Expert Knowledge Based Reliability Models Theory And Case Study Integrating Data And Expert Opinion Using Bayesian Statistics To Build Complex Reliability Models

This volume gathers the latest advances, innovations and applications in the field of condition monitoring, plant maintenance and reliability, as presented by leading international researchers and engineers at the 5th International Conference on Maintenance Engineering and the 2020 Annual Conference of the Centre for Efficiency and Performance Engineering Network (IncoME-V & CEPE Net-2020), held in Zhuhai, China on October 23-25, 2020. Topics include vibro-acoustics monitoring, condition-based maintenance, sensing and instrumentation, machine health monitoring, maintenance auditing and organization, non-destructive testing, reliability, asset management, condition monitoring, life-cycle cost optimisation, prognostics and health management, maintenance performance measurement, manufacturing process monitoring, and robot-based monitoring and diagnostics. The contributions, which were selected through a rigorous international peer-review process, share exciting ideas that will spur novel research directions and foster new multidisciplinary collaborations.

Artificial neural network (ANN) has proven to be a universal approximator for any non-linear continuous function with arbitrary accuracy. This book presents how to apply ANN to measure various software reliability indicators: number of failures in a given time, time between successive failures, fault-prone modules and development efforts. The application of machine learning algorithm i.e. artificial neural networks application in software reliability prediction during testing phase as well as early phases of software development process is presented as well. Applications of artificial neural network for the above purposes are discussed with experimental results in this book so that practitioners can easily use ANN models for predicting software reliability indicators.

User Interfaces for All is the first book dedicated to the issues of Universal Design and Universal Access in the field of Human-Computer Interaction (HCI). Universal Design (or Design for All) is an inclusive and proactive approach seeking to accommodate diversity in the users and usage contexts of interactive products, applications, and services, starting from the design phase of the development life cycle. The ongoing paradigm shift toward a knowledge-intensive information society is already bringing about radical changes in the way people work and interact with each other and with information. The requirement for Universal Design stems from the growing impact of the fusion of the emerging technologies, and from the different dimensions of diversity, which are intrinsic to the information society. This book unfolds the various aspects of this ongoing evolution from a variety of viewpoints. It's a collection of 30 chapters written by leading international authorities, affiliated with academic, research, and industrial organizations, and non-market institutions. The book provides a comprehensive overview of the state of the art in the field, and includes contributions from a variety of theoretical and applied disciplines and research themes. This book can also be used for teaching purposes in HCI courses at the undergraduate as well as graduate level. Students will be introduced to the human-, organizational-, and technology-oriented dimensions that call for a departure from traditional approaches to user interface development. Students will also get an overview of novel methods, techniques, tools, and frameworks for the design, implementation, and evaluation of user interfaces that are universally accessible and usable by the broadest possible end-user population. This comprehensive book is targeted to a broad readership, including HCI researchers, user interface designers, computer scientists, software engineers, ergonomists and usability engineers, Human Factors researchers and practitioners, organizational psychologists, system/product designers, sociologists, policy- and decision makers, scientists in government, industry and education, as well as assistive technology and rehabilitation experts.

Mechanistic models are often employed to simulate processes in coastal environments. However, these predictive tools are highly specialized, involve certain assumptions and limitations, and can be manipulated only by experienced engineers who have a thorough understanding of the underlying principles. This results in significant constraints on thei

UptimeStrategies for Excellence in Maintenance Management, Third EditionCRC Press

