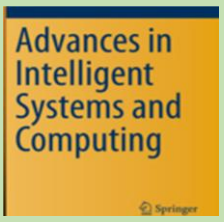


Programme

ICSCCW 2024

12th International Conference on Theory and Application of Soft Computing, Computing with Words, Perception and Artificial Intelligence

https://icsccw2024.com/

26-27 AUGUST, BUDVA-MONTENEGRO

Programme

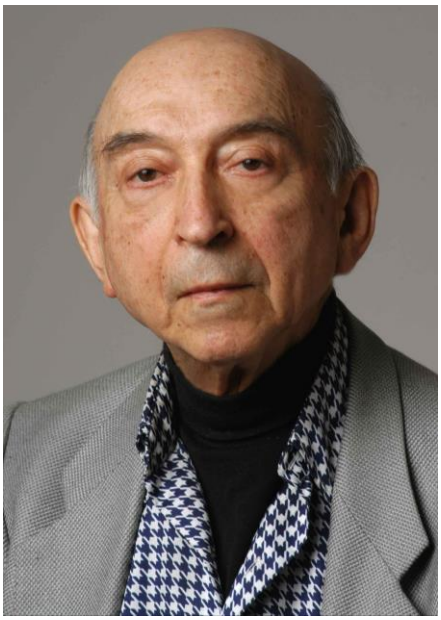
ICSCCW 2024

12th International Conference on Theory and Application of Soft Computing, Computing with Words, Perception and Artificial Intelligence ICSCCW - 2024

https://icsccw2024.com/

26-27 August, Budva, Montenegro

12th International Conference on Theory and Application of Soft Computing, Computing with Words, Perception, and Artificial Intelligence



Dedicated to the memory of
Prof. L.A. Zadeh

PROGRAMME

Organized by:

Azerbaijan Association of "Zadeh's Legacy and Artificial Intelligence"
Azerbaijan State Oil and Industry University (ASOIU, Azerbaijan)
University of Siegen (Siegen, Germany)
BISC – Berkeley Initiative in Soft Computing (Berkeley, USA)
University of Texas (San Antonio, USA)
Georgia State University (Atlanta, USA)
University of Alberta (Canada)
University of Toronto (Toronto, Ontario, Canada)
System Research Institute, Polish Academy of Sciences (Poland)
Near East University (North Cyprus)

ICSCCW- 2024

ICSCCW-2024 Committees

Chairman Prof. R.A. Aliev

Co-Chairman Prof. J. Kacprzyk, Poland
Co-Chairman Prof. M. Jamshidi, USA
Co-Chairman Prof. W. Pedrycz, Canada
Co-Chairman Prof. M. B. Babanli - Azerbaijan,
Co-Chairman Prof. F. S. Sadikoglu, North Cyprus

INTERNATIONAL PROGRAM COMMITTEE

A. Averkin, Russia
A. Piegat, Poland
B. Fazlollahi, USA
B. Kang, China
B. Turksen, Canada, Turkey
C. Kahraman, Turkey
D. Dubois, France
D. Kumar Jana, India
E. Babaei, Iran
F. Aminzadeh, USA
G. Imanov, Azerbaijan
H. Berenji, USA
H. Hamdan, France, UK
H. Prade, France
H. Roth, Germany
I. Batyrshin, Mexico
I. G. Akperov, Russia
I. Perfilieva, Czech Republic
K. Abdulla, Azerbaijan
K. Atanassov, Bulgary
K. Bonfig, Germany
K. Takahashi, Japan
L. Gardashova, Azerbaijan
M. Nikravesh, USA
N. Yusupbekov, Uzbekistan
N. Javadov, Azerbaijan
O. Huseynov, Azerbaijan
O. Kaynak, Turkey
R. R. Aliev, North Cyprus
R. Abiyev, North Cyprus
R. O. Kabaoglu, Turkey
R. Yager, USA
S. Ulyanov, Russia
T. Allahviranloo, Turkey
T. Fukuda, Japan
T. Takagi, Japan
V. Kreinovich, USA
V. Loia, Italy
V. Niskanen, Finland
V. Nourani, Iran
V. Novak, Czech Republic

Organizing Committee

Chairman: U. Eberhardt (Germany)

Co-Chairmen: T. Abdullayev, N. E. Adilova (Azerbaijan).

