Fuzzy Logic Augmentation Of Nature Inspired Optimization Metaheuristics Theory And Applications Studies In Computational Intelligence

This book includes the proceedings of the Intelligent and Fuzzy Techniques INFUS 2019 Conference, held in Istanbul, Turkey, on July 23–25, 2019. Big data analytics refers to the strategy of analyzing large volumes of data, or big data, gathered from a wide variety of sources, including social networks, videos, digital images, sensors, and sales transaction records. Big data analytics allows data scientists and various other users to evaluate large volumes of transaction data and other data sources that traditional business systems would be unable to tackle. Data-driven and knowledge-driven approaches and techniques have been widely used in intelligent decision-making, and they are increasingly attracting attention due to their importance and effectiveness in addressing uncertainty and incompleteness. INFUS 2019 focused on intelligent and fuzzy systems with applications in big data analytics and decision-making, providing an international forum that brought together those actively involved in areas of interest to data science and knowledge engineering. These proceeding feature about 150 peer-reviewed papers

from countries such as China, Iran, Turkey, Malaysia, India, USA, Spain, France, Poland, Mexico, Bulgaria, Algeria, Pakistan, Australia, Lebanon, and Czech Republic.

Learn RPA using Automation Anywhere with step-by-step practical implementation KEY FEATURES ? Get an overview of different stages in the Business Process Automation ? Learn how to use Automation Anywhere to automate business processes using commands such as Excel, Email, PDF, Database, XML, Web Services etc. ? Learn how to use commands together to automate process flows and standard industry use cases ? Learn how to develop bots in Bot Creator ? Learn to use Citrix AISense to capture objects in Citrix, Virtual Machine and Remote environment DESCRIPTION The book starts by giving an overview of Robotic Process Automation (RPA), its tools, and industry use cases. You will then get familiar with the Automation Anywhere Enterprise components and Architecture. Moving on, you will deep dive into the options provided in a Client application such as recorders, workbench, metabot designer and the types of bots in Automation Anywhere. You will then come across the practical implementation of variables in Automation. The book will then show how to implement commands such as Error Handling, XML, Web Services, FTP, OCR, PGP, String Operation, Files & Folders, etc. You will also get familiar with

the working of Workflows and Workflow Manager. Towards the end, the book will teach you how to transfer bots to and from the Web Control Room and schedule bots from the Web Control Room. By the end of the book, you will be able to implement different commands provided in Automation Anywhere. WHAT YOU WILL LEARN ? Understand the fundamentals of Business Process Automation and its stages. ? Use commands such as Excel, PDF, Email, Database, Object Cloning, Loops, If-Else etc. together to create a bot to automate industry use cases. ? Use Variables, MetaBots, IQ bots and Citrix AISense to incorporate features such as Reusability, Cognitive Automation capabilities and Object Capturing in Citrix, Virtual Machine and Remote environment. ? Learn how to create reusable bots using MetaBots ? Develop bots in Bot Creator and upload and schedule them in Web Control Room to be automatically executed on Bot Runner. WHO THIS BOOK IS FOR The book is for anyone who wants to become a RPA developer. Professionals working in this field who want to upgrade themselves will find this book helpful. TABLE OF CONTENTS 1. Chapter 1: Automation Overview 2. Chapter 2: Introduction of RPA 3. Chapter 3: AAE Architecture 4. Chapter 4: Client Application 5. Chapter 5: Variables 6. Chapter 6: Use Cases 7. Chapter 7: Command Library 8. Chapter 8: Metabot 9. Chapter 9: Recorder 10.

Chapter 10: Credential Variable 11. Chapter 11: IQ Bot 12. Chapter 12: Workflows 13. Chapter 13: System & Audit Logs 14. Chapter 14: Bot Transfer

This book highlights recent research results in Bio-Inspired Computing and Applications. It presents 33 selected papers from the 8th International Conference on Innovations in Bio-Inspired Computing and Applications (IBICA 2017), which was held in Marrakesh, Morocco from December 11 to 13, 2017. A premier conference in the nature-inspired computing field, IBICA is intended to bring together the world's leading researchers and practitioners interested in advancing the state of the art in biologically inspired computing, allowing them to exchange notes on a broad range of disciplines. The book offers a valuable reference guide for all researchers, students and practitioners in the fields of Computer Science and Engineering.