Typically, landscape ecologists use empirical observations to conduct research and devise solutions for applied problems in conservation and management. In some instances, they rely on advice and input of experienced professionals in both developing and applying knowledge. Given the wealth of expert knowledge and the risks of its informal and implicit applications in landscape ecology, it is necessary to formally recognize and characterize expert knowledge and bring rigor to methods for its applications. In this context, the broad goal of this book is to introduce the concept of expert knowledge and examine its role in landscape ecological applications. We plan to do so in three steps: First we introduce the topic to landscape ecologists, explore salient characteristics of experts and expert knowledge, and describe methods used in capturing and formalizing that knowledge. Second, we present examples of research in landscape ecology from a variety of ecosystems and geographic locations that formally incorporate expert knowledge. These case studies address a range of topics that will interest landscape ecologists and other resource management and conservation professionals including the specific roles of expert knowledge in developing, testing, parameterizing, and applying models; estimating the uncertainty in expert knowledge; developing methods of formalizing and incorporating expert knowledge; and using expert knowledge as competing models and a source of alternate hypotheses. Third, we synthesize the state of knowledge on this topic and critically examine the advantages and disadvantages of incorporating expert knowledge in landscape ecological applications. The disciplinary subject areas we address are broad and cover much of the scope of contemporary landscape ecology, including broad-scale forest management and conservation, quantifying forest disturbances and succession, conservation of habitats for a range of avian and mammal species, vulnerability and conservation of marine ecosystems, and the spread and impacts of invasive plants. This text incorporates the collective experience and knowledge of over 35 researchers in landscape ecology representing a diverse range of disciplinary subject areas and geographic locations. Through this text, we will catalyze further thought and investigations on expert knowledge among the target readership of researchers, practitioners, and graduate students in landscape ecology.

Uptime describes the combination of activities that deliver fewer breakdowns, improved productive capacity, lower costs, and better environmental performance. The bestselling second edition of Uptime has been used as a textbook on maintenance management in several postsecondary institutions and by many companies as the model framework for their maintenance management programs. Following in the tradition of its bestselling predecessors, Uptime: Strategies for Excellence in Maintenance Management, Third Edition explains how to deal with increasingly complex technologies, such as mobile and cloud computing, to support maintenance departments and set the stage for compliance with international standards for asset management. This updated edition reflects a far broader and deeper wealth of experience and knowledge. In addition, it restructures its previous model of excellence slightly to align what must be done more closely with how to do it. The book provides a strategy for developing and executing improvement plans that work well with the new values prevalent in today's workforce. It also explains how you can use seemingly competing improvement tools to complement and enhance each other. This edition also highlights action you can take to compensate for the gradual loss of skills in the current workforce as "baby boomers" retire.

A collection of papers from a conference held at Kings College, London. Computer-based Design focuses on all areas of design using computational methods and examines how all these individual tools can be integrated to produce a coherent design process. This volume also covers areas of manual design methods and modelling that are vital to the continuing development and evolution of the computer-aided

design process. TOPICS COVERED INCLUDE Product design and modelling Design process Decision-making models Computer-assisted design systems Computer-assisted conceptual design Computer-assisted detailed design Computer assisted design for manufacture Design knowledge manipulation Engineering change Engineering design issues Fuzzy design Computer-aided design Industrial applications of design Advanced design applications Computational fluid dynamics Computer-based Design provides an excellent opportunity for an update on the latest techniques and developments from concept to advanced application in the design arena.

In this introduction to computational modelling the authors provide a concise description of computational methods, including dynamic simulation, knowledge-based models and machine learning, as a single broad class of research tools.

Researchers in the engineering industry and academia are making important advances on reliability-based design and modeling of uncertainty when data is limited. Non deterministic approaches have enabled industries to save billions by reducing design and warranty costs and by improving quality. Considering the lack of comprehensive and defini

Design and Optimization of Thermal Systems, Third Edition: with MATLAB® Applications provides systematic and efficient approaches to the design of thermal systems, which are of interest in a wide range of applications. It presents basic concepts and procedures for conceptual design, problem formulation, modeling, simulation, design evaluation, achieving feasible design, and optimization. Emphasizing modeling and simulation, with experimentation for physical insight and model validation, the third edition covers the areas of material selection, manufacturability, economic aspects, sensitivity, genetic and gradient search methods, knowledge-based design methodology, uncertainty, and other aspects that arise in practical situations. This edition features many new and revised examples and problems from diverse application areas and more extensive coverage of analysis and simulation with MATLAB®.

