
A Hybrid Fuzzy Logic And Extreme Learning Machine For

Genetic Algorithms and Fuzzy Logic Systems

12th International Workshop, WILF 2018, Genoa, Italy, September 6-7, 2018, Revised Selected Papers

Fuzzy Logic in Geology

Integration of Fuzzy Logic and Chaos Theory

SYNTHESIS AND APPLICATIONS (WITH CD)

The Fuzzy Hybrid Decision Support System Using Neural Networks, Fuzzy Logic Controllers, and Object Oriented Databases

A Hybrid Neural Network-fuzzy Logic Limit Protection System for Rotorcraft

Proceedings of: EUSFLAT-2017 - The 10th Conference of the European Society for Fuzzy Logic and Technology, September 11-15,

2017, Warsaw, Poland IWIFSGN'2017 - The Sixteenth International Workshop on Intuitionistic Fuzzy Sets and Generalized Nets,

September 13-15, 2017, Warsaw, Poland, Volume 1

An Essential Guide to Fuzzy Systems

Stability of a Fuzzy Logic Based Piecewise Linear Hybrid System

Fuzzy Logic for Embedded Systems Applications

Fuzzy Logic in Action: Applications in Epidemiology and Beyond

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Advances in Fuzzy Logic and Technology 2017
New Trends In Fuzzy Logic II - Proceedings Of The Wilf '97 - Second Italian Workshop On Fuzzy Logic 1997
NEURAL NETWORKS, FUZZY LOGIC AND GENETIC ALGORITHM
Recent Advances in Interval Type-2 Fuzzy Systems
Fuzzy and Neural: Interactions and Applications
Fuzzy Logic and Applications
An Introduction to Fuzzy Logic and Fuzzy Sets
9th International Workshop, WILF 2011, Trani, Italy, August 29-31, 2011, Proceedings

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Genetic Algorithms and Fuzzy Logic
Systems IGI Global

Fuzzy Logic in Action: Applications in
Epidemiology and Beyond, co-authored by
Eduardo Massad, Neli Ortega, Laécio
Barros, and Cláudio Struchiner is a
remarkable achievement. The book brings
a major paradigm shift to medical sciences

exploring the use of fuzzy sets in
epidemiology and medical diagnosis
arena. The volume addresses the most
significant topics in the broad areas of
epidemiology, mathematical modeling and
uncertainty, embodying them within the
framework of fuzzy set and dynamic
systems theory. Written by leading
contributors to the area of epidemiology,
medical informatics and mathematics, the
book combines a very lucid and
authoritative exposition of the
fundamentals of fuzzy sets with an

insightful use of the fundamentals in the
area of epidemiology and diagnosis. The
content is clearly illustrated by numerous
illustrative examples and several real
world applications. Based on their
profound knowledge of epidemiology and
mathematical modeling, and on their keen
understanding of the role played by
uncertainty and fuzzy sets, the authors
provide insights into the connections
between biological phenomena and
dynamic systems as a mean to predict,
diagnose, and prescribe actions. An

example is the use of Bellman-Zadeh fuzzy decision making approach to develop a vaccination strategy to manage measles epidemics in São Paulo. The book offers a comprehensive, systematic, fully updated and self-contained treatise of fuzzy sets in epidemiology and diagnosis. Its content covers material of vital interest to students, researchers and practitioners and is suitable both as a textbook and as a reference. The authors present new results of their own in most of the chapters. In doing so, they reflect the trend to view fuzzy sets, probability theory and statistics as an association of complementary and synergetic modeling methodologies.