This book describes recent advances in the use of fuzzy logic for the design of hybrid intelligent systems based on nature-inspired optimization and their applications in areas such as intelligent control and robotics, pattern recognition, medical diagnosis, time series prediction and optimization of complex problems. Based on papers presented at the North American Fuzzy Information Processing Society Annual Conference (NAFIPS 2017), held in Cancun, Mexico from 16 to 18 October 2017, the book is divided into nine main parts, the first of which first

addresses theoretical aspects, and proposes new concepts and algorithms based on type-1 fuzzy systems. The second part consists of papers on new concepts and algorithms for type-2 fuzzy systems, and on applications of type-2 fuzzy systems in diverse areas, such as time series prediction and pattern recognition. In turn, the third part contains papers that present enhancements to meta-heuristics based on fuzzy logic techniques describing new nature-inspired optimization algorithms that use fuzzy dynamic adaptation of parameters. The fourth part presents emergent intelligent models, which range from quantum algorithms to cellular automata. The fifth part explores applications of fuzzy logic in diverse areas of medicine, such as the diagnosis of hypertension and heart diseases. The sixth part describes new computational intelligence algorithms and their applications in different areas of intelligent control, while the seventh examines the use of fuzzy logic in different mathematic models. The eight part deals with a diverse range of applications of fuzzy logic, ranging from environmental to autonomous navigation, while the ninth covers theoretical concepts of fuzzy models

This book describes recent advances on fuzzy logic, neural networks and optimization algorithms, as well as their hybrid combinations, and their application in areas such as intelligent control and robotics, pattern

recognition, medical diagnosis, time series prediction and optimization of complex problems. The book contains a collection of papers focused on hybrid intelligent systems based on soft computing. There are some papers with the main theme of type-1 and type-2 fuzzy logic, which basically consists of papers that propose new concepts and algorithms based on type-1 and type-2 fuzzy logic and their applications. There are also some papers that present theory and practice of meta-heuristics in different areas of application. Another group of papers describes diverse applications of fuzzy logic, neural networks and hybrid intelligent systems in medical applications. There are also some papers that present theory and practice of neural networks in different areas of application. In addition, there are papers that present theory and practice of optimization and evolutionary algorithms in different areas of application. Finally, there are some papers describing applications of fuzzy logic, neural networks and meta-heuristics in pattern recognition problems.

Fuzzy Logic Augmentation of Nature-Inspired Optimization MetaheuristicsTheory and ApplicationsSpringer

This book focuses on the fields of fuzzy logic and metaheuristic algorithms, particularly the harmony search algorithm and fuzzy control. There are currently several types of metaheuristics used to

solve a range of real-world of problems, and these metaheuristics contain parameters that are usually fixed throughout the iterations. However, a number of techniques are also available that dynamically adjust the parameters of an algorithm, such as probabilistic fuzzy logic. This book proposes a method of addressing the problem of parameter adaptation in the original harmony search algorithm using type-1, interval type-2 and generalized type-2 fuzzy logic. The authors applied this methodology to the resolution of problems of classical benchmark mathematical functions, CEC 2015, CEC2017 functions and to the optimization of various fuzzy logic control cases, and tested the method using six benchmark control problems – four of the Mamdani type: the problem of filling a water tank, the problem of controlling the temperature of a shower, the problem of controlling the trajectory of an autonomous mobile robot and the problem of controlling the speed of an engine; and two of the Sugeno type: the problem of controlling the balance of a bar and ball, and the problem of controlling control the balance of an inverted pendulum. When the interval type-2 fuzzy logic system is used to model the behavior of the systems, the results show better stabilization because the uncertainty analysis is better. As such, the authors conclude that the proposed method, based on fuzzy systems, fuzzy controllers and the harmony search optimization

algorithm, improves the behavior of complex control plants.

This book covers at an advanced level the most fundamental ideas, concepts and methods in the field of applications of fuzzy logic to the study of neural cell behavior. Motivation and awareness are examined from a physiological and biochemical perspective illustrating fuzzy mechanisms of complex systems.

This book describes the latest advances in fuzzy logic, neural networks and optimization algorithms, as well as their hybrid combinations, and their applications in areas such as: intelligent control and robotics, pattern recognition, medical diagnosis, time series prediction, and optimization of complex problems. The book is divided into five main parts. The first part proposes new concepts and algorithms based on type-1 and type-2 fuzzy logic and their applications; the second explores new concepts and algorithms in neural networks and fuzzy logic applied to recognition. The third part examines the theory and practice of meta-heuristics in various areas of application, while the fourth highlights diverse applications of fuzzy logic, neural networks and hybrid intelligent systems in medical contexts. Finally, the fifth part focuses on applications of fuzzy logic, neural networks and meta-heuristics to robotics problems.

