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Advanced manufacturing techniques seek to improve efficiency and product quality, reduce the risk of human error by automating processes, and meet other goals. Professional technicians work with cutting-edge technologies, and tools such as advanced robotics, additive manufacturing (including 3-D printing), laser machining/welding, nanotechnology, and artificial intelligence (AI). In this book, you'll learn about technician specialties, typical education paths, the skills you'll need to be successful, average salaries, the employment outlook, methods of exploring the career while in school, and much more.

Manufacturing plays a vital role in European economy and society, and is expected to continue as a major generator of wealth in the foreseeable future. A competitive manufacturing industry is essential for the prosperity of Europe, especially in the face of accelerating deindustrialisation. This book provides a broad vision of the future of manufacturing, analysed from a system-management viewpoint and with a special focus on ICT-related matters. Each contribution presents a complex and multidisciplinary research domain from a specific perspective. The first part of the book gives an overview on technology: past, present and future, while the following topics are introduced in the latter part of the book: - Product Lifecycle Management - Sustainable Products and Processes - Production Scheduling and Control - Benchmarking and Performance Measures - Industrial Services - Human Factors and Education in Manufacturing - Collaborative Engineering - Supply Chain Integration The book is intended to provoke debate, build consensus and stimulate creative discussion, leading to further novel research initiatives in the future.

THE NEW ADVANCED SOCIETY Included in this book are the fundamentals of Society 5.0, artificial intelligence, and the industrial Internet of Things, featuring their working principles and application in different sectors. A 360-degree view of the different dimensions of the digital revolution is presented in this book, including the various industries transforming industrial manufacturing, the security and challenges ahead, and the far-reaching implications for society and the economy. The main objective of this edited book is to cover the impact that the new advanced society has on several platforms such as smart manufacturing systems, where artificial intelligence can be integrated with existing systems to make them smart, new business models and strategies, where anything and everything is possible through the internet and cloud, smart food chain systems, where food products can be delivered to any corner of the world at any time and in any situation, smart transport systems in which robots and self-driven cars are taking the lead, advances in security systems to assure people of their privacy and safety, and smart healthcare systems, where biochips can be incorporated into the human body to predict deadly diseases at early stages. Finally, it can be understood that the social reformation of Society 5.0 will lead to a society where every person leads an active and healthy life. Audience The targeted audience for this book includes research scholars and industry engineers in artificial intelligence and information technology, engineering students, cybersecurity experts, government research agencies and policymakers, business leaders, and entrepreneurs. Sandeep Kumar Panda, PhD is an associate professor in the Department of Data Science and Artificial Intelligence at IcfaiTech (Faculty of Science and Technology), ICFAI Foundation for Higher Education, Hyderabad. His research areas include artificial intelligence, IoT, blockchain technology, cloud computing, cryptography, computational intelligence, and software engineering. Ramesh Kumar Mohapatra, PhD is an assistant professor in the Department of Computer Science and Engineering, National Institute of Technology, Rourkela, Odisha, India. His research interests include optical character recognition, document image analysis, video processing, secure computing, and machine learning. Subhrakanta Panda, PhD is an assistant professor in the Department of Computer Science and Information Systems, BITS-PILANI, Hyderabad Campus, Jawahar Nagar, Hyderabad, India. His research interests include social network analysis, cloud computing, security testing, and blockchain. S. Balamurugan, PhD is the Director of Research and Development, Intelligent Research Consultancy Services (IRCS), Coimbatore, Tamilnadu, India. He is also Director of the Albert Einstein Engineering and Research Labs (AEER Labs), as well as Vice-Chairman, Renewable Energy Society of India (RESI), India. He has published 45 books, 200+ international journals/ conferences, and 35 patents.