12th International Workshop, WILF 2018, Genoa, Italy, September 6-7, 2018, Revised Selected Papers

Springer Nature

Complex cyber-physical systems are difficult to model and control. However, humans are capable of accomplishing these tasks by constantly adapting and redefining the rules to control these complex systems. Fuzzy logic provides a means of encoding human inference into a control methodology. However, the fuzzy logic controllers are nonlinear and their

stability is difficult to verify. Therefore, the widespread usefulness of fuzzy logic controllers is limited. It has been proven that fuzzy logic controllers can be implemented as piecewise linear switched controllers. It has also been shown that the piecewise linear system can be implemented as a hybrid system. Piecewise linear hybrid system stability can be verified by extending the Lyapunov proof for one linear system to multiple decreasing Lyapunov functions. The objective of this thesis is to implement fuzzy logic control systems as a piecewise linear hybrid system and examine their stability. A proportional fuzzy logic controller with constant derivative gain is implemented as a piecewise linear hybrid system using Matlab Simulink Stateflow. Stability of the system is examined by obtaining the Lyapunov function of each subsystem and stitching them according to the fuzzy rules. It is shown that the stitching of Lyapunov functions must successively decrease for the system to be stable. Further implications of robustness are examined by varying the fuzzy logic rules and observing the effect on the corresponding stitched Lyapunov

functions.

Fuzzy Logic in Geology Springer

Uncertainty has been of concern to engineers, managers and scientists for many centuries. In management sciences there have existed definitions of uncertainty in a rather narrow sense since the beginning of this century. In engineering and uncertainty has for a long time been considered as in sciences, however, synonymous with random, stochastic, statistic, or probabilistic. Only since the early sixties views on uncertainty have become more heterogeneous and more tools to model uncertainty than statistics have been proposed by several scientists. The problem of modeling uncertainty adequately has become more important the more complex systems have become, the faster the scientific and engineering world develops, and the more important, but also more difficult, forecasting of future states of systems have become. The first question one should probably ask is whether uncertainty is a phenomenon, a feature of real world systems, a state of mind or a label for a situation in which a human being wants to make statements about

phenomena, i. e. , reality, models, and theories, respectively. One can also ask whether uncertainty is an objective fact or just a subjective impression which is closely related to individual persons. Whether uncertainty is an objective feature of physical real systems seems to be a philosophical question. This shall not be answered in this volume.

Integration of Fuzzy Logic and Chaos Theory Springer Science & Business Media
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 are also some papers that present 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.

SYNTHESIS AND APPLICATIONS (WITH CD)
Springer Science & Business Media

This volume includes most of the recent results obtained by Italian researchers in fuzzy logic. It collects selected papers from the 1997 Italian Workshop on Fuzzy Logic — WILF '97 and some invited papers, covering the mathematical foundations of fuzzy logic, neuro-fuzzy systems, hardware implementation of fuzzy logic controllers, and gives an update on applications to control, physics, decision support systems and pattern analysis.

The Fuzzy Hybrid Decision Support System Using Neural Networks, Fuzzy Logic

Controllers, and Object Oriented Databases Springer

A number of academic and industrial researches in control systems have exposed the inherent weaknesses of PID control which are; rigidity, prohibitive computational complexity and non-applicability for intelligent and complex systems. Consequently, a group of researchers have proposed fuzzy logic control as a better alternative to PID control. This notion has spawned numerous debates among researchers, experts and professionals in the field of control systems. As a result, this book investigates and compares the performance of traditional control techniques with fuzzy logic control which will be optimized and made adaptive to the variations of the sensor input. It will also be proven that fuzzy logic control is far more superior in performance to the existing traditional control techniques. These objectives were achieved through the use of MATLAB and SIMULINK to simulate, tweak and fine-tune the different cases for the response and their respective performance metrics. Interestingly as expected, the results of the simulations show that fuzzy logic control,

optimized or not, is better than the traditional control techniques, especially, PID control

A Hybrid Neural Network-fuzzy Logic Limit Protection System for Rotorcraft LAP

Lambert Academic Publishing

This thoroughly refereed and well organized collection of papers is largely based on papers originally presented at the IJCAI'95 Workshop on Fuzzy Logic in AI, held in Montreal, Canada, in August 1995. Additionally, a few papers were invited in order to round off the scope and competent coverage of relevant topics. The 20 revised full papers included are organized in sections on hybrid and novel architectures, machine learning and data mining, image processing and computer vision, and theoretical developments. Focusing on the most pressing problems of AI, the volume supports the view that fuzzy systems combined with traditional AI leads the move towards the next generation of intelligent systems.