The book presents recent advances in nature-

inspired computing, giving a special emphasis to control systems applications. It reviews different techniques used for simulating physical, chemical, biological or social phenomena at the purpose of designing robust, predictive and adaptive control strategies. The book is a collection of several contributions, covering either more general approaches in control systems, or methodologies for control tuning and adaptive controllers, as well as exciting applications of nature-inspired techniques in robotics. On one side, the book is expected to motivate readers with a background in conventional control systems to try out these powerful techniques inspired by nature. On the other side, the book provides advanced readers with a deeper understanding of the field and a broad spectrum of different methods and techniques. All in all, the book is an outstanding, practice-oriented reference guide to nature-inspired computing addressing graduate students, researchers and practitioners in the field of control engineering.

This book is a tribute to Professor Jacek ?urada, who is best known for his contributions to computational intelligence and knowledge-based neurocomputing. It is dedicated to Professor Jacek ?urada, Full Professor at the Computational Intelligence Laboratory, Department of Electrical and Computer Engineering, J.B. Speed School of Engineering, University of Louisville, Kentucky, USA,

as a token of appreciation for his scientific and scholarly achievements, and for his longstanding service to many communities, notably the computational intelligence community, in particular neural networks, machine learning, data analyses and data mining, but also the fuzzy logic and evolutionary computation communities, to name but a few. At the same time, the book recognizes and honors Professor ?urada's dedication and service to many scientific, scholarly and professional societies, especially the IEEE (Institute of Electrical and Electronics Engineers), the world's largest professional technical professional organization dedicated to advancing science and technology in a broad spectrum of areas and fields. The volume is divided into five major parts, the first of which addresses theoretic, algorithmic and implementation problems related to the intelligent use of data in the sense of how to derive practically useful information and knowledge from data. In turn, Part 2 is devoted to various aspects of neural networks and connectionist systems. Part 3 deals with essential tools and techniques for intelligent technologies in systems modeling and Part 4 focuses on intelligent technologies in decision-making, optimization and control, while Part 5 explores the applications of intelligent technologies.

YinYang bipolar relativity can trace its philosophical origins to ancient Chinese YinYang cosmology,

which claims that everything has two sides or two opposite, but reciprocal, poles or energies. More specifically, this discipline is intended to be a logical unification of general relativity and quantum mechanics. YinYang Bipolar Relativity: A Unifying Theory of Nature, Agents and Causality with Applications in Quantum Computing, Cognitive Informatics and Life Sciences presents real-world applications of YinYang bipolar relativity that focus on quantum computing and agent interaction. This unique work makes complex theoretical topics, such as the ubiquitous effects of quantum entanglement, logically comprehendible to a vast audience.

This book focuses on an overview of the AI techniques, their foundations, their applications, and remaining challenges and open problems. Many artificial intelligence (AI) techniques do not explain their recommendations. Providing natural-language explanations for numerical AI recommendations is one of the main challenges of modern AI. To provide such explanations, a natural idea is to use techniques specifically designed to relate numerical recommendations and natural-language descriptions, namely fuzzy techniques. This book is of interest to practitioners who want to use fuzzy techniques to make AI applications explainable, to researchers who may want to extend the ideas from these papers to new application areas, and to graduate students who are interested in the state-of-

the-art of fuzzy techniques and of explainable AIin short, to anyone who is interested in problems involving fuzziness and AI in general. .

The book focuses on smart computing for crowdfunding usage, looking at the crowdfunding landscape, e.g., reward-, donation-, equity-, P2P-based and the crowdfunding ecosystem, e.g., regulator, asker, backer, investor, and operator. The increased complexity of fund raising scenario, driven by the broad economic environment as well as the need for using alternative funding sources, has sparked research in smart computing techniques. Covering a wide range of detailed topics, the authors of this book offer an outstanding overview of the current state of the art; providing deep insights into smart computing methods, tools, and their applications in crowdfunding; exploring the importance of smart analysis, prediction, and decision-making within the fintech industry. This book is intended to be an authoritative and valuable resource for professional practitioners and researchers alike, as well as finance engineering, and computer science students who are interested in crowdfunding and other emerging fintech topics.

