Fuzzy Logic Application In Civil Engineering

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The application of fuzzy logic to traffic assignment in developing countries IGI Global While the weight of a structure constitutes a significant part of the cost, a minimum weight design is not necessarily the minimum cost design. Little attention in

structural optimization has been paid to the cost optimization problem, particularly of realistic three-dimensional structures. Cost optimization is becoming a priority in all civil engineering projects, and the concept of Life-Cycle Costing is penetrating design, manufacturing and construction organizations. In this groundbreaking book the authors present novel computational models for cost optimization of large scale, realistic structures, subjected to the actual constraints of commonly used design codes. As the first book on the subject this book: Contains detailed step-by-step algorithms Focuses on novel computing techniques such as genetic algorithms, fuzzy logic, and parallel computing Covers both Allowable Stress Design (ASD) and Load and Resistance Factor Design (LRFD) codes Includes realistic design examples covering large-scale, high-rise building structures Presents computational models that enable substantial cost savings in the design of structures Fully automated structural

design and cost optimization is where large-scale design technology is heading, thus Cost Optimization of Structures: Fuzzy Logic, Genetic Algorithms, and Parallel Computing will be of great interest to civil and structural engineers, mechanical engineers, structural design software developers, and architectural engineers involved in the design of structures and life-cycle cost optimisation. It is also a pioneering text for graduate students and researchers working in building design and structural optimization.

The Application of Fuzzy Logic and Virtual Reality in the Study of Ancient Methods and Materials Used for the Construction of the Great Wall of China in Jinshanling John Wiley & Sons

An introductory book that provides theoretical, practical, and application coverage of the emerging field of type-2 fuzzy logic control Until recently, little was known about type-2 fuzzy controllers due to the lack of basic calculation methods available for type-2 fuzzy sets and logic—and many different aspects of type-2 fuzzy control still needed to be investigated in order to advance this new and powerful technology. This self-contained reference covers everything readers need to know about the growing field. Written with an educational focus in mind, Introduction to Type-2 Fuzzy Logic Control: Theory and

Applications uses a coherent structure and uniform mathematical notations to link chapters that are closely related, reflecting the book ' s central themes: analysis and design of type-2 fuzzy control systems. The book includes worked examples, experiment and simulation results, and comprehensive reference materials. The book also offers downloadable computer programs from an associated website. Presented by world-class leaders in type-2 fuzzy logic control, Introduction to Type-2 Fuzzy Logic Control: Is useful for any technical person interested in learning type-2 fuzzy control theory and its applications Offers experiment and simulation results via downloadable computer programs Features type-2 fuzzy logic background chapters to make the book self-contained Provides an extensive literature survey on both fuzzy logic and related type-2 fuzzy control Introduction to Type-2 Fuzzy Logic Control is an easy-to-read reference book suitable for engineers, researchers, and graduate students who want to gain deep insight into type-2 fuzzy logic control.

Cost Optimization of Structures PHI Learning Pvt. Ltd. Shows both the shortcomings and benefits of each technique, and even demonstrates useful combinations of the two.

Fuzzy Sets, Fuzzy Logic, And Fuzzy Systems: Selected Papers By Lotfi A Zadeh Pearson Sustainable decision-making in civil engineering, construction and building technology can be supported by fundamental scienti fi c achievements and multiple-criteria decision-making (MCDM) theories.

Use of Fuzzy Logic in Eia :A New

Direction in Civil Engineering Field IGI Global 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.

A Primer on Machine Learning Applications in Civil Engineering

John Wiley & Sons

The latest update on this popular textbook The importance of concepts and methods based on fuzzy logic and fuzzy set theory has been rapidly growing since the early 1990s and all the indications are that this trend will continue in the foreseeable future. Fuzzy Logic with Engineering Applications, Fourth Edition is a new edition of the popular textbook with 15% of new and updated material. Updates have been made to most of the chapters and each chapter now includes new end-of-chapter problems. Key features: New edition of the popular textbook with 15% of new and updated material. Includes new examples and end-of-chapter problems. Has been made more concise with the removal of out of date material. Covers applications of fuzzy logic to engineering and science.