Computational Intelligence in Manufacturing addresses applications of AI, machine learning and other innovative computational techniques across the manufacturing supply chain. The rapid development of smart or digital manufacturing known as Industry 4.0 has swiftly provided a large number of opportunities for product and manufacturing process improvement. Selecting the appropriate technologies and combining them successfully is a challenge this book helps readers overcome. It explains how to prepare different manufacturing cells for flexibility and enhanced productivity with better supply chain management, e.g., calibrating design machine tools for automation and agility. Computational intelligence applications for non-conventional manufacturing processes such as ECM and EDM are covered alongside recent advances in traditional processes like casting, welding and metal forming. As well as describing specific applications, this practical guide also explains the computational intelligence paradigm for enhanced supply chain management. Includes hot topics such as augmented and virtual reality applications in manufacturing Provides details of computational techniques, such as nature inspired algorithms for manufacturing process modeling Gives practical technical advice on how to calibrate processes and tools to work efficiently in an industry 4.0 system

This text provides an in-depth overview of sustainability in machining processes, challenges during machining of difficult-to-cut materials and different ways of green machining in achieving sustainability. It discusses important topics including green and sustainable machining, dry machining, textured cutting coated tools for machining, solid lubricants-based machining, gas-cooled machining, cryogenic cooling for intelligent machining, artificial neural network for machining, big data based machining, and hybrid intelligent machining. This book- Covers advances in sustainable machining such as gas-cooled machining, near dry machining, and minimum quantity lubrication. Explores use of big data, machine learning and artificial intelligence for machining processes. Provides case studies and experimental design as well as results with analysis focusing on achieving sustainability. Discusses artificial intelligence and machine learning based machining processes. Cover the latest applications of sustainable manufacturing for a better understanding of the concepts. The text is primarily written for senior undergraduate, graduate students, and researchers in the fields of mechanical, manufacturing, industrial, production engineering and materials science.

Introduction to Advanced Manufacturing was written by two experienced and passionate engineers whose mission is to make the subject of advanced manufacturing easy to understand and a practical

solution to everyday problems. Harik, Ph.D. and Wuest, Ph.D., professors who have taught the subject for decades, combined their expertise to develop both an applied manual and a theoretical reference that addresses many different needs. Introduction to Advanced Manufacturing covers the following topics in detail: • Composites Manufacturing • Smart Manufacturing • Additive Manufacturing • Computer Aided Manufacturing • Polymers Manufacturing • Assembly Processes • Manufacturing Quality Control and Productivity • Subtractive Manufacturing • Deformative Manufacturing Introduction to Advanced Manufacturing offers a new, refreshing way of studying how things are made in the digital age. With academics and industry professionals in mind, Introduction to Advanced Manufacturing paves the ground for those interested in the new opportunities of Industry 4.0.

This book constitutes the refereed proceedings of the 14th International Conference of the Italian Association for Artificial Intelligence, A*IA 2015, held in Ferrara, Italy, in September 2015. The 35 full papers presented were carefully reviewed and selected from 44 submissions. The papers are organized in topical sections on swarm intelligence and genetic algorithms; computer vision; multi-agents systems; knowledge representation and reasoning; machine learning; semantic Web; natural language; and scheduling, planning and robotics.

Artificial intelligence (AI) has driven businesses to adopt new business practices rapidly, enhance product development and services, has helped to power AI-based market intelligence and customer insights, and improve customer relationship management. This timely book addresses the use of AI in marketing. This book also explores the dark side of AI in marketing management and discusses ethics and transparency of automated decision-making in AI applications, data privacy, cyber security issues, and biases in various facets of marketing. Emerging applications of AI such as DeepFakes which use deep learning technology could increase risks of manipulation and deception. Hence, apart from leveraging AI capabilities and advantages, the book cautions the need for prevention strategies to deal with potential issues that could arise from the adoption of AI in marketing management. This book will provide practical insights into the role of AI in marketing management. It will be a useful reference for those researching marketing and marketing professionals.