The two-volume set LNAI 11288 and 11289 constitutes the proceedings of the 17th Mexican International Conference on Artificial Intelligence, MICAI 2018, held in Guadalajara, Mexico, in October 2018. The total of 62 papers presented in these two

volumes was carefully reviewed and selected from 149 submissions. The contributions are organized in topical as follows: Part I: evolutionary and nature-inspired intelligence; machine learning; fuzzy logic and uncertainty management. Part II: knowledge representation, reasoning, and optimization; natural language processing; and robotics and computer vision.

This book gathers selected papers from two important conferences held on October 24–28, 2018, in Warsaw, Poland: theFifteenth National Conference of Operational and Systems Research, BOS-2018, one of the leading conferences in the field of operational and systems research not only in Poland but also at the European level; andthe Seventeenth International Workshop on Intuitionistic Fuzzy Sets and General Nets, IWIFSGN-2018, one of thepremiere conferences on fuzzy logic. The papers presented here constitute a fair and comprehensive representation of the topics covered by both BOS-2018 and IWIFSGN-2018, includingextensions of the traditional fuzzy sets, in particular on the intuitionistic fuzzy sets, as well as other topics in uncertainty and imprecision modeling, the Generalized Nets (GNs), a powerful extension of the traditional Petri net paradigm, and InterCriteria Analysis, a new method for feature selection and analyses in multicriteria and multi-attribute decision-making problems. The Workshop was dedicated to

the memory of Professor Beloslav Rie?an (1936–2018), a regular participant at the IWIFSGN workshops.

The book proposes new technologies and discusses future solutions for design infrastructure for ICT. The book contains high quality submissions presented at Second International Conference on Information and Communication Technology for Sustainable Development (ICT4SD - 2016) held at Goa, India during 1 - 2 July, 2016. The conference stimulates the cutting-edge research discussions among many academic pioneering researchers, scientists, industrial engineers, and students from all around the world. The topics covered in this book also focus on innovative issues at international level by bringing together the experts from different countries.

This book describes the latest findings related to fuzzy techniques, discussing applications in control, economics, education, humor studies, industrial engineering, linguistics, management, marketing, medicine and public health, military engineering, robotics, ship design, sports, transportation, and many other areas. It also presents recent fuzzy-related algorithms and theoretical results that can be used in other application areas. Featuring selected papers from the Joint World Congress of the International Fuzzy Systems Association (IFSA) and the Annual Conference of the North American Fuzzy Information Processing Society (NAFIPS) IFSA-NAFIPS'2019, held in Lafayette, Louisiana, USA, on June 18–21, 2019, the book is of interest to practitioners wanting to use fuzzy techniques to process imprecise expert knowledge. It is also a valuable resource for researchers wishing to extend the ideas from these papers to new application areas, for graduate students and for anyone else interested in problems involving fuzziness and uncertainty.

This volume constitutes the proceedings of two collocated

international conferences: EUSFLAT-2017 – the 10th edition of the flagship Conference of the European Society for Fuzzy Logic and Technology held in Warsaw, Poland, on September 11–15, 2017, and IWIFSGN'2017 – The Sixteenth International Workshop on Intuitionistic Fuzzy Sets and Generalized Nets, held in Warsaw on September 13–15, 2017. The conferences were organized by the Systems Research Institute, Polish Academy of Sciences, Department IV of Engineering Sciences, Polish Academy of Sciences, and the Polish Operational and Systems Research Society in collaboration with the European Society for Fuzzy Logic and Technology (EUSFLAT), the Bulgarian Academy of Sciences and various European universities. The aim of the EUSFLAT-2017 was t o bring together theoreticians and practitioners working on fuzzy logic, fuzzy systems, soft computing and related areas and to provide a platform for exchanging ideas and discussing the latest trends and ideas, while the aim of IWIFSGN'2017 was to discuss new developments in extensions of the concept of a fuzzy set, such as an intuitionistic fuzzy set, as well as other concepts, like that of a generalized net. The papers included, written by leading international experts, as well as the special sessions and panel discussions contribute to the development the field, strengthen collaborations and intensify networking.

