining Workshops* **New Trends in Disruptive Technologies, Tech Ethics and Artificial Intelligence** *Foundations of Health Information Engineering and Systems* **Business Process Model and Notation** *Challenges of Trustable AI and Added-Value on Health* **Business Process Management Workshops** *Agent-Based Business Process Simulation* **Demystifying Big Data, Machine Learning, and Deep Learning for Healthcare Analytics** *Data Mining and Constraint Programming* **Context Sensitive Health Informatics: Redesigning Healthcare Work** *Enabling Process Management for Loosely Framed Knowledge-intensive Processes* *Innovation in Medicine and Healthcare* *Process Mining Workshops* **Intelligent Systems in Production Engineering and Maintenance** *Enterprise Design, Operations, and Computing* **Artificial Intelligence in Medicine** **Virtual and Mobile Healthcare: Breakthroughs in Research and Practice** **Perspectives on Digital Pathology** **BPM Everywhere** *Therapy Tech* *Innovations in Big Data Mining and Embedded Knowledge* **Advanced Information Systems Engineering** **Knowledge Representation for Health Care** **Business Information Systems** *Transforming Healthcare Through Information Systems* *Interoperability in Healthcare Information Systems: Standards, Management, and Technology* **Process Mining Handbook** *Foundations of Artificial Intelligence in Healthcare and Bioscience* **Process Mining in Healthcare** **Research Challenges in Information Science**

This book constitutes the thoroughly refereed post-workshop proceedings of eight international workshops held in Ulm, Germany, in conjunction with the 7th International Conference on Business Process Management, BPM 2009, in September 2009. The eight workshops were on Empirical Research in Business Process Management (ER-BPM 2009), Reference Modeling (RefMod 2009), Business Process Design (BPD 2009), Business Process Intelligence (BPI 2009), Collaborative Business Processes (CBP 2009), Process-Oriented Information Systems in Healthcare (ProHealth 2009), Business Process Management and Social Software (BPMS2 2009), Event-Driven Business Process Management (edBPM 2009). The 67 revised full papers presented were carefully reviewed and selected from numerous submissions. One of the primary topics at the center of discussion, and very often debate, between industry professionals, government officials, and the general public is the current healthcare system and the potential for an overhaul of its processes and services. Many organizations concerned for the long-term care of patients wish to see new strategies, practices, and organizational tools developed to optimize healthcare systems all over the world. One of the central engines of the current shift toward reorientation of healthcare services is virtual and mobile healthcare. *Virtual and Mobile Healthcare: Breakthroughs in Research and Practice* explores the trends, challenges, and issues related to the emergence of mobile and virtual healthcare. The book also examines how mobile technologies can best be used for the benefit of both doctors and their patients. Highlighting a range of topics such as smart healthcare, electronic health records, and m-health, this publication is an ideal reference source for medical professionals, healthcare administrators, doctors, nurses, practitioners, and researchers in all areas of the medical field. We are entering an entirely new phase of BPM – the era of “BPM Everywhere” or BPME. BPME represents the strategy for leveraging, not simply surviving but fully exploiting the wave of disruption facing every business over the next 5 years and beyond. Without question, one of the single most disruptive events in the last decade was the introduction of the smartphone. Consider for a moment how great of an impact this has had on the relationship between businesses and their customers. Not even the emergence of the Web and Internet-based “digital native” business models can compare with the level of intimacy now available with your customers. In the era of the Internet of Things where smart homes, appliances, cars, phones, virtually imaginable devices are all connected, BPM must, and will, be everywhere. As Peter Whibley discusses in “The Internet of Things Will Be Invisible,” by 2025 there are expected to be more than 26 billion or more connected devices. In the chapter “Digital Prescriptive Maintenance: Disrupting Manufacturing through IoT, Big Data, and Dynamic Case Management,” Dr. Setrag Khoshafian introduces the “4 Vs” of “thing” data, specifically “Volume, Velocity, Variety and Value.” From monitors and remote sensors, to appliances and vehicles, to tens of billions of other “things,” connected devices are generating meaningful and informative data that would easily overwhelm any human being, but collectively they present critical context about processes and the state of operations. “Big Data” has never been so large, nor presented such an acute role within enterprises and the processes that drive them. BPME as well as traditional BPM methods can already be found at the center of this. Its role will grow exponentially. Emergent factors such as process mining (see chapter “Mining the Swarm” by Keith Swenson, et al.) will be critical for uncovering engagement patterns and the need for process management platforms to coordinate interaction and control of smart devices. It is intelligent BPM that is expanding the window of what can be automated, by enabling adaptable automation. The mobile strategies in far too many organizations seem to be the building of apps that presume that customers will use their smartphones like mini laptops. This avoids the fact that we now have a level of intimacy with our customer we've never had before. As discussed in the chapter “BPM to Go – Supporting Business Processes in a Mobile and Sensing World,” our customers are carrying around a device that offers a range of capabilities unlike any laptop. A smartphone produces volumes of meaningful data about our customers (think about the “4Vs”) and is able to interact with that customer in ways that a laptop never can. The growing ubiquity of connectivity always within reach combined with new services and capabilities such as mobile banking is a key part of driving constantly-changing expectations. Yet digital disruption is not limited to mobile devices, and is in fact disrupting everywhere BPM is otherwise found, and why BPM everywhere is becoming the new normal. This book provides a conceptual clarification of the interconnections