This comprehensive book examines a range of examples, prepared by a diverse group of academic and industry practitioners, which demonstrate how cloud-based simulation is being extensively used across many disciplines, including cyber-physical systems engineering. This book is a compendium of the state of the art in cloud-based simulation that instructors can use to inform the next generation. It highlights the underlying infrastructure, modeling paradigms, and simulation methodologies that can be brought to bear to develop the next generation of systems for a highly connected society. Such systems, aptly termed cyber-physical systems (CPS), are now widely used in e.g. transportation systems, smart grids, connected vehicles, industrial production systems, healthcare, education, and defense. Modeling and simulation (M&S), along with big data technologies, are at the forefront of complex systems engineering research. The disciplines of cloud-based simulation and CPS engineering are evolving at a rapid pace, but are not optimally supporting each other's advancement. This book brings together these two communities, which already serve multi-disciplinary applications. It provides an overview of the simulation technologies landscape, and of infrastructure pertaining to the use of cloud-based environments for CPS engineering. It covers the engineering, design, and application of cloud simulation technologies and infrastructures applicable for CPS engineering. The contributions share valuable lessons learned from developing real-time embedded and robotic systems deployed through cloud-based infrastructures for application in CPS engineering and IoT-enabled society. The coverage incorporates cloud-based M&S as a medium for facilitating CPS engineering and governance, and elaborates on available cloud-based M&S technologies and their impacts on specific aspects of CPS engineering.

The subject of system reliability evaluation has never been so extensively and incisively discussed as in the present volume. The book fills a gap in the existing literature on the subject by highlighting the shortcomings of the current state-of-the-art and focusing on on-going efforts aimed at seeking better models, improved solutions and alternative approaches to the problem of system reliability evaluation. The book's foremost objective is to provide an insight into developments that are likely to revolutionize the art and science in the near future. At the same time it will help serve as a benchmark for the reader not only to understand and appreciate the newer developments but to profitably guide him in reorienting his efforts. This book will be valuable for people working in various industries, research organizations, particularly in electrical and electronics, defence, nuclear, chemical, space and communciation systems. It will also be useful for serious-minded students, teachers, and for the laboratories of educational institutions.

Ergonomics touches every man, woman and child each day of their lives whether they recognise it or not. Ergonomics (or lack of it) plays a more significant role in the lives of about two-thirds of the world s population over 10 years of age who work for one-third of their lives to make a living. There are 120 million occupational accidents and injuries and 200,000 fatalities each year according to WHO 95. Occupational accidents, injuries and fatalities are undesired events. The occupational activities are planned and designed, and executed with a purpose under supervision but accidents are not. Hence it stands to reason that better planning, design and execution will help to reduce these undesirable outcomes. One must also recognise that under global scheme of biological evolution, the human beings were not designed to endure a life long exposure to artificial activities repetitively. Thus occupational health problems are inevitable if we do not return to nature for our sustenance. As a society, we have chosen to live and work as we do. In fact, there is a far rapid evolution (mutation and speciation) of occupations than of any biological organism. This places us in a situation where better planning, design and execution of our occupational activities have become absolute necessity. However, since ergonomics is a modifier and not a causal factor, its significance does not become immediately apparent to us. Perhaps it is for this reason that even in developed world occupational health services are available to between 20% to 50% of the work force and less than 10% of the workforce in the developing countries. Occupational health services are remedial approaches. The rational wisdom of the human race should strive to get proactive control of undesirable outcomes through ergonomics. Unfortunately, it is sadly lacking even today. On an optimistic note one can observe that its presence and application is slowly increasing.