This book provides a brief synthesis of the known implementations, opportunities and challenges at the intersection of artificial intelligence (AI) and modern industry beyond the big-four companies that traditionally consume and produce such advanced technology: Facebook, Amazon, Microsoft and Google. With this information, the author also makes some reasonable claims about the role of AI in future industries. The book draws on a broad range of material, including reports from consulting firms, published surveys, academic papers and books, and expert knowledge available to the author due to numerous collaborations in academia and industry on AI. It is rigorous rather than speculative, drawing on known findings and expert summaries, where available. This provides industry leaders and other interested stakeholders with an accessible review of contemporary perspectives on AI's forward-looking role in industry as well as a clarifying guide on the major issues that companies are likely to face as they commence on this exciting path. Examines the likely role of AI in industries of the future, both known and unknown Presents use-cases of AI currently being explored across Big Tech, multi-national corporations and start-ups Explores the regulation of AI and its potential impacts on the workforce

This book constitutes the thoroughly refereed joint post-proceedings of four workshops held during the Pacific Rim International Conference on Artificial Intelligence, PRICAI 2000, held in Melbourne, Australia, in August/September 2000. The 32 revised full papers presented were carefully selected during two rounds of reviewing and revision. In accordance with the four workshops represented, the book is organized in topical sections on applications of artificial intelligence in industry, artificial intelligence in electronic commerce, intelligent information agents, and teamwork and adjustable autonomy in agents.

The two-volume set IFIP AICT 513 and 514 constitutes the refereed proceedings of the International IFIP WG 5.7 Conference on Advances in Production Management Systems, APMS 2017, held in Hamburg, Germany, in September 2017. The 121 revised full papers presented were carefully reviewed and selected from 163 submissions. They are organized in the following topical sections: smart manufacturing system characterization; product and asset life cycle management in smart factories of industry 4.0; cyber-physical (IIoT) technology deployments in smart manufacturing systems; multi-disciplinary collaboration in the development of smart product-service solutions; sustainable human integration in cyber-physical systems: the operator 4.0; intelligent diagnostics and maintenance solutions; operations planning, scheduling and control; supply chain design; production management in food supply chains; factory planning; industrial and other services; operations management in engineer-to-order manufacturing; gamification of complex systems design development; lean and green manufacturing; and eco-efficiency in manufacturing operations.

This book addresses the current status, challenges and future directions of data-driven materials discovery and design. It presents the analysis and learning from data as a key theme in many science and cyber related applications. The challenging open questions as well as future directions in the application of data science to materials problems are sketched. Computational and experimental facilities today generate vast amounts of data at an unprecedented rate. The book gives guidance to discover new knowledge that enables materials innovation to address grand challenges in energy, environment and security, the clearer link needed between the data from these facilities and the theory and underlying science. The role of inference and optimization methods in distilling the data and constraining predictions using insights and results from theory is key to achieving the desired goals of real time analysis and feedback. Thus, the importance of this book lies in emphasizing that the full value of knowledge driven discovery using data can only be realized by integrating statistical and information sciences with materials science, which is increasingly dependent on high throughput and large scale computational and experimental data gathering efforts. This is especially the case as we enter a new era of big data in materials science with the planning of future experimental facilities such as the Linac Coherent Light Source at Stanford (LCLS-II), the European X-ray Free Electron Laser (XFEL) and MaRIE (Matter Radiation in Extremes), the signature concept facility from Los Alamos National Laboratory. These facilities are expected to generate hundreds of terabytes to several petabytes of in situ spatially and temporally resolved data per sample. The questions that then arise include how we can learn from the data to accelerate the processing and analysis of reconstructed microstructure, rapidly map spatially resolved properties from high throughput data, devise diagnostics for pattern detection, and guide experiments towards desired targeted properties. The authors

are an interdisciplinary group of leading experts who bring the excitement of the nascent and rapidly emerging field of materials informatics to the reader.

This book constitutes the refereed proceedings of the 18th Australian Joint Conference on Artificial Intelligence, AI 2005, held in Sydney, Australia in December 2005. The 77 revised full papers and 119 revised short papers presented together with the abstracts of 3 keynote speeches were carefully reviewed and selected from 535 submissions. The papers are categorized in three broad sections, namely: AI foundations and technologies, computational intelligence, and AI in specialized domains. Particular topics addressed by the papers are logic and reasoning, machine learning, game theory, robotic technology, data mining, neural networks, fuzzy theory and algorithms, evolutionary computing, Web intelligence, decision making, pattern recognition, agent technology, and AI applications.

Presents a framework of worldwide problems, issues and solutions relevant to the design of work and development of personnel in advanced manufacturing systems. Focuses on people and their central roles in automated production resulting from rapid computer-based integration. Addresses social, technical, organizational, managerial and ecological design issues relating to manufacturing success and the business objectives of a firm. Provides solutions to problems of integrating the human element into the production process.