between agent-based modeling and business process management (BPM) and presents practical examples of agent-based models dealing with BPM and simulation in NetLogo. The book is structured in three parts. Part I starts with the motivation for the work and introduces the general structure of the book. Next, chapter 2 provides a brief introduction to main BPM concepts including the business process lifecycle, which describes the analysis of an organization by means of modeling and simulation, business process performance indicators, and the automatic extraction of information from event data. Chapter 3 then offers a summary of the concept of agent and the studies concerning agent-based approaches that involve business process analysis and management studies. Part II of the book introduces in chapter 4 the NetLogo tool adopted throughout the remaining book. After that, chapter 5 focuses on agent-oriented modeling as a problem domain analysis and design approach for creating decision-support systems based on agent-based simulations. Chapter 6 further describes the topic of agent-based modeling and simulation for business process analysis. The final part III starts with chapter 7 that reviews some BPM applications by introducing programs enabling to manage models represented in standard formats, such as BPMN, Petri nets, and the eXtensible Event Stream standard language. Subsequently, chapter 8 describes a number of case studies from different areas, and eventually, chapter 9 introduces some examples of advanced topics of process mining and agent-based simulation with process discovery, conformance checking, and agent-based applications utilizing Petri nets. The book is primarily written for researchers and advanced graduate and PhD students who look for an introduction to the fruitful exploitation of agent-based modeling to business process management. The book is also useful for industry practitioners who are interested in supporting their business decisions with computational simulations. The book is complemented by a dedicated web site with lots of additional details and models in NetLogo for further evaluation by the reader. This book introduces ongoing reflections within the research community on established information systems development topics and emerging concepts, approaches and ideas in the field of healthcare information systems. By promoting research on theoretical and methodological issues related to both information systems development in general and healthcare information systems in particular, it presents current research in order to promote improved practice. It comprises a selection of the best papers presented at the 24th International Conference on Information Systems Development (ISD) held in Harbin, China, August 25 – 27, 2015. The four-volume set LNCS 11244, 11245, 11246, and 11247 constitutes the refereed proceedings of the 8th International Symposium on Leveraging Applications of Formal Methods, Verification and Validation, ISoLA 2018, held in Limassol, Cyprus, in October/November 2018. The

papers presented were carefully reviewed and selected for inclusion in the proceedings. Each volume focusses on an individual topic with topical section headings within the volume: Part I, Modeling: Towards a unified view of modeling and programming; X-by-construction, STRESS 2018. Part II, Verification: A broader view on verification: from static to runtime and back; evaluating tools for software verification; statistical model checking; RERS 2018; doctoral symposium. Part III, Distributed Systems: rigorous engineering of collective adaptive systems; verification and validation of distributed systems; and cyber-physical systems engineering. Part IV, Industrial Practice: runtime verification from the theory to the industry practice; formal methods in industrial practice - bridging the gap; reliable smart contracts: state-of-the-art, applications, challenges and future directions; and industrial day. This book constitutes the refereed proceedings of the 30th International Conference on Advanced Information Systems Engineering, CAiSE 2018, held in Talinn, Estonia, in June 2018. The 37 papers presented in this volume were carefully reviewed and selected from 175 submissions. The papers are organized in topical sections on Process Execution, User-Oriented IS Development, Social Computing and Personalization, the Cloud and Data Services, Process Discovery, Decisions and the Blockchain, Process and Multi-level Modelling, Data Management and Visualization, Big Data and Intelligence, Data Modelling and Mining, Quality Requirements and Software, and Tutorials. This book constitutes the thoroughly refereed post-conference proceedings of the Second International Symposium on Foundations of Health Information Engineering and Systems, FHIES 2012, held in Paris, France, in August 2012. The 11 revised full papers presented together with 3 short papers in this volume were carefully reviewed and selected from 26 submissions. Topics of interest covered in this volume are such as software engineering; systems engineering; data engineering; applied mathematics; and psychology. This book constitutes the refereed proceedings of the 13th Conference on Artificial Intelligence in Medicine, AIME 2011, held in Bled, Slovenia, in July 2011. The 42 revised full and short papers presented together with 2 invited talks were carefully reviewed and selected from 113 submissions. The papers are organized in topical sections on knowledge-based systems; data mining; special session on AI applications; probabilistic modeling and reasoning; terminologies and ontologies; temporal reasoning and temporal data mining; therapy planning, scheduling and guideline-based care; and natural language processing. The book presents a collection of 103 peer-reviewed articles from the Second International Conference on Intelligent Systems in Production Engineering and Maintenance (ISPEM 2018). The conference was organized by the Faculty of Mechanical Engineering and CAMT (Centre for Advanced Manufacturing Technologies), Wroc?aw University of Science and Technology and was held in Wroc?aw (Poland) on 17–18 September 2018. The conferences topics included the possibility of using a wide range of intelligent methods in production engineering, presenting and discussing new solutions for innovative plants, research findings and case studies demonstrating advances in production and maintenance from the point of view of Industry 4.0 – particularly applications of intelligent