Members: A. Alizadeh, A. Nuriyev (Azerbaijan), J. Lorkowski (USA), K. Rizvanova O. Poleshchuk (Russia), H. Igamberdiev, (Uzbekistan), M. M. M. Elamin, (Sudan, North Cyprus), N. Mehdiyev (Germany), M. A. Salahli (Turkey).

Conference Organization Secretariat

Azadlig Ave. 34, AZ 1010, Baku, Azerbaijan
Phone: +99 412 598 45 09; +99 412 493 45 38
Fax: +99 412 598 45 09
E-mail: nigar.adilova@asoiu.edu.az

SCHEDULE-AT-A-GLANCE

Time	Monday, August 26, 2024
08:00 – 08:40	**Breakfast**
08:40 – 09:20	**Registration**
09:20 – 09:50	**Opening Ceremony**
09:50 – 10:30	***Keynote Speech*** **Chair: R. A. Aliev, Azerbaijan** **J. Kacprzyk:** A bipolar extension of the classic Bellman and Zadeh's model of decision making in a fuzzy environment
10:30 – 11:00	***Keynote Speech*** **Chair: J. Kacprzyk, Poland** **R. A. Aliev:** Multi-attribute dynamic decision analysis under bimodal information
11:00 – 11:20	**Tea/Coffee**
11:20 – 12:40	***Session A*** **Theory and Application of Soft Computing** **Chairman: R. R. Aliyev**
12:40 – 14:00	***Session B*** **Decision theory with imperfect information** **Chairman: L. A. Gardashova**
14:00 – 15:00	**Lunch**
15:00 – 15:30	***Keynote Speech*** **Chair: F. S. Sadikoglu, North Cyprus** **R. B. Eke:** Some of the Contributions of Fuzzy Logic and Artificial Intelligence to Rhetoric
15:30 – 16:00	***Keynote Speech*** **Chair: Ziya Selcuk, Turkey** **V. Nourani:** Comparative Evaluation of Shallow and Deep Learning Techniques for Groundwater Level Estimation
16:00 – 16:20	**Tea/Coffee**
16:20 – 18:00	***Session C*** **Theory and Application of Soft Computing** **Chairman: Liviu – George Maha**
09:00-18:00	**Flexible Session**
18:00	**Welcome reception**

Time	Tuesday, August 27, 2024
08:00 – 09:00	**Breakfast**
09:00 – 09:30	**Opening Ceremony**
09:30 – 10:10	***Keynote Speech*** **Chair: R. B. Eke, Turkey** **W. Pedrycz:** Models of Large Group Decision Processes in Data - Knowledge Environment
10:10-10:50	***Keynote Speech*** **Chair: W. Pedrycz, Canada** **T. Allahviranloo:** Applications of Linguistic Z-Numbers in Decision Making, Social Networks, and Artificial Intelligence
10:50 – 11:10	**Tea/Coffee**
11:10 - 13:00	***Session D*** **Artificial intelligence tools** **Chairman: Adrian Iftene**
13:00 – 14:00	**Lunch**
14:00 - 15:30	***Session E*** **Theory and Application of Soft Computing** **Chairman: N. E. Adilova**
15:30 – 16:00	**Round Table**
09:00 – 18:00	**Flexible Session**
	Closing Ceremony

Welcome

I would like to convey my greetings to all the participants of ICSCCW-2024. As you know, this is a long-life conference. The first conference was held in 2001. The father of fuzzy logic, the Honorary Chair of ICAFS, Prof. L.A. Zadeh participated in almost all the conferences held in different countries of the world. Unfortunately, about six years ago, in the beginning of September, 2017, we have lost a genius scientist, Prof. L.A. Zadeh. Let us rise and observe a minute of silence in memory of Prof. L.A. Zadeh.