This book comprises papers on diverse aspects of fuzzy logic, neural networks, and nature-inspired optimization meta-heuristics and their application in various areas such as intelligent control and robotics, pattern recognition, medical diagnosis, time series prediction and optimization of complex problems. The book is organized into seven main parts, each with a collection of papers on a similar subject. The first part presents new concepts and algorithms based on type-2 fuzzy logic for dynamic parameter adaptation in meta-heuristics. The second part discusses network theory and applications,

and includes papers describing applications of neural networks in diverse areas, such as time series prediction and pattern recognition. The third part addresses the theory and practice of meta-heuristics in different areas of application, while the fourth part describes diverse fuzzy logic applications in the control area, which can be considered as intelligent controllers. The next two parts explore applications in areas, such as time series prediction, and pattern recognition and new optimization and evolutionary algorithms and their applications respectively. Lastly, the seventh part addresses the design and application of different hybrid intelligent systems.

In the last decade, opinion mining has been explored by using various machine learning methods. In the literature, document-level sentiment analysis has been majorly dealt with short-sized text only. For large-sized text, document-level sentiment analysis has never been dealt. In this paper, a hybrid framework named as ‘‘Senti-NSetPSO’’ is proposed to analyse large-sized text. Senti-NSetPSO comprises of two classifiers: binary and ternary based on hybridization of particle swarm optimization (PSO) with Neutrosophic Set. This method is suitable to classify large-sized text having more than 25 kb of size. Swarm size generated from large text can give a suitable measurement for implementation of PSO convergence. The proposed approach is trained and tested for large-sized text collected from Blitzer, aclIMDb, Polarity and Subjective Dataset. The proposed method establishes a co-relation between sentiment analysis and Neutrosophic Set. On Blitzer, aclIMDb and Polarity dataset, the model acquires satisfactory accuracy by ternary classifier. The accuracy of ternary classifier of the proposed framework shows significant improvement than review paper classifier present in the literature.

This volume constitutes the proceedings of the 18th Mexican

Conference on Artificial Intelligence, MICAI 2019, held in Xalapa, Mexico, in October/November 2019. The 59 full papers presented in this volume were carefully reviewed and selected from 148 submissions. They cover topics such as: machine learning; optimization and planning; fuzzy systems, reasoning and intelligent applications; and vision and robotics.

Modern optimization approaches have attracted an increasing number of scientists, decision makers, and researchers. As new issues in this field emerge, different optimization methodologies must be developed and implemented. The Handbook of Research on Emergent Applications of Optimization Algorithms is an authoritative reference source for the latest scholarly research on modern optimization techniques for solving complex problems of global optimization and their applications in economics and engineering. Featuring coverage on a broad range of topics and perspectives such as hybrid systems, non-cooperative games, and cryptography, this publication is ideally designed for students, researchers, and engineers interested in emerging developments in optimization algorithms.

Nature-inspired Optimization Algorithms for Fuzzy Controlled Servo Systems suits the general need of a book that explains the major issues to fuzzy control in servo systems without any solid mathematical prerequisite. In addition, pertinent information on nature-inspired optimization algorithms is offered. The book is intended to rapidly make intelligible notions of fuzzy set theory and fuzzy control to readers with limited experience. The attractive analysis and design methodologies dedicated to fuzzy controllers are accompanied by applications to servo systems and case studies in fuzzy controlled servo systems are organized in a special chapter of this book, and allow simple implementations of low-cost automation solutions. The

theoretical approaches presented throughout the book are validated by the illustration of digital simulation results and real-time experimental results as well. This book aims at a large category of audience including graduate students, engineers (designers, practitioners and researchers), and everyone who faces challenging control problems. Gives a merge between classical and modern approaches to fuzzy control Presents in a unified structure from the point of view of a control engineer the essential aspects regarding fuzzy control in servo systems Makes intelligible notions of fuzzy set theory and fuzzy control to readers with limited experience This book highlights recent advances in the design of hybrid intelligent systems based on nature-inspired optimization and their application in areas such as intelligent control and robotics, pattern recognition, time series prediction, and optimization of complex problems. The book is divided into seven main parts, the first of which addresses theoretical aspects of and new concepts and algorithms based on type-2 and intuitionistic fuzzy logic systems. The second part focuses on neural network theory, and explores the applications of neural networks in diverse areas, such as time series prediction and pattern recognition. The book's third part presents enhancements to meta-heuristics based on fuzzy logic techniques and describes new nature-inspired optimization algorithms that employ fuzzy dynamic adaptation of parameters, while the fourth part presents diverse applications of nature-inspired optimization algorithms. In turn, the fifth part investigates applications of fuzzy logic in diverse areas, such as time series prediction and pattern recognition. The sixth part examines new optimization algorithms and their

applications. Lastly, the seventh part is dedicated to the design and application of different hybrid intelligent systems.

