Fuzzy Logic Application In Civil Engineering

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Proceedings of EECE 2020 Frontiers Media SA
Providing equal emphasis on theoretical foundations and practical issues, this book features fuzzy logic concepts and techniques in intelligent systems, control, and information technology. Uses Fuzzy Logic Toolbox MATLAB to demonstrate exemplar applications and to develop hands-on exercises.

Advances in Civil Engineering and Infrastructural Development Pearson
Materials science includes those parts of chemistry and physics that deal with the properties of materials. It encompasses four classes of materials, the study of each of which may be considered a separate field: metals; ceramics; polymers and composites. Materials science is often referred to as materials science and engineering because it has many applications. Industrial applications of materials science include processing techniques (casting, rolling, welding, ion implantation, crystal growth, thin-film deposition, sintering, glassblowing, etc.), analytical techniques (electron microscopy, x-ray diffraction, calorimetry, nuclear microscopy (HEFIB) etc.), materials design, and cost/benefit tradeoffs in industrial production of materials. This book presents new research directions in a very new field which happens to be an old field as well.

Fuzzy Logic Controller for Mechatronics and Automation Emerald Group Publishing
This chapter aims to understand and analyze the failure mechanism of Steel Fiber-Reinforced Concrete (SFRC). Fiber reinforced Concrete (FRC) [ACI 116, 2000], Plain concrete fails in a brittle manner at the occurrence of cracking. Ductile fibers in FRC continue to carry stresses well beyond cracking, thus maintaining the structural integrity. The types of fibers using in FRC are Metallic (high-modulus) fibers and Nonmetallic (low-modulus). The metallic fibers to improve the flexural toughness and ductility of concrete for example: Steel, Carbon, and Glass. The Non-metallic (low-modulus) fibers enhance the fresh concrete properties and reduces the plastic-shrinkage cracking. Polypropylene, Cellulose, Nylon, Polyester. The steel fiber adding in to the concrete is called as steel Fiber Reinforced (SFRC) concrete. The SFRC is widely used in structure where fibre reinforcement is not essential for integrity and safety. For example: slabs on grade, rock slope stabilization and repair. The SFRC as substitutes of the shear reinforcement in structures/members and these concepts to cover in many building codes

A Primer on Machine Learning Applications in Civil Engineering Infinite Study
Presents knowledge and experience of soft computing techniques in civil engineering. The principal concern of the book is to show how soft computing techniques can be applied to solve problems in research and practice.

Smart Civil Structures ASCE Publications
Many industries have struggled to realize the importance of modern technology, but none more so than the construction industry. By employing various computer-aided management systems, construction businesses have increased their profitability and the systematic way their companies function. Managing Business in the Civil Construction Sector Through Information Communication Technologies supplies a compendium of innovative research that highlights the use of computer-aided design and tools and the vital role that such forms of information technology have to play in the actual production activities of any civil construction company. Subsequent chapters focus on equally vital areas such as that of construction management, contracts management, materials management, human resource management, and enterprise resource planning. Chapters on cloud computing technology, internet of things, and artificial intelligence enable readers to acquire an overview and grasp the basics of these latest trending technologies. This book is ideally designed for construction firms, students, entrepreneurs, industry professionals, IT consultants, and academicians.

Safety Evaluation Based on Identification Approaches Related to Time-Variant and Nonlinear Structures CRC Press
A smart civil structure integrates smart materials, sensors, actuators, signal processors, communication networks, power sources, diagonal strategies, control strategies, repair strategies, and life-cycle management strategies. It should function optimally and safely in its environment and maintain structural integrity during strong winds, severe earthquakes, and other extreme events. This book extends from the fundamentals to the state-of-the-art. It covers the elements of smart civil structures, their integration, and their functions. The elements consist of smart materials, sensors, control devices, signal processors, and communication networks. Integration refers to multi-scale modelling and model updating, multi-type sensor placement, control theory, and collective placement of control devices and sensors. And the functions include structural health monitoring, structural vibration control, structural self-repairing, and structural energy harvesting, with emphasis on their synthesis to form truly smart civil structures. It suits civil engineering students, professionals, and researchers with its blend of principles and practice.