Advanced Manufacturing Methods: Smart Processes and Modeling for Optimization describes developments in advanced manufacturing processes and applications considering typical and advanced materials. It helps readers implement manufacturing 4.0 production techniques and highlights why a consolidated source and robust platform are necessary for implementing machine learning processes in the manufacturing sector. Discusses the industrial impact of manufacturing process. Provides novel fundamental manufacturing solutions. Presents the various aspects of applications in advanced materials in correlation of physical properties with macro-, micro- and nanostructures. Reviews both classical and artificial manufacturing when applied with typical and novel innovative materials. Aimed at those working in manufacturing, mechanical and optimization of manufacturing processes, this work provides readers with a comprehensive view of current development in, and applications of, advanced manufacturing.

This is an open access book. It gathers the first volume of the proceedings of the 31st edition of the International Conference on Flexible Automation and Intelligent Manufacturing, FAIM 2022, held on June 19 – 23, 2022, in Detroit, Michigan, USA. Covering four thematic areas including Manufacturing Processes, Machine Tools, Manufacturing Systems, and Enabling Technologies, it reports on advanced manufacturing processes, and innovative materials for 3D printing, applications of machine learning, artificial intelligence and mixed reality in various production sectors, as well as important issues in human-robot collaboration, including methods for improving safety. Contributions also cover strategies to improve quality control, supply chain management and training in the manufacturing industry, and methods supporting circular supply chain and sustainable manufacturing. All in all, this book provides academicians, engineers and professionals with extensive information on both scientific and industrial advances in the converging fields of manufacturing, production, and automation.

The manufacturing system is going through substantial changes and developments in light of Industry 4.0. Newer manufacturing technologies are being developed and applied. There is a need to optimize these techniques when applied in different circumstances with respect to materials, tools, product configurations, and process parameters. This book covers computational intelligence applied to manufacturing. It discusses nature-inspired optimization of processes and their design and development in manufacturing systems. It explores all manufacturing processes, at both macro and micro levels, and offers manufacturing philosophies. Nonconventional manufacturing, real industry problems and case studies, research on generative processes, and relevance of all this to Industry 4.0 is also included. Researchers, students, academicians, and industry professionals will find this reference title very useful.

This book is intended to help management and other interested parties such as engineers, to understand the state of the art when it comes to the intersection between AI and Industry 4.0 and get them to realise the huge possibilities which can be unleashed by the intersection of these two fields. We have heard a lot about Industry 4.0, but most of the time, it focuses mainly on automation. In this book, the authors are going a step further by exploring advanced applications of Artificial Intelligence (AI) techniques, ranging from the use of deep learning algorithms in order to make predictions, up to an implementation of a full-blown Digital Triplet system. The scope of the book is to showcase what is currently brewing in the labs with the hope of migrating these technologies towards the factory floors. Chairpersons and CEOs must read these papers if they want to stay at the forefront of the game, ahead of their competition, while also saving huge sums of money in the process.

Advances in Additive Manufacturing: Artificial intelligence, Nature Inspired and Bio-manufacturing covers the latest developments in additive manufacturing. The book explores nature-inspired additive manufactured processes and their applications, as well as various algorithms to enhance characteristics, efficiency and the development of a product in minimum time. The integration of AM with artificial intelligence (AI) from prefabrication stage to final product, with real-time defect detection, control and process efficiency improvement are also discussed. This book will be a great resource for engineers, researchers and academics involved in this revolutionary and unique field of manufacturing. Discusses the modeling of additive manufacturing processes using artificial intelligence. Looks at the optimization of designs, technologies and materials of AM and the use of simulation in AM. Includes case studies and real-world problems from today's industries and society.