systems, methods and tools in production engineering, maintenance, logistics, quality management, information systems and product development. The book is divided into two parts: the first includes papers related to intelligent systems in production engineering, while the second is dedicated to special sessions focusing on: 1. Computer Aided methods in Production Engineering 2. Mining 4.0 and Intelligent Mining Transportation 3. Modelling and Simulation of Production Processes 4. Multi-Faceted Modelling of Networks and Processes 5. Product Design and Product Manufacturing in Industry 4.0 This book is an excellent source of information for scientists in the field of manufacturing engineering and for top managers in production enterprises. What are the possibilities for process mining in hospitals? In this book the authors provide an answer to this question by presenting a healthcare reference model that outlines all the different classes of data that are potentially available for process mining in healthcare and the relationships between them. Subsequently, based on this reference model, they explain the application opportunities for process mining in this domain and discuss the various kinds of analyses that can be performed. They focus on organizational healthcare processes rather than medical treatment processes. The combination of event data and process mining techniques allows them to analyze the operational processes within a hospital based on facts, thus providing a solid basis for managing and improving processes within hospitals. To this end, they also explicitly elaborate on data quality issues that are relevant for the data aspects of the healthcare reference model. This book mainly targets advanced professionals involved in areas related to business process management, business intelligence, data mining, and business process redesign for healthcare systems as well as graduate students specializing in healthcare information systems and process analysis. Multimedia information and digital images are increasingly important in the field of healthcare, but establishing an adequate technological framework for their management, and workable international standards to ensure compatibility and interoperability, are crucial if they are to be employed effectively. This book presents the main research efforts of EURO-TELEPATH, an initiative of the European Corporation in Science and Technology (COST) Action, IC0604. This program began in November 2007, and ran until November 2011. Its aim was to develop the standards and solutions necessary to represent, interpret, browse and retrieve digital medical images, while preserving their diagnostic quality for clinical purposes, education and research. At the end of the project, the most relevant researchers in the field of digital pathology – many of whom had been active members of EURO-TELEPATH – were asked to contribute to a book which would compile the main research efforts of the European COST Action consortium. The book is divided into six parts. The first is an introduction to the instruments and activities of COST. This is followed by sections dealing with: the state-of-the-art in pathology; pathology business modeling; standards and specifications in pathology; the analysis, processing, retrieval and management of images; technology and automation in pathology; and strategic developments and emerging research. As well as being a comprehensive overview of the IC0604 COST program, the book includes a selection of papers from American and Japanese researchers working in the same field. Health IT is a major field of investment in support of healthcare delivery, but patients and professionals tend to have systems imposed upon them by organizational policy or as a result of even higher policy decision. And, while many health IT systems are efficient and welcomed by their users, and are essential to modern healthcare, this is not the case for all. Unfortunately, some systems cause user frustration and result in inefficiency in use, and a few are known to have inconvenienced patients or even caused harm, including the occasional death. This book seeks to answer the need for better understanding of the importance of robust evidence to support health IT and to optimize investment in it; to give insight into health IT evidence and evaluation as its primary source; and to promote health informatics as an underpinning science demonstrating the same ethical rigour and proof of net benefit as is expected of other applied health technologies. The book is divided into three parts: the context and importance of evidence-based health informatics; methodological considerations of health IT evaluation as the source of evidence; and ensuring the relevance and application of evidence. A number of cross cutting themes emerge in each of these sections. This book seeks to inform the reader on the wide range of knowledge available, and the appropriateness of its use according to the circumstances. It is aimed at a wide readership and will be of interest to health policymakers, clinicians, health informaticians, the academic health informatics community, members of patient and policy organisations, and members of the vendor industry. This book constitutes the proceedings of the 26th International Conference on Enterprise Design, Operations, and Computing, EDOC 2022, which took place in Bozen-Bolzano, Italy, in October 2022. The 15 full papers included in this book were carefully reviewed and selected from 48 submissions. They were organized in topical sections as follows: enterprise security; enterprise architecture; business process modeling and monitoring; business process mining and discovery; and process-driven applications. Demystifying Big Data, Machine Learning, and Deep Learning for Healthcare Analytics presents the changing world of data utilization, especially in clinical healthcare. Various techniques, methodologies, and algorithms are presented in this book to organize data in a structured manner that will assist physicians in the care of patients and help biomedical engineers and computer scientists understand the impact of these techniques on healthcare analytics. The book is divided into two parts: Part 1 covers big data aspects such as healthcare decision support systems and analytics-related topics. Part 2 focuses on the current frameworks and applications of deep learning and machine learning, and provides an outlook on future directions of research and development. The entire book takes a case study