Uncertainty can take many forms, can be represented in many ways, and can have important implications in decision-making and policy development. This book provides a rigorous scientific framework for dealing with uncertainty in real-world situations, and provides a comprehensive study of concepts, measurements, and applications of uncertainty in ecological modeling and natural resource management. The focus of this book is on the kinds and implications of uncertainty in environmental modeling and management, with practical guidelines and examples for successful modeling and risk analysis in the face of uncertain conditions and incomplete information. Provided is a clear classification of uncertainty; methods for measuring, modeling, and communicating uncertainty; practical guidelines for capturing and representing expert knowledge and judgment; explanations of the role of uncertainty in decision-making; a guideline to avoiding logical fallacies when dealing with uncertainty; and several example cases of real-world ecological modeling and risk analysis to illustrate the concepts and approaches. Case topics provide examples of structured decision-making, statistical modeling, and related topics. A summary provides practical next steps that the reader can take in analyzing and interpreting uncertainty in real-world situations. Also provided is a glossary and a suite of references.

This tutorial book gives an overview of the current state of the art in measuring the different aspects of dependability of systems: reliability, security and performance.

In this fully up-to-date volume, important new developments and applications of discrete element modelling are highlighted and brought together for presentation at the First International UDEC/3DEC Symposium. Papers covered the following key areas: * behaviour of masonry structures (walls, bridges, towers, columns) * stability and deformation of tunnels and caverns in fractured rock masses * geomechanical modelling for mining and waste repositories * rock reinforcement design (anchors, shotcrete, bolts) * mechanical and hydro-mechanical behaviour of dams and foundations * rock slope stability, deformation and failure mechanisms * modelling of fundamental rock mechanical problems * modelling of geological processes * constitutive laws for fractured rock masses and masonry structures * dynamic behaviour of discrete structures. Numerical Modelling of Discrete Materials in Geotechnical Engineering, Civil Engineering, and Earth Sciences provides an ultra-modern, in-depth analysis of discrete element modelling in a range of different fields, thus proving valuable reading for civil, mining, and geotechnical engineers, as well as other interested professionals.

The author establishes a thorough foundation for more efficient planning, implementation and controlling, which also promotes the company-wide acceptance of systems, strategies and actions taken.

This volume presents the findings of the 6th International Workshop on Software Metrics. Consequently continuing the Workshop's tradition the focus is on the combination of theoretical and practical contributions.

This book presents a bibliographical review of the use of Bayesian networks in reliability over the last decade. Bayesian network (BN) is considered to be one of the most powerful models in probabilistic knowledge representation and inference, and it is increasingly used in the field of reliability. After focusing on the engineering systems, the book subsequently discusses twelve important issues in the BN-based reliability methodologies, such as BN structure modeling, BN parameter modeling, BN inference, validation, and verification. As such, it is a valuable resource for researchers and practitioners in the field of reliability engineering.

This book presents the latest research findings in the field of maintenance and safety of aging infrastructure. The invited contributions provide an overview of the use of advanced computational and/or experimental techniques in damage and vulnerability assessment as well as maintenance and retrofitting of aging structures and infrastructures such

This book offers a systematic approach to knowledge engineering problems. It gives a brief overview of knowledge engineering systems and environments, covering both classical and recent techniques of the design and evaluation of them. Detailed descriptions of particular techniques and applications are also provided. Contents: Knowledge Representation Using Semantics of Semantic Networks (A V Hudli)Production Rules and Systems: A Top-Down Construction of Bottom-Up Inference (M Perlin)KNOWBEL: New Tools for Expert System Development (H Wang et al.)COOP: A Self-Assessment Based Approach to Cooperating Expert Systems (S Shekhar & C V Ramamoorthy)Knowledge as a Key Component in Intelligent Information Systems (M P Papazoglou)A Data Parallel Shell for Large Knowledge Bases (A K Bansal & J L Potter)A Knowledge Based Approach for the Specifications and Analysis of Real-Time Software Systems (J J P Tsai & H-C Jang)A Tool for Knowledge Base Verification (D Zhang & Nguyen)and other papers Readership: Computer scientists, researchers and professionals in knowledge engineering and artificial intelligence. keywords:

One out of every two men over eigthy suffers from carcinoma of the prostate.It is discovered incidentally in many patients with an alleged benign prostatic hyperplasia. In treating patients, the authors make clear that primary radical prostatectomy is preferred over transurethral resection due to the lower complication rate.