Currently, the significant increase can be noticed in number of consumer products, industrial systems, multimedia systems etc. with high level of MIQ based on Fuzzy Logic. Fuzzy Logic is widely used in practice with hybrid intelligent systems. Recently, Fuzzy Set and Fuzzy Logic theory and technology are extensively used in the realm of decision analysis. We are proud to have the honor of presenting this conference for the sixteenth time. As a result, we hope to be able to promote further research in the above-mentioned fields. Furthermore, this conference is to give students the opportunity to become familiar with these subject matters.

We would like to thank everybody who participated in the preparation and presentation of this conference. I hope that this conference will be fruitful and will give chance and opportunities for exchange of experience.

The Chairman of ICSCCW-2024,

Prof. R.A. Aliev

Plenary Session Papers Abstracts

A bipolar extension of the classic Bellman and Zadeh's model of decision making in a fuzzy environment

Janusz Kacprzyk

Systems Research Institute,
Polish Academy of Sciences, Warsaw, Poland

Email: kacprzyk@ibspan.waw.pl

Janusz Kacprzyk is Professor of Computer Science at the Systems Research Institute, Polish Academy of Sciences, WIT – Warsaw School of Information Technology, AGH University of Science and Technology in Cracow, and Professor of Automatic Control at PIAP – Industrial Institute of Automation and Measurements in Warsaw, Poland. He is Honorary Foreign Professor at the Department of Mathematics, Yli Normal University, Xinjiang, China. He is Full Member of the Polish Academy of Sciences, Member of Academia Europaea, European Academy of Sciences and Arts, European Academy of Sciences, International Academy of Systems and Cybernetics (IASCYS), Foreign Member of the: Bulgarian Academy of Sciences, Spanish Royal Academy of Economic and Financial Sciences (RACEF), Finnish Society of Sciences and Letters, Flemish Royal Academy of Belgium of Sciences and the Arts (KVAB), Russian Academy of Sciences, National Academy of Sciences of Ukraine, Lithuanian Academy of Sciences, Accademia di Scienze, Lettere e Arte (Palrmo). He was awarded with 8 honorary doctorates. He is Fellow of IEEE, IET, IFSA, EurAI, IFIP, AAIA, AIIA, I2CICC, and SMIA. His main research interests include the use of modern computation computational and artificial intelligence tools, notably fuzzy logic, in systems science, decision making, optimization, control, data analysis and data mining, with applications in mobile robotics, systems modeling, ICT etc. He authored 8 books, (co)edited more than 150 volumes, (co)authored more than 650 papers, including ca. 150 in journals indexed by the WoS. He is listed in 2020-2022 "World's 2% Top Scientists" by Stanford University, Elsevier (Scopus) and ScieTech Strategies and published in PLOS Biology Journal. He is the editor in chief of 8 book series at Springer, and of 2 journals, and is on the editorial boards of ca. 40 journals. He is President of the Polish Operational and Systems Research Society and Past President of International Fuzzy Systems Association.

Abstract

The classic Bellman and Zadeh's model of decision making in a fuzzy environment, meant as the fuzzy constraints and fuzzy goals, is one of the most powerful conceptual frameworks within which to formulate a multitude of decision making, choice, selection, optimization, control, etc. problems in which there is imprecision, represented by fuzzy sets, usually stemming from the use of natural language. The models boil down to an aggregation of the fuzzy constraints and fuzzy goals which is usually assumed to be an aggregation operation corresponding to AND or some t-norm, for instance, the minimum, algebraic product, the Łukasiewicz t-norm, as well as the traditional (weighted) average. In general, the functioning of the (weighted) average can somehow be deduced from results obtained by using the additive utility functions, of the algebraic product – by those obtained by using the use of the multiplicative utility functions, and the minimum corresponds to a safety first, pessimistic attitude. In addition to the aggregation operators, weights can also be associated with the fuzzy constraints and fuzzy goals. However, this all does not change the very essence of the problem which is that all fuzzy constraints and fuzzy goals should be jointly considered, even with different weights. In this abstract we propose a new approach which constitutes a conceptually new extension of the classic Bellman and Zadeh's model of decision making in a fuzzy environment in which we