approach, providing a wealth of real-world case studies in the application chapters to act as a foundational reference for biomedical engineers, computer scientists, healthcare researchers, and clinicians. Provides a comprehensive reference for biomedical engineers, computer scientists, advanced industry practitioners, researchers, and clinicians to understand and develop healthcare analytics using advanced tools and technologies Includes in-depth illustrations of advanced techniques via dataset samples, statistical tables, and graphs with algorithms and computational methods for developing new applications in healthcare informatics Unique case study approach provides readers with insights for practical clinical implementation Anomaly Detection and Complex Event Processing over IoT Data Streams: With Application to eHealth and Patient Data Monitoring presents advanced processing techniques for IoT data streams and the anomaly detection algorithms over them. The book brings new advances and generalized techniques for processing IoT data streams, semantic data enrichment with contextual information at Edge, Fog and Cloud as well as complex event processing in IoT applications. The book comprises fundamental models, concepts and algorithms, architectures and technological solutions as well as their application to eHealth. Case studies, such as the bio-metric signals stream processing are presented –the massive amount of raw ECG signals from the sensors are processed dynamically across the data pipeline and classified with modern machine learning approaches including the Hierarchical Temporal Memory and Deep Learning algorithms. The book discusses adaptive solutions to IoT stream processing that can be extended to different use cases from different fields of eHealth, to enable a complex analysis of patient data in a historical, predictive and even prescriptive application scenarios. The book ends with a discussion on ethics, emerging research trends, issues and challenges of IoT data stream processing.

Provides the state-of-the-art in IoT Data Stream Processing, Semantic Data Enrichment, Reasoning and Knowledge Covers extraction (Anomaly Detection) Illustrates new, scalable and reliable processing techniques based on IoT stream technologies Offers applications to new, real-time anomaly detection scenarios in the health domain This book constitutes the refereed proceedings of the 6th International Workshop on Knowledge Representation for Health Care, KR4HC 2014, held as part of the Vienna Summer of Logic, VSL 2014, in Vienna, Austria, in July 2014. The workshop aimed at attracting the interest of novel research and advances contributing in the definition, representation and exploitation of health care knowledge in medical informatics. The 12 revised full research papers and 4 short papers presented in this book were carefully reviewed and selected from 26 submissions. This book is a revised version of the PhD dissertation written by the author at the Department of Business Informatics and Operations Management at Ghent University in Belgium. It addresses shortcomings in Business Process Management concerning loosely framed knowledge-intensive processes, which are characterized by their numerous valid process variants and their reliance on knowledge workers to apply their knowledge to decide on a suitable process variant that fits the context of a specific process execution. The goal was to lay the foundation for a process-aware business process management (IT-)system to support such processes. Several proof-of-concept implementations have been made for the core components and were evaluated in the domain of the healthcare. Starting from an artificial, but realistic, case about patients that arrive in the emergency room with suspected arm fractures and later progressing to a case study of the diagnosis and treatment of patients in the emergency department of a real hospital, using data from their patient files. In 2020, the PhD dissertation won the “CAiSE PhD award”, granted to outstanding PhD theses in the field of Information Systems Engineering. A successful integration of constraint programming and data mining has the potential to lead to a new ICT paradigm with far reaching implications. It could change the face of data mining and machine learning, as well as constraint programming technology. It would not only allow one to use data mining techniques in constraint programming to identify and update constraints and optimization criteria, but also to employ constraints and criteria in data mining and machine learning in order to discover models compatible with prior knowledge. This book reports on some key results obtained on this integrated and cross- disciplinary approach within the European FP7 FET Open project no. 284715 on “Inductive Constraint Programming” and a number of associated workshops and Dagstuhl seminars. The book is structured in five parts: background; learning to model; learning to solve; constraint programming for data mining; and showcases. Although the standards in electronic health records and general healthcare services continue to evolve, many organizations push to connect interoperability with public service and basic citizenship rights. This poses significant technical and organizational challenges that are the focus of many research and standardization efforts. Interoperability in Healthcare Information Systems: Standards, Management and Technology provides a comprehensive collection on the overview of electronic health records and health services interoperability and the different aspects representing its outlook in a framework that is useful for practitioners, researchers, and decision-makers. From the Foreword: "[This book] provides a comprehensive overview of the fundamental concepts in healthcare process management as well as some advanced topics in the cutting-edge research of the closely related areas. This book is ideal for graduate students and practitioners who want to build the foundations and develop novel contributions in healthcare process modeling and management." --Christopher Yang, Drexel University Process modeling and process management are traversal disciplines which have earned more and more relevance over the last two decades. Several research areas are involved within these disciplines, including database systems, database management, information systems, ERP, operations research, formal languages, and logic. Process Modeling and Management for Healthcare provides the reader with an in-depth