Sustainable Decision-Making in Civil Engineering, Construction and Building Technology CRC Press
This book comprises select proceedings of the First International Conference on Geomatics in Civil Engineering (ICGCE 2018). This book presents latest research on applications of geomatics engineering in different domains of civil engineering, like structural engineering, geotechnical engineering, hydraulic and water resources engineering, environmental engineering and transportation engineering. It also covers miscellaneous applications of geomatics in a wide range of technical and societal problems making use of geospatial information, engineering principles, and relational data structures involving measurement sciences. The book proves to be very useful for the scientific and engineering community working in the field of geomatics and geospatial technology.

Fuzzy Logic IGI Global
Safety evaluation by definition involves many complex factors and thus covers a wide range of topics. In order to focus the content of the workshop the subject matter was specific to the state of the art and the recent developments in nonlinear and time-variant methods employing identification procedures. Participants in the workshop represented a wide range of expertise. They were se lected in order to cover the state of the art of knowledge in fault-detection and dam age assessment, system identification, signal processing, mathematical and physical modelling and applications of techniques such as fuzzy logic and neural networks. The emphasis was placed on the exploitation and understanding of nonlinearity arising from structural or material faults. Figure 1 indicates the range of topics covered in the workshop. Since no unique or general approach yet exists for treating nonlinearity in the field of safety evaluation, many of the topics presented were problem specific. In order to assist the reader in selecting the material of primary interest a matrix of the topics covered by each participant is shown in Table 1. This table relates the authors to the subject matter, providing a guide through the diverse range of topics presented at the workshop.

Data Science for Civil Engineering MV Learning
This timely book deals with a current topic, i.e. the applications of metaheuristic algorithms, with a primary focus on optimization problems in civil engineering. The first chapter offers a concise overview of different kinds of metaheuristic algorithms, explaining their advantages in solving complex engineering problems that cannot be effectively tackled by traditional methods, and citing the most important works for further reading. The remaining chapters report on advanced studies on the applications of certain metaheuristic algorithms to specific engineering problems. Genetic algorithm, bat algorithm, cuckoo search, harmony search and simulated annealing are just some of the methods presented and discussed step by step in real-application contexts, in which they are often used in combination with each other. Thanks to its synthetic yet meticulous and practice-oriented approach, the book is a perfect guide for graduate students, researchers and professionals willing to applying metaheuristic algorithms in civil engineering and other related engineering fields, such as mechanical, transport and geotechnical engineering. It is also a valuable aid for both lectures and advanced engineering students.

Proceedings of the Canadian Society of Civil Engineering Annual Conference 2021 Springer Science & Business Media
The use of a multi-criteria, decision-making theory was first studied in the 1970s. Its application in civil and environmental engineering is a new approach which can be enormously helpful for manufacturing companies, students, managers, engineers, etc. The purpose of this book is to provide a resource for students and researchers that includes current application of a multi-criteria, decision-making theory in various fields such as: environment, healthcare and engineering. In addition, practical application are shown for students manually. In real life problems there are many critical parameters (criteria) that can directly or indirectly affect the consequences of different decisions. Application of a multi-criteria, decision-making theory is basically the use of computational methods that incorporate several criteria and order of preference in evaluating and selecting the best option among many alternatives based on the desired outcome.

Metaheuristics and Optimization in Civil Engineering Springer Nature
This book is a guide for students, researchers, and practitioners to the latest developments in fuzzy hybrid computing in construction engineering and management. It discusses basic theory related to fuzzy logic and fuzzy hybrid computing, their application in a range of practical construction problems, and emerging and future research trends.