This two-volume set of LNAI 12798 and 12799 constitutes the thoroughly refereed proceedings of the 34th International Conference on Industrial, Engineering and Other Applications of Applied Intelligent Systems, IEA/AIE 2021, held virtually and in Kuala Lumpur, Malaysia, in July 2021. The 87 full papers and 19 short papers presented were carefully reviewed and selected from 145 submissions. The IEA/AIE 2021 conference will continue the tradition of emphasizing on applications of applied intelligent systems to solve real-life problems in all areas. These areas include the following: Part I, Artificial Intelligence Practices: Knowledge discovery and pattern mining; artificial intelligence and machine learning; semantic, topology, and ontology models; medical and health-related applications; graphic and social network analysis; signal and bioinformatics processing; evolutionary computation; attack security; natural language and text processing; fuzzy inference and theory; and sensor and communication networks. Part II, From Theory to Practice: Prediction and recommendation; data management, clustering and classification; robotics; knowledge based and decision support systems; multimedia applications; innovative applications of intelligent systems; CPS and industrial applications; defect, anomaly and intrusion detection; financial and supply chain applications; Bayesian networks; BigData and time series processing; and information retrieval and relation extraction.

Special topic volume with invited peer reviewed papers covers engineering materials, manufacture and production, automation and control, environment-friendly design and manufacture, web/internet technologies, artificial intelligence and smart computing in design and manufacture, enterprise, management, and other related topics and so on. This work will be invaluable to production and research engineers, and also to research students and academics interested in the field.

This book introduces Industrial AI in multiple dimensions. Industrial AI is a systematic discipline which focuses on developing, validating and deploying various machine learning algorithms for indus-

trial applications with sustainable performance. Combined with the state-of-the-art sensing, communication and big data analytics platforms, a systematic Industrial AI methodology will allow integration of physical systems with computational models. The concept of Industrial AI is in infancy stage and may encompass the collective use of technologies such as Internet of Things, Cyber-Physical Systems and Big Data Analytics under the Industry 4.0 initiative where embedded computing devices, smart objects and the physical environment interact with each other to reach intended goals. A broad range of Industries including automotive, aerospace, healthcare, semiconductors, energy, transportation, mining, construction, and industrial automation could harness the power of Industrial AI to gain insights into the invisible relationship of the operation conditions and further use that insight to optimize their uptime, productivity and efficiency of their operations. In terms of predictive maintenance, Industrial AI can detect incipient changes in the system and predict the remains useful life and further to optimize maintenance tasks to avoid disruption to operations.

This book covers advanced manufacturing in biological, petroleum, and nanotechnology processing for the development of novel products and systems that incorporate enhanced pollution control and waste management for environmental remediation. The book is divided into three parts. The first section looks at the design and application of process systems, the second section focuses largely on pollution control and management, and the final section discusses areas related to process modeling and simulation. Coverage highlights the integration of smart tools and solutions and looks at current advances in monitoring industrial and environmental processes that can assist in making significant progress in process design for the effective control of pollution and waste management. Presents advanced methods for manufacturing industrial products; Highlights new solutions for pollution and waste management; Explores modeling and simulation of industrial and environmental processes.

Artificial Intelligence Techniques for Networked Manufacturing Enterprises Management addresses prominent concepts and applications of AI technologies in the management of networked manufacturing enterprises. The aim of this book is to align latest practices, innovation and case studies with academic frameworks and theories, where AI techniques are used efficiently for networked manufacturing enterprises. More specifically, it includes the latest research results and projects at different levels addressing quick-response system, theoretical performance analysis, performance and capability demonstration. The role of emerging AI technologies in the modelling, evaluation and optimisation of networked enterprises' activities at different decision levels is also covered. Artificial Intelligence Techniques for Networked Manufacturing Enterprises Management is a valuable guide for postgraduates and researchers in industrial engineering, computer science, automation and operations research.

This book constitutes the refereed proceedings of the 15th Australian Joint Conference on Artificial Intelligence, AI 2002, held in Canberra, Australia in December 2002. The 62 revised full papers and 12 posters presented were carefully reviewed and selected from 117 submissions. The papers are organized in topical sections on natural language and information retrieval, knowledge representation and reasoning, deduction, learning theory, agents, intelligent systems. Bayesian reasoning and classification, evolutionary algorithms, neural networks, reinforcement learning, constraints and scheduling, neural network applications, satisfiability reasoning, machine learning applications, fuzzy reasoning, and case-based reasoning.