This volume contains papers based on contributions to two workshops: the Workshop on Architecting Dependable Systems (WADS 2008)and the Third International Workshop on Views On Designing Complex Architectures (VODCA 2008).

This book contains extended versions of 34 carefully selected and reviewed papers presented at the Third International Conference on Mathematical Methods in Reliability, held in Trondheim, Norway in 2002. It provides a broad overview of current research activities in reliability theory and its applications. There are chapters on reliability modelling, network and system reliability, reliability optimization, survival analysis, degradation and maintenance modelling, and software reliability. The authors are all leading experts in the field. A particular feature of the book is a historical review by Professor Richard E Barlow, well known for his pioneering research on reliability. The list of authors also includes the plenary session speakers Odd O Aalen, Philip J Boland, Sallie A Keller-McNulty, and Nozer Singpurwalla. Contents: Reliability Theory in the Past and Present Centuries; General Aspects of Reliability Modelling; Reliability of Networks and Systems; Stochastic Modelling and Optimization in Reliability; Modelling in Survival and Reliability Analysis; Statistical Methods for Degradation Data; Statistical Methods for Maintained Systems; Statistical Inference in Survival Analysis; Software Reliability Methods. Readership: Graduate students, academics and professionals in probability & statistics, reliability analysis, survival analysis, industrial engineering, software engineering, operations research and applied mathematics research.

This book is a collection of papers presented at the International Conference on Reliability Techniques and their Application.Reliability 91, 10-12 June 1991 was held at the Royal Lancaster Hotel, London, UK, organised by SRD (the Safety and Reliability Consultants of AEA Technology) and the institution of Quality Assurance (IQA), and supported by the European Safety and Reliability Association (ESRA).

The two-volume set LNCS 11944-11945 constitutes the proceedings of the 19th International Conference on Algorithms and Architectures for Parallel Processing, ICA3PP 2019, held in Melbourne, Australia, in December 2019. The 73 full and 29 short papers presented were carefully reviewed and selected from 251 submissions. The papers are organized in topical sections on: Parallel and Distributed Architectures, Software Systems and Programming Models, Distributed and Parallel and Network-based Computing, Big

Data and its Applications, Distributed and Parallel Algorithms, Applications of Distributed and Parallel Computing, Service Dependability and Security, IoT and CPS Computing, Performance Modelling and Evaluation.

This book constitutes the refereed proceedings of the 21st International Conference on Case-Based Reasoning Research and Development (ICCBR 2013) held in Saratoga Springs, NY, USA, in July 2013. The 17 revised full papers presented together with 9 posters were carefully reviewed and selected from 39 submissions. The presentations and posters covered a wide range of CBR topics of interest both to researchers and practitioners including case retrieval and adaptation, similarity assessment, case base maintenance, knowledge management, recommender systems, multiagent systems, textual CBR, and applications to healthcare and computer games.

In the wake of the recent financial crisis, increasing the effectiveness of auditing has weighed heavily on the minds of those responsible for governance. When a business is profitable and paying healthy dividends to its stockholders, fraudulent activities and accounting irregularities can go unnoticed. However, when revenue and cash flow decline, internal costs and operations may be scrutinized more diligently, and discrepancies can emerge as a result. Effective Auditing for Corporates provides you with proactive advice-to help you safeguard core value within a corporation and to ensure that auditing processes and key personnel meet the expectations of management, compliance, and stockholders alike. Aimed primarily at auditors (both external and internal), risk managers, accountants, CFOs, and consultants, Effective Auditing for Corporates covers: * Compliance and the corporate audit * Fraud detection * Risk-based auditing * The development of Sarbanes-Oxley * Cultural changes in external auditing * Auditing management information systems