Fuzzy Logic and Mathematics Springer Science & Business Media
This book comprises selected proceedings of the International Conference on Recent Advancements in Civil Engineering and Infrastructural Developments (ICRACEID 2019). The contents are broadly divided into five areas (i) smart transportation with urban planning, (ii) clean energy and environment, (iii) water distribution and waste management, (iv) smart materials and structures, and (v) disaster management. The book aims to provide solutions to global challenges using innovative and emerging technologies covering various fields of civil engineering. The major topics covered include urban planning, transportation, water distribution, waste management, disaster management, environmental pollution and control, environmental impact assessment, application of GIS and remote sensing, and structural analysis and design. Given the range of topics discussed, the book will be beneficial for students, researchers as well industry professionals.

Use of Fuzzy Logic in Eia :A New Direction in Civil Engineering Field Concepts Books Publication
New Materials in Civil Engineering provides engineers and scientists with the tools and methods needed to meet the challenge of designing and constructing more resilient and sustainable infrastructures. This book is a valuable guide to the properties, selection criteria, products, applications, lifecycle and recyclability of advanced materials. It presents an A-to-Z approach to all types of materials, highlighting their key performance properties, principal characteristics and applications. Traditional materials covered include concrete, soil, steel, timber, fly ash, geosynthetic, fiber-reinforced concrete, smart materials, carbon fiber and reinforced polymers. In addition, the book covers nanotechnology and biotechnology in the development of new materials. Covers a variety of materials, including fly ash, geosynthetic, fiber-reinforced concrete, smart materials, carbon fiber reinforced polymer and waste materials Provides a “one-stop resource of information for the latest materials and practical applications Includes a variety of different use case studies

Bounding Uncertainty in Civil Engineering Springer Nature
Taking an engineering, rather than a mathematical, approach, Bounding uncertainty in Civil Engineering - Theoretical Background deals with the mathematical theories that use convex sets of probability distributions to describe the input data and/or the final response of systems. The particular point of view of the authors is centered on the applications to civil engineering problems, and the theory of random sets has been adopted as a basic and relatively simple model. However, the authors have tried to elucidate its connections to the more general theory of imprecise probabilities, Choquet capacities, fuzzy sets, p-boxes, convex sets of parametric probability distributions, and approximate reasoning both in one dimension and in several dimensions with associated joint spaces. If choosing the theory of random sets may lead to some loss of generality, it has, on the other hand, allowed for a self-contained selection of the topics and a more unified presentation of the theoretical contents and algorithms. With over 80 examples worked out step by step, the book should assist newcomers to the subject (who may otherwise find it difficult to navigate a vast and dispersed literature) in applying the techniques described to their own specific problems.

New Materials in Civil Engineering John Wiley & Sons
Machine learning has undergone rapid growth in diversification and practicality, and the repertoire of techniques has evolved and expanded. The aim of this book is to provide a broad overview of the available machine-learning techniques that can be utilized for solving civil engineering problems. The fundamentals of both theoretical and practical aspects are discussed in the domains of water resources/hydrological modeling, geotechnical engineering, construction engineering and management, and coastal/marine engineering. Complex civil engineering problems such as drought forecasting, river flow forecasting, modeling evaporation, estimation of dew point temperature, modeling compressive strength of concrete, ground water level forecasting, and significant wave height forecasting are also included. Features Exclusive information on machine learning and data analytics applications with respect to civil engineering Includes many machine learning techniques in numerous civil engineering

disciplines Provides ideas on how and where to apply machine learning techniques for problem solving Covers water resources and hydrological modeling, geotechnical engineering, construction engineering and management, coastal and marine engineering, and geographical information systems Includes MATLAB® exercises

The application of fuzzy logic to traffic assignment in developing countries Springer Nature