While human capabilities can withstand broad levels of strain, they cannot hope to compete with the advanced abilities of automated technologies. Developing advanced robotic systems will provide a better, faster means to produce goods and deliver a level of seamless communication and synchronization that exceeds human skill. Advanced Robotics and Intelligent Automation in Manufacturing is a pivotal reference source that provides vital research on the application of advanced manufacturing technologies in regards to production speed, quality, and innovation. While highlighting topics such as human-machine interaction, quality management, and sensor integration, this publication explores state-of-the-art technologies in the field of robotics engineering as well as human-robot interaction. This book is ideally designed for researchers, students, engineers, manufacturers, managers, industry professionals, and academicians seeking to enhance their innovative design capabilities.

This book constitutes the refereed proceedings of the 5th Mexican International Conference on Artificial Intelligence, MICAI 2006, held in Apizaco, Mexico in November 2006. It contains over 120 papers that address such topics as knowledge representation and reasoning, machine learning and feature selection, knowledge discovery, computer vision, image processing and image retrieval, robotics, as well as bioinformatics and medical applications.

This book introduces the latest research on advanced control charts and new machine learning approaches to detect abnormalities in the smart manufacturing process. By approaching anomaly detection using both statistics and machine learning, the book promotes interdisciplinary cooperation between the research communities, to jointly develop new anomaly detection approaches that are more suitable for the 4.0 Industrial Revolution. The book provides ready-to-use algorithms and parameter sheets, enabling readers to design advanced control charts and machine learning-based approaches for anomaly detection in manufacturing. Case studies are introduced in each chapter to help practitioners easily apply these tools to real-world manufacturing processes. The book is of interest to researchers, industrial experts, and postgraduate students in the fields of industrial engineering, automation, statistical learning, and manufacturing industries.

This book constitutes the refereed proceedings of the 4th Mexican International Conference on Artificial Intelligence, MICAI 2005, held in Monterrey, Mexico, in November 2005. The 120 revised full papers presented were carefully reviewed and selected from 423 submissions. The papers are organized in topical sections on knowledge representation and management, logic and constraint programming, uncertainty reasoning, multiagent systems and distributed AI, computer vision and pattern recognition, machine learning and data mining, evolutionary computation and genetic algorithms, neural networks, natural language processing, intelligent interfaces and speech processing, bioinformatics and medical applications, robotics, modeling and intelligent control, and intelligent tutoring systems.

The five-volume set IFIP AICT 630, 631, 632, 633, and 634 constitutes the refereed proceedings of the International IFIP WG 5.7 Conference on Advances in Production Management Systems, APMS 2021, held in Nantes, France, in September 2021.* The 378 papers presented were carefully reviewed and selected from 529 submissions. They discuss artificial intelligence techniques, decision aid and new and renewed paradigms for sustainable and resilient production systems at four-wall factory and value chain levels. The papers are organized in the following topical sections: Part I: artificial intelligence based optimization techniques for demand-driven manufacturing; hybrid approaches for production planning and scheduling; intelligent systems for manufacturing planning and control in the industry 4.0; learning and robust decision support systems for agile manufacturing environments; low-code and model-driven engineering for production system; meta-heuristics and optimization techniques for energy-oriented manufacturing systems; metaheuristic for production systems; modern analytics and new AI-based smart techniques for replenishment and production planning under uncertainty; system identification for manufacturing control applications; and the future of lean thinking and practice. Part II: digital transformation of SME manufacturers: the crucial