This book describes the latest advances in fuzzy logic, neural networks, and optimization algorithms, as well as their hybrid intelligent combinations, and their applications in the areas such as intelligent control, robotics, pattern recognition, medical diagnosis, time series prediction, and optimization. The topic is highly relevant as most current intelligent systems and devices use some form of intelligent feature to enhance their performance. The book also presents new and advanced models and algorithms of type-2 fuzzy logic and intuitionistic fuzzy systems, which are of great interest to researchers in these areas. Further, it proposes novel, nature-inspired optimization algorithms and innovative neural models. Featuring contributions on theoretical aspects as well as applications, the book appeals to a wide audience.

This book presents recent research in intelligent and fuzzy techniques. Emerging conditions such as pandemic, wars, natural disasters and various high technologies force people for significant changes in business and social life. The adoption of digital technologies to transform services or businesses, through replacing non-digital or manual processes with digital processes or replacing older digital technology with newer digital technologies through intelligent systems is the main scope of this book. It focuses on revealing the reflection of digital transformation in our business and social life under emerging conditions

through intelligent and fuzzy systems. The latest intelligent and fuzzy methods and techniques on digital transformation are introduced by theory and applications. The intended readers are intelligent and fuzzy systems researchers, lecturers, M.Sc. and Ph.D. students studying digital transformation. Usage of ordinary fuzzy sets and their extensions, heuristics and metaheuristics from optimization to machine learning, from quality management to risk management makes the book an excellent source for researchers.

“Stability Augmentation of a Grid-connected Wind Farm” introduces a comprehensive approach to stabilizing the power output from wind farms, covering both fixed and variable speed wind turbine generator systems. The book presents the different tools suitable for application in wind farms, together with modeling and control strategies. The book reports on output power and terminal voltage fluctuation minimization, using the integration of energy storage systems with power electronic converters. Transient stability enhancement of the power systems is also discussed. “Stability Augmentation of a Grid-connected Wind Farm” provides advanced tools with detailed modeling and controller design, including extensive simulation results.

The two-volume set LNAI 10245 and LNAI 10246 constitutes the refereed proceedings of the 16th International Conference on Artificial Intelligence and Soft Computing, ICAISC 2017, held in Zakopane, Poland in June 2017. The 133 revised full papers presented were carefully reviewed and selected from 274 submissions. The papers included in the first volume are

organized in the following five parts: neural networks and their applications; fuzzy systems and their applications; evolutionary algorithms and their applications; computer vision, image and speech analysis; and bioinformatics, biometrics and medical applications.

This book focuses on the fields of nature-inspired algorithms, optimization problems and fuzzy logic. In this book, a new metaheuristic based on String Theory from Physics is proposed. It is important to mention that we have proposed the new algorithm to generate new potential solutions in optimization problems in order to find new ways that could improve the results in solving these problems. We are presenting the results for the proposed method in different cases of study. The first case, is optimization of traditional benchmark mathematical functions. The second case, is the optimization of benchmark functions of the CEC 2015 Competition and we are also presenting results of the CEC 2017 Competition on Constrained Real-Parameter Optimization that are problems that contain the presence of constraints that alter the shape of the search space making them more difficult to solve. Finally, in the third case, we are presenting the optimization of a fuzzy inference system, specifically for finding the optimal design of a fuzzy controller for an autonomous mobile robot. It is important to mention that in all study cases we are presenting statistical tests in or-der to validate the performance of proposed method. In summary, we believe that this book will be of great interest to a wide audience, ranging from engineering and science graduate students, to researchers and professors in

computational intelligence, metaheuristics, optimization, robotics and control.

This book reviews the state-of-the-art developments in nature-inspired algorithms and their applications in various disciplines, ranging from feature selection and engineering design optimization to scheduling and vehicle routing. It introduces each algorithm and its implementation with case studies as well as extensive literature reviews, and also includes self-contained chapters featuring theoretical analyses, such as convergence analysis and no-free-lunch theorems so as to provide insights into the current nature-inspired optimization algorithms. Topics include ant colony optimization, the bat algorithm, B-spline curve fitting, cuckoo search, feature selection, economic load dispatch, the firefly algorithm, the flower pollination algorithm, knapsack problem, octonian and quaternion representations, particle swarm optimization, scheduling, wireless networks, vehicle routing with time windows, and maximally different alternatives. This timely book serves as a practical guide and reference resource for students, researchers and professionals.