advocate the use of some other, more sophisticated „AND-like" aggregation operators, notably a nonstandard operator ``and, if possible" which makes it possible to account for just some of the fuzzy constraints and fuzzy goals, basically those which should be taken into account if their satisfaction is possible under the circumstances, for instance, in a real estate context, when a customer is interested in purchasing a house the price of is what should necessarily be taken into account, but another aspect, for instance, the location sought may be important but not necessary. The „and, if possible" aggregation can here be a proper model and it has been proposed in the context of database querying. We show how to reformulate the basic Bellman and Zadeh's model, as well as some other related models, multistage decision making and control models, using the above „and, if possible" AND-like aggregation operator. We show some examples of using the approach to solve practical problems. Moreover, we mention some possible extensions like the use of extensions of the basic concept of a fuzzy set, exemplified by the intuitionistic fuzzy sets and Z-numbers. The new model can be useful and applicable for many practical problems in which satisfaction of fuzzy goals and constraints is more intricate, including those which are mandatory and optional.

Multi-attribute dynamic decision analysis under bimodal information

Rafik Aliev

Joint MBA Program, Georgia State University, USA,
Azerbaijan State Oil and Industry University, Azerbaijan,
Azadlig Ave. 34, AZ1010, Baku, Azerbaijan

Email: raliev@asoa.edu.az

Rafik A. Aliev received the Ph.D. and Doctorate degrees from the Institute of Control Problems, Moscow, Russia, in 1967 and 1975, respectively. His major fields of study are decision theory with imperfect information, fuzzy logic, soft computing and control theory. He is a Professor and the Head of the Department of the joint MBA Program between the Georgia State University (Atlanta, GA, USA) and the Azerbaijan State Oil and Industry University. His current research is focused on generalized theory of stability, recurrent fuzzy neural networks, fuzzy type-2 systems, evolutionary computation, decision theory with imperfect information, calculus with Z numbers, and fuzzy economics. He has over 350 scientific publications including 76 books, 39 editor volumes and over 280 research papers. Dr. Aliev is a regular Chairman of the International Conferences on Applications of Fuzzy Systems and Soft Computing and International Conferences on Soft Computing and Computing with Words. He is an Editor of the Journal of Advanced Computational Intelligence and Intelligent Informatics (Japan), associate editor of the Information Sciences journal, a member of Editorial Boards of International Journal of Information Technology and Decision Making, International Journal of Web-based Communities (The Netherlands), Iranian Journal of Fuzzy Systems (Iran), International Journal of Advances in Fuzzy Mathematics (Italy), and International Journal "Intelligent Automation and Soft Computing." He is series editor of "Advances in Uncertain Computation", "World Scientific". He was awarded USSR State Prize in field of Science (1983), and Lifetime Achievement Award in Science (2014). He was supervisor of more than 150 PhD Students and over 30 Doctorate Dissertations.

Abstract

Dynamic decision making in multiobjective settings is intensively developed field. The pioneering work of Bellman and Zadeh opened a door for fuzzy-logic-based modeling of uncertain decision-relevant information in dynamic problems. However, a gap exists on consideration of information reliability in such problems. Also, fundamental investigations inspired by this work is mainly

developed by in works of professor J. Kacprzyk. The concept of Z-number introduced by Zadeh allows to address the issue of describing reliability and imprecision of information (bimodal information setting) under a lack of statistical data on decision processes. This may allow to reduce computational complexity as compared to existing techniques used for fuzzy-probabilistic settings. In this work, it is proposed to use Z-numbers to describe goals and constraints in multicriteria dynamic decision problem formulation. An application to decision making for one-sector economy with two objectives under partially reliable information is considered.