Proceedings of: EUSFLAT-2017 - The 10th Conference of the European Society for Fuzzy Logic and Technology, September 11-15, 2017, Warsaw, Poland IWIFSGN'2017 - The

Sixteenth International Workshop on Intuitionistic Fuzzy Sets and Generalized Nets, September 13-15, 2017, Warsaw, Poland, Volume 1
DIANE Publishing

This book provides comprehensive introduction to a consortium of technologies underlying soft computing, an evolving branch of computational intelligence. The constituent technologies discussed comprise neural networks, fuzzy logic, genetic algorithms, and a number of hybrid systems which include classes such as neuro-fuzzy, fuzzy-genetic, and neuro-genetic systems. The hybridization of the technologies is demonstrated on architectures such as Fuzzy-Back-propagation Networks (NN-FL), Simplified Fuzzy ARTMAP (NN-FL), and Fuzzy Associative Memories. The book also gives an exhaustive discussion of FL-GA hybridization. Every architecture has been discussed in detail through illustrative examples and applications. The algorithms have been presented in pseudo-code with a step-by-step illustration of the same in problems. The applications, demonstrative of the potential of the architectures, have been chosen from diverse disciplines of

science and engineering. This book with a wealth of information that is clearly presented and illustrated by many examples and applications is designed for use as a text for courses in soft computing at both the senior undergraduate and first-year post-graduate engineering levels. It should also be of interest to researchers and technologists desirous of applying soft computing technologies to their respective fields of work.

An Essential Guide to Fuzzy Systems

Springer Science & Business Media

It is really important to diagnose jaw tumor in its early stages to improve its prognosis. A differential diagnosis could be performed using X-ray images; therefore, accurate and fully automatic jaw lesions image segmentation is a challenging and essential task. The aim of this work was to develop a novel, fully automatic and effective method for jaw lesions in panoramic X-ray image segmentation.

Stability of a Fuzzy Logic Based Piecewise Linear Hybrid System World Scientific

While several books are available today that address the mathematical and philosophical foundations of fuzzy logic,

none, unfortunately, provides the practicing knowledge engineer, system analyst, and project manager with specific, practical information about fuzzy system modeling. Those few books that include applications and case studies concentrate almost exclusively on engineering problems: pendulum balancing, truck backeruppers, cement kilns, antilock braking systems, image pattern recognition, and digital signal processing. Yet the application of fuzzy logic to engineering problems represents only a fraction of its real potential. As a method of encoding and using human knowledge in a form that is very close to the way experts think about difficult, complex problems, fuzzy systems provide the facilities necessary to break through the computational bottlenecks associated with traditional decision support and expert systems. Additionally, fuzzy systems provide a rich and robust method of building systems that include multiple conflicting, cooperating, and collaborating experts (a capability that generally eludes not only symbolic expert system users but analysts who have turned to such related technologies as neural networks and

genetic algorithms). Yet the application of fuzzy logic in the areas of decision support, medical systems, database analysis and mining has been largely ignored by both the commercial vendors of decision support products and the knowledge engineers who use them. Fuzzy Logic for Embedded Systems Applications Springer
Fuzzy Logic for Embedded Systems Applications, by a recognized expert in the field, covers all the basic theory relevant to electronics design, with particular emphasis on embedded systems, and shows how the techniques can be applied to shorten design cycles and handle logic problems that are tough to solve using conventional linear techniques. All the latest advances in the field are discussed and practical circuit design examples presented. Fuzzy logic has been found to be particularly suitable for many embedded control applications. The intuitive nature of the fuzzy-based system design saves engineers time and reduces costs by shortening product development cycles and making system maintenance and adjustments easier. Yet despite its wide acceptance—and perhaps because of