This book presents different experimental results as evidence of the good results obtained compared with respect to conventional approaches and literature references based on fuzzy logic. Nowadays, the evolution of intelligence systems for decision making has been reached considerable levels of success, as these systems are getting more intelligent and can be of great help to experts in decision making. One of the more important realms in decision making is the area of

medical diagnosis, and many kinds of intelligence systems provide the expert good assistance to perform diagnosis; some of these methods are, for example, artificial neural networks (can be very powerful to find tendencies), support vector machines, that avoid overfitting problems, and statistical approaches (e.g., Bayesian). However, the present research is focused on one of the most relevant kinds of intelligent systems, which are the fuzzy systems. The main objective of the present work is the generation of fuzzy diagnosis systems that offer competitive classifiers to be applied in diagnosis systems. To generate these systems, we have proposed a methodology for the automatic design of classifiers and is focused in the Generalized Type-2 Fuzzy Logic, because the uncertainty handling can provide us with the robustness necessary to be competitive with other kinds of methods. In addition, different alternatives to the uncertainty modeling, rules-selection, and optimization have been explored. Besides, different experimental results are presented as evidence of the good results obtained when compared with respect to conventional approaches and literature references based on Fuzzy Logic.

This book presents the latest research of the field of optimization, modeling and algorithms, discussing the real-world application problems associated with new innovative methodologies. The requirements and demands of problem solving have been increasing exponentially and new computer science and engineering technologies have reduced the

scope of data coverage worldwide. The recent advances in information communication technology (ICT) have contributed to reducing the gaps in the coverage of domains around the globe. The book is a valuable reference work for researchers in the fields of computer science and engineering with a particular focus on modeling, simulation and optimization as well as for postgraduates, managers, economists and decision makers

This book presents the proceedings of the 10th Conference on Theory and Applications of Soft Computing, Computing with Words and Perceptions, ICSCCW 2019, held in Prague, Czech Republic, on August 27–28, 2019. It includes contributions from diverse areas of soft computing and computing with words, such as uncertain computation, decision-making under imperfect information, neuro-fuzzy approaches, deep learning, natural language processing, and others. The topics of the papers include theory and applications of soft computing, information granulation, computing with words, computing with perceptions, image processing with soft computing, probabilistic reasoning, intelligent control, machine learning, fuzzy logic in data analytics and data mining, evolutionary computing, chaotic systems, soft computing in business, economics and finance, fuzzy logic and soft computing in earth sciences, fuzzy logic and soft computing in engineering, fuzzy logic and soft

computing in material sciences, soft computing in medicine, biomedical engineering, and pharmaceutical sciences. Showcasing new ideas in the field of theories of soft computing and computing with words and their applications in economics, business, industry, education, medicine, earth sciences, and other fields, it promotes the development and implementation of these paradigms in various real-world contexts. This book is a useful guide for academics, practitioners and graduates.

This book presents recent advances on the design of intelligent systems based on fuzzy logic, neural networks and nature-inspired optimization and their application in areas such as, intelligent control and robotics, pattern recognition, time series prediction and optimization of complex problems. The book is organized in eight main parts, which contain a group of papers around a similar subject. The first part consists of papers with the main theme of theoretical aspects of fuzzy logic, which basically consists of papers that propose new concepts and algorithms based on fuzzy systems. The second part contains papers with the main theme of neural networks theory, which are basically papers dealing with new concepts and algorithms in neural networks. The third part contains papers describing applications of neural networks in diverse areas, such as time series prediction and pattern recognition. The fourth

part contains papers describing new nature-inspired optimization algorithms. The fifth part presents diverse applications of nature-inspired optimization algorithms. The sixth part contains papers describing new optimization algorithms. The seventh part contains papers describing applications of fuzzy logic in diverse areas, such as time series prediction and pattern recognition. Finally, the eighth part contains papers that present enhancements to meta-heuristics based on fuzzy logic techniques.