Accompanied by a website hosting a solutions manual and software. The book is essential reading for graduates and senior undergraduate students in civil, chemical, mechanical and electrical engineering as wells as researchers and practitioners working with fuzzy logic in industry.

Fuzzy Logic and Mathematics

ASCE Publications

What is fuzzy logic?--a system of concepts and methods for exploring modes of reasoning that are approximate rather than exact. While the engineering community has appreciated the advances in understanding using fuzzy logic for quite some time, fuzzy logic's impact in non-engineering disciplines is only now being recognized. The authors of Fuzzy Logic in Geology attend to this growing interest in the subject and introduce the use of fuzzy set theory in a style geoscientists can understand. This is followed by individual chapters on topics relevant to earth scientists: sediment modeling, fracture detection, reservoir cha

racterization, clustering in geophysical data analysis, ground water movement, and time series analysis. George Klir is the Distinguished Professor of Systems Science and Director of the Center for Intelligent Systems, Fellow of the IEEE and IFSA, editor of nine volumes, editorial board member of 18 journals, and author or co-author of 16 books Foreword by the inventor of fuzzy logic--Professor Lotfi Zadeh

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

CRC Press

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/hydro

logical 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

Fuzzy Logic with Engineering Applications

Springer Science & Business Media

This book is an attempt to accumulate the researches on diverse inter disciplinary field of engineering and management using Fuzzy Inference System (FIS). The book is organized in seven sections with twenty two chapters, covering a wide range of applications. Section I, caters theoretical aspects of FIS in chapter one. Section II, dealing with FIS applications to management related problems and consisting three chapters. Section III, accumulates six chapters to commemorate FIS application to mechanical and industrial engineering problems. Section IV, elaborates FIS application to image processing and cognition problems encompassing four chapters. Section V, describes FIS

application to various power system engineering problem in three chapters. Section VI highlights the FIS application to system modeling and control problems and constitutes three chapters. Section VII accommodates two chapters and presents FIS application to civil engineering problem.

A Primer on Machine Learning Applications in Civil Engineering

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Fuzzy Logic Controller for Mechatronics and Automation

WIT Press

This report contains 27 papers that serve as a testament to the state-of-the-art of civil engineering at the outset of the 21st century, as well as to commemorate the ASCE's Se squicentennia l. Written by the leading practitioners , educators, and researchers of civil engineering, each of these peer-reviewed papers explores a particular aspect of

civil engineering knowledge and practice. Each paper explores the development of a particular civil engineering specialty, including milestones and future barriers, constraints, and opportunities. The papers celebrate the history, heritage, and accomplishments of the profession in all facets of practice, including construction facilities, special structures, engineering mechanics, surveying and mapping, irrigation and water quality, forensics, computing, materials, geotechnical engineering, hydraulic engineering, and transportation engineering. While each paper is unique, collectively they provide a snapshot of the profession while offering thoughtful predictions of likely developments in the years to come. Together the papers illuminate the mounting complexity facing civil engineering stemming from rapid growth in scientific knowledge, technological development, and human populations, especially in the last 50 years. An overarching theme is the need for systems-level approaches

and consideration from undergraduate education through advanced engineering materials, processes, technologies, and design methods and tools. These papers speak to the need for civil engineers of all specialties to recognize and embrace the growing i nterconnected ness of the global infras tructure, economy, society, and the need to work for more sustainable, life-cycle-oriented solutions. While embracing the past and the present, the papers collected here clearly have an eye on the future needs of ASCE and the civil engineering profession.

Fuzzy Logic-Based Modeling in Collaborative and Blended Learning CRC-Press

This book consists of selected papers written by the founder of fuzzy set theory, Lotfi A Zadeh. Since Zadeh is not only the founder of this field, but has also been the principal contributor to its development over the last 30 years, the papers contain virtually all the major ideas in fuzzy set theory, fuzzy logic, and fuzzy systems in their historical context. Many of the ideas presented in the papers are still open to further development. The book is thus an important resource for anyone

interested in the areas of fuzzy set theory, fuzzy logic, and fuzzy systems, as well as their applications. Moreover, the book is also intended to play a useful role in higher education, as a rich source of supplementary reading in relevant courses and seminars.The book contains a bibliography of all papers published by Zadeh in the period 1949-1995. It also contains an introduction that traces the development of Zadeh's ideas pertaining to fuzzy sets, fuzzy logic, and fuzzy systems via his papers. The ideas range from his 1965 seminal idea of the concept of a fuzzy set to ideas reflecting his current interest in computing with words – a computing in which linguistic expressions are used in place of numbers.Places in the papers, where each idea is presented can easily be found by the reader via the Subject Index.