This book contains the papers presented at the 20th UK Workshop on Computational Intelligence (UKCI 2021), held virtually by Aberystwyth University, 8–10th September 2021. This marks the 20th anniversary of UKCI; a testament to the increasing role and importance of Computational Intelligence (CI) and the continuing interest in its development. UKCI provides a forum for the academic community and industry to share ideas and experience in this field. EDMA 2021, the 4th International Engineering Data- and Model-Driven Applications workshop, is also incorporated and held in conjunction with UKCI 2021. Paper submissions were invited in the areas of fuzzy systems, neural networks, evolutionary computation, machine learning, data mining, cognitive computing, intelligent robotics, hybrid methods, deep learning and applications of CI.

Modem manufacturing systems involve many processes and operations that can be monitored and controlled at several levels of intelligence. At the highest level there is a computer that supervises the various manufacturing functions, whereas at the lowest level there are stand alone computer controlled systems of manufacturing processes and robotic cells. Until recenty computer-aided manufacturing systems constituted isolated "islands" of automation, each oriented to a particular application, but present day systems offer integrated approaches to manufacturing and enterprise operations. These modem systems, known as computer-integrated manufacturing (CIM) systems, can easily meet the current performance and manufacturing competitiveness requirements under strong environmental changes. CIM systems are much of a challenge, and imply a systemic approach to the design and operation of a manufacturing enterprise. Actualy, a CIM system must take into account in a unified way the following three views : the user view, the technology view, and the enterprise view. This means that CIM includes both the engineering and enterprise planning and control activities, as well as the information flow activities across all the stages of the system.

This book bridges the gap between the many different disciplines used in applications of risk analysis to real world problems. Contributed by some of the world's leading experts, it creates a common information base and language for all risk analysis practitioners, risk managers, and decision makers. Valuable as both a reference for practitioners and a comprehensive textbook for students, Fundamentals of Risk Analysis and Risk Management is a unique contribution to the field. Its broad coverage ranges from basic theory of risk analysis to practical applications, risk perception, legal and political issues, and risk management.

Safety and Reliability – Safe Societies in a Changing World collects the papers presented at the 28th European Safety and Reliability Conference, ESREL 2018 in Trondheim, Norway, June 17-21, 2018. The contributions cover a wide range of methodologies and application areas for safety and reliability that contribute to safe societies in a changing world. These methodologies and applications include: - foundations of risk and reliability assessment and management - mathematical methods in reliability and safety - risk assessment - risk management - system reliability - uncertainty analysis - digitalization and big data - prognostics and system health management - occupational safety - accident and incident modeling - maintenance modeling and applications - simulation for safety and reliability analysis - dynamic risk and barrier management - organizational factors and safety culture - human factors and human reliability - resilience engineering - structural reliability - natural hazards - security - economic analysis in risk management Safety and Reliability – Safe Societies in a Changing World will be invaluable to academics and professionals working in a wide range of industrial and governmental sectors: offshore oil and gas, nuclear engineering, aeronautics and aerospace, marine transport and engineering, railways, road transport, automotive engineering, civil engineering, critical infrastructures, electrical and electronic engineering, energy production and distribution, environmental engineering, information technology and telecommunications, insurance and finance, manufacturing, marine transport, mechanical engineering, security and protection, and policy making.

Within the last fifty years the performance requirements for technical objects and systems were supplemented with: customer expectations (quality), abilities to prevent the loss of the object properties in operation time (reliability and maintainability), protection against the effects of undesirable events (safety and security) and the ability to

This book is part of a three volume set that constitutes the refereed proceedings of the 4th International Symposium on Neural Networks, ISNN 2007, held in Nanjing, China in June 2007. Coverage includes neural networks for control applications, robotics, data mining and feature extraction, chaos and synchronization, support vector machines, fault diagnosis/detection, image/video processing, and applications of neural networks.