analysis of what process modeling and process management techniques can do in healthcare, the major challenges faced, and those challenges remaining to be faced. The book features contributions from leading authors in the field. The book is structured into two parts. Part one covers fundamentals and basic concepts in healthcare. It explores the architecture of a process management environment, the flexibility of a process model, and the compliance of a process model. It also features a real application domain of patients suffering from age-related macular degeneration. Part two of the book includes advanced topics from the leading frontiers of scientific research on process management and healthcare. This section of the book covers software metrics to measure features of the process model as a software artifact. It includes process analysis to discover the formal properties of the process model prior to deploying it in real application domains. Abnormal situations and exceptions, as well as temporal clinical guidelines, are also presented in depth Pro. Foundational Handbook of Artificial Intelligence in Healthcare and Bioscience: A User Friendly Guide for IT Professionals, Healthcare Providers, Researchers, and Clinicians uses color-coded illustrations to explain AI from its basics to modern technologies. Other sections cover extensive, current literature research and citations regarding AI's role in the business and clinical aspects of health care. The book provides readers with a unique opportunity to appreciate AI technology in practical terms, understand its applications, and realize its profound influence on the clinical and business aspects of health care. Artificial Intelligence is a disruptive technology that is having a profound and growing influence on the business of health care as well as medical diagnosis, treatment, research and clinical delivery. The AI relationships in health care are complex, but understandable, especially when discussed and developed from their foundational elements through to their practical applications in health care. Provides an illustrated, foundational guide and comprehensive descriptions of what Artificial Intelligence is and how it functions Integrates a comprehensive discussion of AI applications in the business of health care Presents in-depth clinical and AI-related discussions on diagnostic medicine, therapeutic medicine, and prevalent disease categories with an emphasis on immunology and genetics, the two categories most influenced by AI Includes comprehensive coverage of a variety of AI treatment applications, including medical/pharmaceutical care, nursing care, stem cell therapies, robotics, and 10 common disease categories with AI applications This open access book constitutes revised selected papers from the International Workshops held at the Third International Conference on Process Mining, ICPM 2021, which took place in Eindhoven, The Netherlands, during October 31–November 4, 2021. The conference focuses on the area of process mining research and practice, including theory, algorithmic challenges, and applications. The co-located workshops provided a forum for novel research ideas. The 28 papers included in this volume were carefully reviewed and selected from 65 submissions. They stem from the following workshops: 2nd International Workshop on Event Data and Behavioral Analytics (EDBA) 2nd International Workshop on Leveraging Machine Learning in Process Mining (ML4PM) 2nd International Workshop on Streaming Analytics for Process Mining (SA4PM) 6th International Workshop on Process Querying, Manipulation, and Intelligence (PQMI) 4th International Workshop on Process-Oriented Data Science for Healthcare (PODS4H) 2nd International Workshop on Trust, Privacy, and Security in Process Analytics (TPSA) One survey paper on the results of the XES 2.0 Workshop is included. In today's dynamic business world, the success of a company increasingly depends on its ability to react to changes in its environment in a quick and flexible way. Companies have therefore identified process agility as a competitive advantage to address business trends like increasing product and service variability or faster time to market, and to ensure business IT alignment. Along this trend, a new generation of information systems has emerged—so-called process-aware information systems (PAIS), like workflow management systems, case handling tools, and service orchestration engines. With this book, Reichert and Weber address these flexibility needs and provide an overview of PAIS with a strong focus on methods and technologies fostering flexibility for all phases of the process lifecycle (i.e., modeling, configuration, execution and evolution). Their presentation is divided into six parts. Part I starts with an introduction of fundamental PAIS concepts and establishes the context of process flexibility in the light of practical scenarios. Part II focuses on flexibility support for pre-specified processes, the currently predominant paradigm in the field of business process management (BPM). Part III details flexibility support for loosely specified processes, which only partially specify the process model at build-time, while decisions regarding the exact specification of certain model parts are deferred to the run-time. Part IV deals with user- and data-driven processes, which aim at a tight integration of processes and data, and hence enable an increased flexibility compared to traditional PAIS. Part V introduces existing technologies and systems for the realization of a flexible PAIS. Finally, Part VI summarizes the main ideas of this book and gives an outlook on advanced flexibility issues. The book's target groups include researchers, PhD students and Master students in the field of information systems. After reading the book, they will better understand PAIS flexibility aspects. To support the easy use as a textbook, a series of exercises is provided at the end of each chapter and slides and further teaching material are available on the book's web site www.flexible-processes.com. Professionals specializing in business process management (BPM) who want to obtain a good understanding of flexibility challenges in BPM and state-of-the-art solutions will also benefit from the presentations of open source as well as commercial process management systems and related practical scenarios. This book constitutes the proceedings of the 4th workshop on Business Process Model and Notation, BPMN 2012, held in Vienna, Austria, in