its name—it is still misunderstood and feared by many engineers. There is a need for embedded systems designers—both hardware and software—to get up to speed on the principles and applications of fuzzy logic in order to ascertain when and how to use them appropriately. Fuzzy Logic for Embedded Systems Applications provides practical guidelines for designing electronic circuits and devices for embedded systems using fuzzy-based logic. It covers both theory and applications with design examples. * Unified approach to fuzzy electronics from an engineering point of view * Easy to follow with plenty of examples * Review and evaluation of free resources
Fuzzy Logic in Action: Applications in Epidemiology and Beyond Physica
Intelligent Control considers non-traditional modelling and control approaches to nonlinear systems. Fuzzy logic, neural networks and evolutionary computing techniques are the main tools used. The book presents a modular switching fuzzy logic controller where a PD-type fuzzy controller is executed first followed by a PI-type fuzzy controller thus improving the performance of the

controller compared with a PID-type fuzzy controller. The advantage of the switching-type fuzzy controller is that it uses one rule-base thus minimises the rule-base during execution. A single rule-base is developed by merging the membership functions for change of error of the PD-type controller and sum of error of the PI-type controller. Membership functions are then optimized using evolutionary algorithms. Since the two fuzzy controllers were executed in series, necessary further tuning of the differential and integral scaling factors of the controller is then performed. Neural-network-based tuning for the scaling parameters of the fuzzy controller is then described and finally an evolutionary algorithm is applied to the neurally-tuned-fuzzy controller in which the sigmoidal function shape of the neural network is determined. The important issue of stability is addressed and the text demonstrates empirically that the developed controller was stable within the operating range. The text concludes with ideas for future research to show the reader the potential for further study in this area. Intelligent Control will be of interest to researchers from engineering

and computer science backgrounds working in the intelligent and adaptive control.

Integration of Fuzzy Logic and Chaos Theory Springer

The 1960s were perhaps a decade of confusion, when scientists faced difficulties in dealing with imprecise information and complex dynamics. A new set theory and then an infinite-valued logic of Lotfi A. Zadeh were so confusing that they were called fuzzy set theory and fuzzy logic; a deterministic system found by E. N. Lorenz to have random behaviours was so unusual that it was lately named a chaotic system. Just like irrational and imaginary numbers, negative energy, anti-matter, etc., fuzzy logic and chaos were gradually and eventually accepted by many, if not all, scientists and engineers as fundamental concepts, theories, as well as technologies. In particular, fuzzy systems technology has achieved its maturity with widespread applications in many fields, ranging from control, automation, and artificial intelligence to image/signal processing, pattern recognition, and electronic commerce. Chaos, on the other

hand, was considered one of the three monumental discoveries of the twentieth century together with the theory of relativity and quantum mechanics. As a very special nonlinear dynamical phenomenon, chaos has reached its current outstanding status from being merely a scientific curiosity in the mid-1960s to an applicable technology in the late 1990s. Finding the intrinsic relation between fuzzy logic and chaos theory is certainly of significant interest and of potential importance. The past 20 years have indeed witnessed some serious explorations of the interactions between fuzzy logic and chaos theory, leading to such research topics as fuzzy modeling of chaotic systems using Takagi-Sugeno models, linguistic descriptions of chaotic systems, fuzzy control of chaos, and a combination of fuzzy control technology and chaos theory for various engineering practices. *A Hybrid Algorithm and Its Applications to Fuzzy Logic Modeling of Nonlinear Systems* Springer Science & Business Media Fuzzy logic techniques have had extraordinary growth in various engineering systems. The developments in engineering sciences have caused

apprehension in modern years due to high-tech industrial processes with ever-increasing levels of complexity. Advanced Fuzzy Logic Approaches in Engineering Science provides innovative insights into a comprehensive range of soft fuzzy logic techniques applied in various fields of engineering problems like fuzzy sets theory, adaptive neuro fuzzy inference system, and hybrid fuzzy logic genetic algorithms belief networks in industrial and engineering settings. The content within this publication represents the work of particle swarms, fuzzy computing, and rough sets. It is a vital reference source for engineers, research scientists, academicians, and graduate-level students seeking coverage on topics centered on the applications of fuzzy logic in high-tech industrial processes.