Some of the Contributions of Fuzzy Logic and Artificial Intelligence to Rhetoric

Rustu Burak Eke

The Language and System Foundation

Istanbul, Turkey

Email: avukateke@gmail.com

Av.Dr. Rüştü Burak Eke graduated from Istanbul University, Faculty of Law in 1982. He received master's degree (Thesis: "Transfer of Technology through Foreign Investments) and PhD degree (Thesis: Patent Right and License Agreement) at the same university where he worked as a research assistant in the Conflict of Laws Department between 1983-1990 and lecturer at the Faculty of Business Administration between 1990-1995. He was on the board of Başak Insurance Company, an affiliate of state-owned bank Ziraat Bankası between 1995-1996 and thereafter he worked as CEO of Ziraat Leasing, also affiliate of Ziraat Bankası from 1995 to 2003. R. Burak Eke is a member of Istanbul Bar since1985. Currently, he is working as advisor and trainer for numerous companies on the subjects of Communication and Organizational Learning along with his professional activities as an attorney at law. He lectures on contemporary rhetoric at MEF University in Istanbul. He is the founder and trustee of Dil ve Sistem Vakfi (The Language and System Foundation)

Abstract

Rhetoric, which examines the role of language in human performance with the use of fuzzy logic and artificial intelligence, aims to enhance the performance of a system by employing language to reinforce mental patterns. It is my view that the integration of these two disciplines will result in significant contributions.

Comparative Evaluation of Shallow and Deep Learning Techniques for Groundwater Level Estimation

Vahid Nourani
University of Tabriz, Tabriz, Iran

Email: nourani@tabrizu.ac.ir

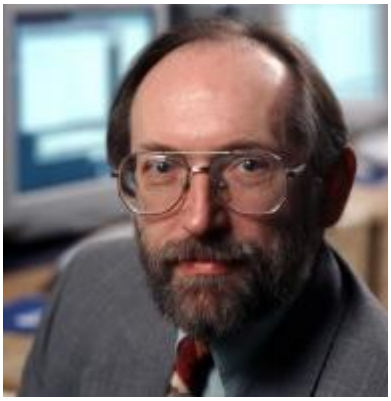
Prof. Vahid Nourani received his B.Sc. and M.S. degrees in Civil Engineering from University of Tabriz, Iran in 1998 and 2000, respectively. He then continued his graduate study in Civil and Environmental Engineering in the field of Hydrology at Shiraz University, Iran and Tohoku University, Japan and was graduated in 2005. Prof. Nourani was with the Faculty of Civil Engineering, University of Tabriz as Assistant Professor from 2005- 2009; as Associate Professor from 2009-2014; as Professor from 2014 and with Department of Civil Engineering, University of Minnesota, USA at 2011 as visiting Associate Professor and as Adjunct Professor with Near East University from 2017. In this period, 89 Ph.D. and M.S. students were graduated under his technical supervision. His research interests include rainfall-runoff modeling, Artificial Intelligence applications to hydro-environmental engineering, Hydroinformatics and computational hydraulics. His researches outcomes have been published as 202 Journal articles, 2 books, 11 book chapters and more than 190 papers presented in international and national conferences. Currently he is Editor-in-Chief for Journal of Civil & Env. Eng. (Tabriz Univ.), Associate Editor for Journal of Hydrology, Guest Editor for Water and Sustainability Journals, Vice Dean of Civil Engineering Faculty at Tabriz University and director of Excellence Center in Hydroinformatics. In 2021, Prof. Nourani was ranked as 11035 among world's top 2% scientists reported by the Stanford University. From April 2022, Prof. Nourani has started his collaboration with CDU, Faculty of Science and Technology, as honorary adjunct professor.