September 2012. The BPMN workshop series provides a forum for academics and practitioners who share an interest in business process modeling using the Business Process Modeling Notation, which is seen by many as the de facto standard for business process modeling. This year, the workshop lasted two days and consisted of both a scientific and a practitioner event. The six full and three short papers presented were carefully reviewed and selected from 22 submissions. The workshop applied a thorough reviewing process, during which each paper was reviewed by three Program Committee members. In addition, an extended abstract of the workshop keynote is also included. This book presents the proceedings of the KES International Conferences on Innovation in Medicine and Healthcare (KES-InMed-21), held virtually on June 14–16, 2021. Covering a number of key areas, including digital IT architecture in healthcare; advanced ICT for medicine and healthcare; biomedical engineering, trends, research

and technologies; and healthcare support systems, this book is a valuable resource for researchers, managers, industrialists and anyone wishing to gain an overview of the latest research in these fields. Health informatics applications will be a cornerstone of the next generation healthcare delivery system. These applications will support the delivery of safe, patient-centered care, and collaborative care delivery. The complexity of modern healthcare is delivered by many different specialties, to many different patients with complex diseases and comorbidity. A one size fits all approach is not adequate to reach the triple aim of improving the patient experience of care, improving the health of populations, and reducing the per capita cost of healthcare. Health informatics applications must rather be built to be adaptable and sensitive to the complex contexts where they will be used. The health informatics community has long been interested in the role that context plays in the design, implementation and evaluation of Health IT. We have come to realize that context is not just a passive characteristic that impacts Health IT usage but rather is embedded in the core of the users, processes and outcomes that Health IT interacts with. Therefore, we need better approaches to study and understand its impact on Health IT usage in different healthcare settings. This book contains the conference papers from CSHI 2017 - Delivering 21st Century Healthcare - Building a Quality-and-Efficiency Driven System. It contains papers on a variety of topics that are divided into four sections: Theoretical approaches to investigate context sensitive health informatics to generate robust evidence, Redesigning healthcare work practices, Patient participation in healthcare design and redesign, and Human factors and usability. The 2017 CSHI conference continues our efforts to develop robust scientific evidence on context and Health IT. A pointed look at the state of tech-based mental healthcare and what we must do to change it Proponents of technology trumpet it as the solution to the massive increase in the mental distress that confronts our nation. They herald the arrival of algorithms, intelligent chatbots, smartphone applications, telemental healthcare services, and more—but are these technological fixes really as good as they seem? In *Therapy Tech*, Emma Bedor Hiland presents the first comprehensive study of how technology has transformed mental healthcare, showing that this revolution can't deliver what it promises. Far from providing a solution, technological mental healthcare perpetuates preexisting disparities while relying on the same failed focus on personal responsibility that has let us down before. Through vivid, in-depth case studies, *Therapy Tech* reveals these problems, covering issues including psychosurveillance on websites like Facebook and 7 Cups of Tea, shortcomings of popular AI “doctors on demand” like Woebot, Wysa, and Joy, and even how therapists are being conscripted into the gig economy. Featuring a vital coda that brings *Therapy Tech* up to date for the COVID era, this book is the first to give readers a large-scale analysis of mental health technologies and the cultural changes they have enabled. Both a sobering dissection of the current state of mental health and a necessary warning of where things are headed, *Therapy Tech* makes an important assertion about how to help those in need of mental health services today. This book includes recent research on disruptive technologies, tech ethics, and artificial intelligence. Due to the important advances in technologies such as artificial intelligence, big data, the Internet of Things or bioinformatics produced in recent years, it is necessary to conduct a thorough review of current ethical patterns. One of the research fields that is in full expansion and with a broad future is technology ethics or tech ethics. Just a few years ago, this type of research was a small part, and they did not have too many technology researchers involved. At present, due to the explosion of new applications of artificial intelligence, their problems and their legal barriers have flourished innumerable initiatives, declarations, principles, guides and analyses focused on measuring the social impact of these systems and on the development of a more ethical technology. It is, therefore, a problem that needs to be addressed from an academic and multidisciplinary point of view, where experts in ethics and behavior work together with experts in new and disruptive technologies. The international conference *Disruptive Technologies Tech Ethics and Artificial Intelligence (DITTET 2021)* provides a forum to present and discuss the latest scientific and technical advances and their implications in the field of ethics. It also provides a forum for experts to present their latest research in disruptive technologies, promoting knowledge transfer. It provides a unique opportunity to bring together experts in different fields, academics and professionals to exchange their experience in the development and deployment of disruptive technologies, artificial intelligence and their ethical problems. DITTET intends to bring together researchers and developers from industry, humanities and academia to report on the latest scientific advances and the application of artificial intelligence as well as its ethical implications in fields as diverse as climate change, politics, economy or security in today's world. This book constitutes the refereed