2019 19th International Conference on Sciences and Techniques of Automatic Control and Computer Engineering (STA)

Springer Science & Business Media

We describe in this book, new methods and applications of hybrid intelligent systems using soft computing techniques. Soft Computing (SC) consists of several intelligent computing paradigms, including

fuzzy logic, neural networks, and evolutionary algorithms, which can be used to produce powerful hybrid intelligent systems. The book is organized in five main parts, which contain a group of papers around a similar subject. The first part consists of papers with the main theme of intelligent control, which are basically papers that use hybrid systems to solve particular problems of control. The second part contains papers with the main theme of pattern recognition, which are basically papers using soft computing techniques for achieving pattern recognition in different applications. The third part contains papers with the themes of intelligent agents and social systems, which are papers that apply the ideas of agents and social behavior to solve real-world problems. The fourth part contains papers that deal with the hardware implementation of intelligent systems for solving particular problems. The fifth part contains papers that deal with modeling, simulation and optimization for real-world applications.

IJCAI '95 Workshop, Montreal, Canada, August 19-21, 1995, Selected Papers Springer Science & Business

Media

The primary purpose of this book is to present information about selected topics on the interactions and applications of fuzzy + neural. Most of the discussion centers around our own research in these areas. Fuzzy + neural can mean many things: (1) approximations between fuzzy systems and neural nets (Chapter 4); (2) building hybrid neural nets to equal fuzzy systems (Chapter 5); (3) using neural nets to solve fuzzy problems (Chapter 6); (4) approximations between fuzzy neural nets and other fuzzy systems (Chapter 8); (5) constructing hybrid fuzzy neural nets for certain fuzzy systems (Chapters 9, 10); or (6) computing with words (Chapter 11).

This book is not intended to be used primarily as a text book for a course in fuzzy + neural because we have not included problems at the end of each chapter, we have omitted most proofs (given in the references), and we have given very few references. We wanted to keep the mathematical prerequisites to a minimum so all longer, involved, proofs were omitted. Elementary differential calculus is the only prerequisite needed since we do mention partial derivatives

once or twice.

Design of Hybrid Fuzzy Logic Controllers
This edited book presents the state-of-the-art of applying fuzzy logic to managerial decision-making processes in areas such as fuzzy-based portfolio management, recommender systems, performance assessment and risk analysis, among others. Presenting the latest research, with a strong focus on applications and case studies, it is a valuable resource for researchers, practitioners, project leaders and managers wanting to apply or improve their fuzzy-based skills.

Development of Fuzzy Logic and Neural Network Control and Advanced Emissions Modeling for Parallel Hybrid Vehicles

Springer Science & Business Media
This book addresses the latest research and applications of fuzzy management methods for business decisions. It showcases a broad set of applications and discusses topics such as measures for the quality of analytics outcomes in big data environments; how fuzzy management methods support the inclusion of human thinking and human behavior in decision making processes; how to generate better results with fuzzy management methods

in cases of imprecise information; new personalization concepts enabled by fuzzy logic for the offering of customized products and services especially in the electronic market; and lastly the application of fuzzy analysis for executives using natural rather than computer language. The combination of research papers and case studies makes it a valuable resource both for researchers and practitioners in the digital economy.

Development of a Real Time Adaptive Controller Utilizing Hybrid Fuzzy Logic/crisp Expert Rules and Neural Network Based Inferential Sensing for Constrained Optimization of an Elemental Phosphorus Calcining Furnace

IntechOpen
This book reviews current state of the art methods for building intelligent systems using type-2 fuzzy logic and bio-inspired optimization techniques. Combining type-2 fuzzy logic with optimization algorithms, powerful hybrid intelligent systems have been built using the advantages that each technique offers. This book is intended to be a reference for scientists and engineers interested in applying type-2 fuzzy logic for solving problems in pattern recognition, intelligent control, intelligent

manufacturing, robotics and automation. This book can also be used as a reference for graduate courses like the following: soft computing, intelligent pattern recognition, computer vision, applied artificial intelligence, and similar ones. We consider that this book can also be used to get novel ideas for new lines of re-search, or to continue the lines of research proposed by the authors.

Latest Research and Case Studies PHI Learning Pvt. Ltd.

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 to 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.

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