Fuzzy Hybrid Computing in Construction Engineering and Management

LAP Lambert Academic Publishing

The first edition of Fuzzy Logic with Engineering Applications (1995) was the first classroom text for und ergraduates in the field. Now updated for the second time, this new edition features the latest advances in

the field including material on expansion of the MLFE method using genetic algorithms, cognitive mapping, fuzzy agent-based models and total uncertainty. Redundant or obsolete topics have been removed, resulting in a more concise yet inclusive text that will ensure the book retains its broad appeal at the forefront of the literature. Fuzzy Logic with Engineering Applications, 3rd Edition is oriented mainly towards methods and techniques. Every chapter has been revised, featuring new illustrations and examples throughout. Supporting MATLAB code is downloadable at www.wileyeurope.com/go/fuzzylogic. This will benefit student learning in all basic operations, the generation of membership functions, and the specialized applications in the latter chapters of the book, providing an invaluable tool for students as well as for self-study

by practicing engineers.

Structural Health Monitoring Using Genetic Fuzzy Systems

Emerald Group Publishing

This book has been designed to improve the methodology of EIA that involved uncertainty and impreciseness during prediction of it's parameter.The parametric information or data available from the periphery of a project are not always crisp or precise, rather linguistic & hedges.Most of the data are nonnumeric, viz. "good,""very good,""low,""high,""less,""big," "poor,"etc. which are fuzzy data.Naturally every decision maker hesitates more or less on every evaluation activity.At present there is no tool available to an engineers or experts by which these uncertainties can be eliminated or reduced.The aim of this book is to build up a new concept of fuzzy EIA tool to tackle this uncertainty with "degree of membership value" for all possible grades of truthness. Consequently exploring the subject Fuzzy-EIA in this book is a kind of innovative contribution in a new direction and dimension. I strongly feel that this book will highly be beneficial to both students and teachers and will also get benefit to use as a major resource for learning theory, solving problems, and initiating research projects for the UG/PG programmes and research

scholar in various fields.

On Application of Decision Logic Tables and Fuzzy Sets

Emerald Group Publishing

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

Fuzzy Hybrid Computing in Construction Engineering and Management

SIAM

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 with Engineering Applications

Springer Nature

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, de cision-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, de cision-making theory is basically the use of computationa l methods that incorporate several criteria and order of preference in evaluating and selecting the best option among many alternatives based on the desired outcome.

Fuzzy Logic

CRC Press

The hydrological sciences typically present grey or fuzzy information, making them quite messy and a choice challenge for fuzzy logic

application. Providing readers with the first book to cover fuzzy logic modeling as it relates to water science, the author takes an approach that incorporates verbal expert views and other parameters that allow **Proceedings of EECE 2020** BoD – Books on Demand sections dealing with fuzzy functions and fuzzy random functions are certain to be of special interest. The reader is expected to be in command of the knowledge gained in a basic university mathematics course, with the inclusion of stochastic elements. A specification of uncertainty in any particular case is often difficult. For this reason Chaps. 3 and 4 are devoted solely to this problem. The derivation of fuzzy variables for representing informal and lexical uncertainty reflects the subjective assessment of objective conditions in the form of a membership function. Techniques for modeling fuzzy random variables are presented for data that simultaneously exhibit stochastic and nonstochastic properties. The application of fuzzy randomness is demonstrated in three fields of civil engineering and computational mechanics: structural analysis, safety assessment, and design. The methods of fuzzy structural analysis and fuzzy probabilistic structural

analysis developed in Chap. 5 are applicable without restriction to arbitrary geometrically and physically nonlinear problems. The most important forms of the latter are the Fuzzy Finite Element Method (FFEM) and the Fuzzy Stochastic Finite Element Method (FSFEM).

Type-2 Fuzzy Logic for Edge Detection of Gray Scale Images

Oxford University Press

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.