proceedings selected by an expert panel through a peer-review process. All these works will be presented by the experts in the different sessions organized at the DITTET congress to be held at the Pontifical University of Salamanca (Salamanca, Spain) on September 15, 26 and 17, 2021. This book constitutes revised selected papers from the International Workshops held at the Second International Conference on Process Mining, ICPM 2020, which took place during October 4-9, 2020. The conference was planned to take place in Padua, Italy, but had to be held online due to the COVID-19 pandemic. The conference focuses on the area of process mining research and practice, including theory, algorithmic challenges, and applications. The co-located workshops provided a forum for novel research ideas. The 29 papers included in this volume were carefully reviewed and selected from 59 submissions. They stem from the following workshops: 1st International Workshop on Event Data and Behavioral Analytics (EDBA) 1st International Workshop on Leveraging Machine Learning in Process Mining (ML4PM) 1st International Workshop on Streaming Analytics for Process Mining (SA4PM'20) 5th International Workshop on Process Querying, Manipulation, and Intelligence (PQMI) 3rd International Workshop on Process-Oriented Data Science for Healthcare (PODS4H) 1st International Workshop on Trust and Privacy in Process Analytics (TPPA) Artificial Intelligence (AI) in healthcare promises to improve the accuracy of diagnosis and screening, support clinical care, and assist in various public health interventions such as disease surveillance, outbreak response, and health system management. But the increasing importance of AI in healthcare means that trustworthy AI is vital to achieve the beneficial impacts on health anticipated by both health professionals and patients. This book presents the proceedings of the 32nd Medical Informatics Europe Conference (MIE2022), organized by the European Federation for Medical Informatics (EFMI) and held from 27 - 30 May 2022 in Nice, France. The theme of the conference was Challenges of Trustable AI and Added-Value on Health. Over 400 submissions were received from 43 countries, and were reviewed in a thorough process by at least three reviewers before being assessed by an SPC co-chair, with papers requiring major revision undergoing further review. Included here are 147 full papers (acceptance rate 54%), 23 short papers and 79 posters from the conference. Topics covered include the usual sub-domains of biomedical informatics: decision support and clinical information systems; clinical research informatics; knowledge management and representation; consumer health informatics; natural language processing; public health informatics; and privacy, ethical and societal aspects, but also innovative approaches to the collection, such as organization and analysis of data and knowledge related to health and wellbeing, as well as theoretical and applied contributions to AI methods and algorithms. Providing an overview of the latest developments in medical informatics, the book will be of interest to all those involved in the development and provision of healthcare today. This book constitutes the proceedings of two events held in conjunction with the CAiSE conferences and related to the areas of enterprise, business-process and information systems modeling: the 18th International Conference on Business Process Modeling, Development and Support, BPMDS 2017, and the 22nd International Conference on Evaluation and Modeling Methods for Systems Analysis and Development, EMMSAD, 2017. They took place in Essen, Germany, in June 2017. The focus theme for BPMDS 2017 papers was “Enabling Business Transformation by Business Process Modeling, Development and Support”. From 24 submitted papers, 11 were finally accepted and organized by: Non-functional considerations in business processes; new challenges in business process modeling and support; testing business processes; business process model comprehension; an experience report on teaching business process modeling. The EMMSAD conference focuses on evaluating, exploring and enhancing modeling methods and techniques for the development of information and software systems, enterprises, and business processes. It received 25 submissions, from which 9 full and 2 short papers were selected and organized: evaluation and comparison of modeling languages and methods; modeling approaches to support decision making; behavioral specification and business process modeling; and modeling languages and methods in evolving context. This book constitutes the proceedings of the 16th International Conference on Research Challenges in Information Sciences, RCIS 2022, which took place in Barcelona, Spain, during May 17-20, 2022. It focused on the special theme "Ethics and Trustworthiness in Information Science". The scope of RCIS is summarized by the thematic areas of information systems and their engineering; user-oriented approaches; data and information management; business process management; domain-specific information systems engineering; data science; information infrastructures, and reflective research and practice. The 35 full papers presented in this volume were carefully reviewed and selected from a total 100 submissions. The 18 Forum papers are based on 11 Forum submissions, from which 5 were selected, and the remaining 13 were transferred from the regular submissions. The 6 Doctoral Consortium papers were selected from 10 submissions to the consortium. The contributions were organized in topical sections named: Data Science and Data Management; Information Search and Analysis; Business Process Management; Business Process Mining; Digital Transformation and Smart Life; Conceptual Modelling and Ontologies; Requirements Engineering; Model-Driven Engineering; Machine Learning Applications. In addition, two-page summaries of the tutorials can be found in the back matter. This book constitutes the refereed proceedings of the Second International Conference on Health Information Science, HIS 2013, held in London, UK, in March 2013. The 20 full papers presented together with 3 short papers, 3 demo papers and one poster in this volume were carefully reviewed and selected from numerous submissions. The papers cover all aspects of health information sciences and systems that support the health information management and health service delivery. The scope of the conference includes 1) medical/health/biomedicine