Explore the diverse electrical engineering application of polymer composite materials with this in-depth collection edited by leaders in the field Polymer Composites for Electrical Engineering delivers a comprehensive exploration of the fundamental principles, state-of-the-art research, and future challenges of polymer composites. Written from the perspective of electrical engineering applications, like electrical and thermal energy storage, high temperature applications, fire retardance, power cables, electric stress control, and others, the book covers all major application branches of these widely used materials. Rather than focus on polymer composite materials themselves, the distinguished editors have chosen to collect contributions from industry leaders in the area of real and practical electrical engineering applications of polymer composites. The books relevance will only increase as advanced polymer composites receive more attention and interest in the area of advanced electronic devices and electric power equipment. Unique amongst its peers, Polymer Composites for Electrical Engineering offers readers a collection of practical and insightful materials that will be of great interest to both academic and industrial audiences. Those resources include: A comprehensive discussion of glass fiber reinforced polymer composites for power equipment, including GIS, bushing, transformers, and more) Explorations of polymer composites for capacitors, outdoor insulation, electric stress control, power cable insulation, electrical and thermal energy storage, and high temperature applications A treatment of semi-conductive polymer composites for power cables In-depth analysis of fire-retardant polymer composites for electrical engineering An examination of polymer composite conductors Perfect for postgraduate students and researchers working in the fields of electrical, electronic, and polymer engineering, Polymer Composites for Electrical Engineering will also earn a place in the libraries of those working in the areas of composite materials, energy science and technology, and nanotechnology.

Civil and Environmental Engineering: Concepts, Methodologies, Tools, and Applications Springer

With the expansion of new technologies, materials, and the design of complex systems, the expectations of society upon engineers are becoming larger than ever. Engineers make critical decisions with potentially high adverse consequences. The current political, societal, and financial climate requires engineers to formally consider the factors of uncertainty (e.g., floods, earthquakes, winds, environmental risks) in their decisions at all levels. Uncertainty Modeling and Analysis in Civil Engineering provides a thorough report on the immediate state of uncertainty modeling and analytical methods for civil engineering systems, presenting a toolbox for solving problems in real-world situations. Topics include Neural networks Genetic algorithms Numerical modeling Fuzzy sets and operations Reliability and risk analysis Systems control Uncertainty in probability estimates This compendium is a considerable reference for civil engineers as well as for engineers in other disciplines, computer scientists, general scientists, and students.

Managing Business in the Civil Construction Sector Through Information Communication Technologies Nova Publishers

The book presents the select proceedings of the 2nd International Conference on Sustainable Construction Technologies and Advancements in Civil Engineering (ScTACE 2021). This book discusses the latest developments and contributions towards sustainable construction technologies and advances in civil engineering. Various topics covered in this book are construction technologies, geotechnical engineering, transportation and traffic engineering, structural engineering, environmental engineering, remote sensing and GIS, geo-environmental engineering, water resources engineering and earthquake engineering. This book will be useful for students, researchers and professionals working in the area of civil engineering.

Advances in Civil Engineering and Building Materials IV CRC Press

The findings from literature searches, site visits, and interviews of experts on the Great Wall were used as the inputs for the fuzzy sets and logic assessments. The fuzzy models used in the evaluations were the fuzzy sets angular model and the fuzzy sets rotational model. The outputs of the fuzzy evaluations (i.e., the main construction method, the sequence implemented at the time of construction, and the current performance of the structure) were used as the inputs to create the VR model of the structure using the software SolidWorks, Google SketchUp (with Google Earth), Unity Pro, and 3ds Max. This virtual reality model guided the end user through the construction methods of the structure (dynamic interaction) and gave a walkthrough simulation of the structure. The acquisition and analysis of the knowledge base from the literature review, site visits, and interviews of the experts are shown in Volume I of this dissertation. The fuzzy assessments are presented in Volume II, and the creation and feedback of the VR models are shown in Volume III of this dissertation.

Applications of Geomatics in Civil Engineering CRC Press

Civil Engineering and Urban Planning IV includes the papers presented at the 4th International Conference on Civil Engineering and Urban Planning (CEUP 2015, Beijing, China, 25-27 July 2015). The contributions from experts and world-renowned scientists cover a wide variety of topics: - Civil engineering;- Architecture and urban planning; - Transpor