role of standard; digital transformations towards supply chain resiliency; engineering of smart-product-service-systems of the future; lean and Six Sigma in services healthcare; new trends and challenges in reconfigurable, flexible or agile production system; production management in food supply chains; and sustainability in production planning and lot-sizing Part III: autonomous robots in delivery logistics; digital transformation approaches in production management; finance-driven supply chain; gastronomic service system design; modern scheduling and applications in industry 4.0; recent advances in sustainable manufacturing; regular session: green production and circularity concepts; regular session: improvement models and methods for green and innovative systems; regular session: supply chain and routing management; regular session: robotics and human aspects; regular session: classification and data management methods; smart supply chain and production in society 5.0 era; and supply chain risk management under coronavirus Part IV: AI for resilience in global supply chain networks in the context of pandemic disruptions; blockchain in the operations and supply chain management; data-based services as key enablers for smart products, manufacturing and assembly; data-driven methods for supply chain optimization; digital twins based on systems engineering and semantic modeling; digital twins in companies first developments and future challenges; human-centered artificial intelligence in smart manufacturing for the operator 4.0; operations management in engineer-to-order manufacturing; product and asset life cycle management for smart and sustainable manufacturing systems; robotics technologies for control, smart manufacturing and logistics; serious games analytics: improving games and learning support; smart and sustainable production and supply chains; smart methods and techniques for sustainable supply chain management; the new digital lean manufacturing paradigm; and the role of emerging technologies in disaster relief operations: lessons from COVID-19 Part V: data-driven platforms and applications in production and logistics: digital twins and AI for sustainability; regular session: new approaches for routing problem solving; regular session: improvement of design and operation of manufacturing systems; regular session: crossdock and transportation issues; regular session: maintenance improvement and lifecycle management; regular session: additive manufacturing and mass customization; regular session: frameworks and conceptual modelling for systems and services efficiency; regular session: optimization of production and transportation systems; regular session: optimization of supply chain agility and reconfigurability; regular session: advanced modelling approaches; regular session: simulation and optimization of systems performances; regular session: AI-based approaches for quality and performance improvement of production systems; and regular session: risk and performance management of supply chains *The conference was held online.

Smart manufacturing uses big data, the Internet of things (IoT) and the Internet of Services (IoS), and flexible and dynamic workforces to cope with ever-increasing demand in low-volume, high-mix production. Companies worldwide are already pivoting towards dynamic and reconfigurable production as a smarter way to build and make things. As such, this book discusses the next generation of

manufacturing, which will involve the transformational convergence of intelligent machines, powerful computing and analytics, and unprecedented networking of people, products, and services.

This book provides readers with a guide to the use of Digital Twin in manufacturing. It presents a collection of fundamental ideas about sensor electronics and data acquisition, signal and image processing techniques, seamless data communications, artificial intelligence and machine learning for decision making, and explains their necessity for the practical application of Digital Twin in Industry. Providing case studies relevant to the manufacturing processes, systems, and sub-systems, this book is beneficial for both academics and industry professionals within the field of Industry 4.0 and digital manufacturing.

In the industry of manufacturing and design, one major constraint has been enhancing operating performance using less time. As technology continues to advance, manufacturers are looking for better methods in predicting the condition and residual lifetime of electronic devices in order to save repair costs and their reputation. Intelligent systems are a solution for predicting the reliability of these components; however, there is a lack of research on the advancements of this smart technology within the manufacturing industry. AI Techniques for Reliability Prediction for Electronic Components provides emerging research exploring the theoretical and practical aspects of prediction methods using artificial intelligence and machine learning in the manufacturing field. Featuring coverage on a broad range of topics such as data collection, fault tolerance, and health prognostics, this book is ideally designed for reliability engineers, electronic engineers, researchers, scientists, students, and faculty members seeking current research on the advancement of reliability analysis using AI.

"This book provides introductory instruction on how to learn how to use artificial intelligence to produce additively manufactured parts, including a description of the starting points, what you can know, how it blends and how artificial intelligence in additive manufacturing apply"--

After the recent launch of home-based personal 3D printers as well as government funding and company investments in advancing manufacturing initiatives, additive manufacturing has rapidly come to the forefront of discussion and become a more approachable lucrative career of particular interest to the younger generation. It is essential to identify the long-term competitive advantages and how to teach, inspire, and create a resolute community of supporters, learners, and new leaders in this important industry progression. Applications of Artificial Intelligence in Additive Manufacturing provides instruction on how to use artificial intelligence to produce additively manufactured parts. It discusses an overview of the field, the strategic blending of artificial intelligence and additive manufacturing, and features case studies on the various emerging technologies. Covering topics such as artificial intelligence models, experimental investigations, and online detections, this book is an essential resource for engineers, manufacturing professionals, computer scientists, AI scientists, researchers, educators, academicians, and students.