information resources, such as patient medical records, devices and equipments, software and tools to capture, store, retrieve, process, analyse, and optimize the use of information in the health domain, 2) data management, data mining, and knowledge discovery, all of which play a key role in the decision making, management of public health, examination of standards, privacy and security issues, and 3) development of new architectures and applications for health information systems. 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. This book addresses the usefulness of knowledge discovery through data mining. With this aim, contributors from different fields propose concrete problems and applications showing how data mining and discovering embedded knowledge from raw data can be beneficial to social organizations, domestic spheres, and ICT markets. Data mining or knowledge discovery in databases (KDD) has received increasing interest due to its focus on transforming large amounts of data into novel, valid, useful, and structured knowledge by detecting concealed patterns and relationships. The concept of knowledge is broad and speculative and has promoted epistemological debates in western philosophies. The intensified interest in knowledge management and data mining stems from the difficulty in identifying computational models able to approximate human behaviors and abilities in resolving organizational, social, and physical problems. Current ICT interfaces are not yet adequately advanced to support and simulate the abilities of physicians, teachers, assistants or housekeepers in domestic spheres. And unlike in industrial contexts where abilities are routinely applied, the domestic world is continuously changing and unpredictable. There are challenging questions in this field: Can knowledge locked in conventions, rules of conduct, common sense, ethics, emotions, laws, cultures, and experiences be mined from data? Is it acceptable for automatic systems displaying emotional behaviors to govern complex interactions based solely on the mining of large volumes of data? Discussing multidisciplinary themes, the book proposes computational models able to approximate, to a certain degree, human behaviors and abilities in resolving organizational, social, and physical problems. The innovations presented are of primary importance for: a. The academic research community b. The ICT market c. Ph.D. students and early stage researchers d. Schools, hospitals, rehabilitation and assisted-living centers e. Representatives from multimedia industries and standardization bodies This book contains the refereed proceedings of the 14th International Conference on Business Information Systems, BIS 2011, held in Poznań, Poland, in June 2011. The 25 revised full papers were carefully reviewed and selected from 57 submissions. Following this year's conference theme of "Towards Flexible, Personalized and Adaptive Business Applications," the contributions were grouped into eight sections on business rules, business process verification, business process variants and composition, business process improvement, data modeling and integration, Internet science, modern enterprises, and specific business information systems issues. 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. The World Health Organization defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity", and its constitution also asserts that health for all people is "dependent on the fullest co-operation of individuals and States". The ongoing pandemic has highlighted the power of both healthy and unhealthy information, so while healthcare and public health services have depended upon timely and accurate data and continually updated knowledge, social media has shown how unhealthy misinformation can be spread and amplified, reinforcing existing prejudices, conspiracy theories and political biases. This book presents the proceedings of MedInfo 2021, the 18th World Congress of Medical and Health Informatics, held as a virtual event from 2-4 October 2021, with pre-recorded presentations for all accepted submissions. The theme of the conference was One World, One Health – Global Partnership for Digital Innovation and submissions were requested under 5 themes: information and knowledge management; quality, safety and outcomes; health data science; human, organizational and social aspects; and global health informatics. The Programme Committee received 352 submissions from 41 countries across all IMIA regions, and 147 full papers, 60 student papers and 79 posters were accepted for presentation after review and are included in these proceedings. Providing an overview of current work in the field over a wide range of disciplines, the book will be of interest to all those whose work involves some aspect of medical or health informatics. The domain of eHealth faces ongoing challenges to deliver 21st century healthcare. Digitalization, capacity building and user engagement with truly interdisciplinary and cross-domain collaboration are just a few of the areas which must be addressed. This book presents 190 full papers from the Medical Informatics Europe (MIE 2018) conference, held in Gothenburg, Sweden, in April 2018. The MIE conferences aim to enable close interaction and networking between an international audience of academics, health professionals, patients and industry partners. The title of this year's conference is: Building Continents of Knowledge in Oceans of Data – The Future of Co-Created eHealth, and contributions cover a broad range of topics related to the digitalization of healthcare, citizen participation, data science, and changing health systems, addressed from the perspectives of citizens, patients and their families, healthcare professionals, service providers, developers and policy makers. The second part of the title in particular has attracted a large number of papers describing strategies to create, evaluate, adjust or deliver tools and services for improvements in healthcare organizations or to enable citizens to respond to the challenges of dealing with health systems. Papers are grouped under the headings: standards and interoperability, implementation and evaluation, knowledge management, decision support, modeling and analytics, health informatics education and learning systems, and patient-centered services. Attention is also given to development for sustainable use, educational strategies and workforce development, and the book will be of interest to both developers and practitioners of healthcare services.