This book presents an authoritative collection of contributions by researchers from 16 different countries (Austria, Chile, Georgia, Germany, Mexico, Norway, P.R. of China, Poland, North Macedonia, Romania, Russia, Spain, Turkey, Ukraine, the United Kingdom and United States) that report on recent developments and new directions in advanced control systems, together with new theoretical findings, industrial applications and case studies on complex engineering systems. This book is dedicated to Professor Vsevolod Mykhailovych Kuntsevich, an Academician of the National Academy of Sciences of Ukraine, and President of the National Committee of the Ukrainian Association on Automatic Control, in recognition of his pioneering works, his great scientific and scholarly achievements, and his years of service to many scientific and professional communities, notably those involved in automation, cybernetics, control,

management and, more specifically, the fundamentals and applications of tools and techniques for dealing with uncertain information, robustness, non-linearity, extremal systems, discrete control systems, adaptive control systems and others. Covering essential theories, methods and new challenges in control systems design, the book is not only a timely reference guide but also a source of new ideas and inspirations for graduate students and researchers alike. Its 15 chapters are grouped into four sections: (a) fundamental theoretical issues in complex engineering systems, (b) artificial intelligence and soft computing for control and decision-making systems, (c) advanced control techniques for industrial and collaborative automation, and (d) modern applications for management and information processing in complex systems. All chapters are intended to provide an easy-to-follow introduction to the topics addressed, including the most relevant references. At the same time, they reflect various aspects of the latest research work being conducted around the world and, therefore, provide information on the state of the art.

This book focuses on the fields of fuzzy logic, bio-inspired algorithm, especially the differential evolution algorithm and also considering the fuzzy control area. The main idea is that these two areas together can help solve various control problems and

to find better results. In this book, the authors test the proposed method using five benchmark control problems. First, the water tank, temperature, mobile robot, and inverted pendulum controllers are considered. For these 4 problems, experimentation was carried out using a Type-1 fuzzy system and an Interval Type-2 system. The last control problem was the D.C. motor, for which the experiments were performed with Type-1, Interval Type-2, and Generalized Type-2 fuzzy systems. When we use fuzzy systems combined with the differential evolution algorithm, we can notice that the results obtained in each of the controllers are better and with increasing uncertainty, the results are even better. For this reason, the authors consider in this book the proposed method using fuzzy systems and the differential evolution algorithm to improve the fuzzy controllers' behavior in complex control problems.

The three-volume set CCIS 923, CCIS 924, and CCIS 925 constitutes the thoroughly refereed proceedings of the First International Conference on Intelligent Manufacturing and Internet of Things, and of the 5th International Conference on Intelligent Computing for Sustainable Energy and Environment, ICSEE 2018, held in Chongqing, China, in September 2018. The 135 revised full papers presented were carefully reviewed and selected from over 385 submissions.The papers of this volume are

organized in topical sections on: digital manufacturing; industrial product design; logistics, production and operation management; manufacturing material; manufacturing optimization; manufacturing process; mechanical transmission system; robotics.

We describe in this book, recent developments on fuzzy logic, neural networks and optimization algorithms, as well as their hybrid combinations, and their application in areas such as, intelligent control and robotics, pattern recognition, medical diagnosis, time series prediction and optimization of complex problems. The book contains a collection of papers focused on hybrid intelligent systems based on soft computing. There are some papers with the main theme of type-1 and type-2 fuzzy logic, which basically consists of papers that propose new concepts and algorithms based on type-1 and type-2 fuzzy logic and their applications. There also some papers that presents theory and practice of meta-heuristics in different areas of application. Another group of papers describe diverse applications of fuzzy logic, neural networks and hybrid intelligent systems in medical applications. There are also some papers that present theory and practice of neural networks in different areas of application. In addition, there are papers that present theory and practice of optimization and evolutionary algorithms in different areas of application. Finally, there are

some papers describing applications of fuzzy logic, neural networks and meta-heuristics in pattern recognition problems.

This book describes recent advances on fuzzy logic augmentation of nature-inspired optimization metaheuristics and their application in areas such as intelligent control and robotics, pattern recognition, time series prediction and optimization of complex problems. The book is organized in two main parts, which contain a group of papers around a similar subject. The first part consists of papers with the main theme of theoretical aspects of fuzzy logic augmentation of nature-inspired optimization metaheuristics, which basically consists of papers that propose new optimization algorithms enhanced using fuzzy systems. The second part contains papers with the main theme of application of optimization algorithms, which are basically papers using nature-inspired techniques to achieve optimization of complex optimization problems in diverse areas of application.