Abstract

In this study, ground water (GW) level of the Urmia Lake aquifer (Miandoab basin) located in northwest of Iran was evaluated via machine learning methods that consisted of shallow learning methods (SLM) including Artificial neural network (ANN), adaptive network-based fuzzy inference system (ANFIS) and deep learning methods (DLM) including the Long Short-Term Memory (LSTM) and Convolutional neural network (CNN). K-means clustering method was applied for clustering the piezometers and finally three clusters were obtained, and modeling process was implemented for their representative piezometers. Data were divided to training and verification subsets that were respectively 75% and 25% of the total data. The inputs of the modeling were GW level with one-month lag and hydroclimatic parameters on monthly scale like precipitation, temperature, and evaporation. ANNs were more robust to noise, and they outperformed ANFIS up to 21% based on Nash Sutcliff efficiency (NSE). Results indicated that however, DLM may outperform the SLM in training phase based on NSE up to 8%, but in verification phase SLMs led to more accurate results up to 28%. DLM can be very complex with many layers and parameters. This complexity can make the model more difficult to train and increase the risk of overfitting.

Models of Large Group Decision Processes in Data - Knowledge Environment

Witold Pedrycz



Department of Electrical & Computer Engineering
University of Alberta, Edmonton AB T6R 2V4 Canada

Email: *wpedrycz@ualberta.ca*

Witold Pedrycz is a Professor and Canada Research Chair (CRC) in Computational Intelligence in the Department of Electrical and Computer Engineering, University of Alberta, Edmonton, Canada. He is also with the Systems Research Institute of the Polish Academy of Sciences, Warsaw, Poland. He also holds an appointment of special professorship in the School of Computer Science, University of Nottingham, UK. In 2009 Dr. Pedrycz was elected a foreign member of the Polish Academy of Sciences. In 2012 he was elected a Fellow of the Royal Society of Canada. Witold Pedrycz has been a member of numerous program committees of IEEE conferences in the area of fuzzy sets and neurocomputing. In 2007 he received a prestigious Norbert Wiener award from the IEEE Systems, Man, and Cybernetics Council. He is a recipient of the IEEE Canada Computer Engineering Medal 2008. In 2009 he has received a Cajastur Prize for Soft Computing from the European Centre for Soft Computing for "pioneering and multifaceted contributions to Granular Computing". In 2013 has was awarded a Killam Prize. In the same year he received a Fuzzy Pioneer Award 2013 from the IEEE Computational Intelligence Society. His main research directions involve Computational Intelligence, fuzzy modeling and Granular Computing, knowledge discovery and data mining, fuzzy control, pattern recognition, knowledge-based neural networks, relational computing, and Software Engineering. He has published numerous papers in this area. He is also an author of 15 research monographs covering various aspects of Computational Intelligence, data mining, and Software Engineering. Dr. Pedrycz is intensively involved in editorial activities. He is an Editor-in-Chief of Information Sciences and Editor-in-Chief of WIREs Data Mining and Knowledge Discovery (Wiley). He currently serves as an Associate Editor of IEEE Transactions on Fuzzy Systems and is a member of a number of editorial boards of other international journals.

Abstract

Recent years saw a rapidly growing interest in large group decision-making models. The key components of decision processes such as alternatives, criteria (and their conflicting character), weights, and ranking mechanisms are studied with intent of delivering sound ranking completed in the presence of information granularity that are inherently encountered in decision scenarios. Along with knowledge elicited from decision makers, data are of paramount interest and relevance to the design methodology and algorithms realizing decision processes. We advocate that in numerous scenarios of large group decision processes both domain knowledge and data have to be involved in the formation of decision models. Each alternative characterized by some criteria is associated with data describing the decision environment. Aiming at meeting the key objective of coping with knowledge and data, we develop clustering algorithms operating in a heterogeneous data-knowledge environment embracing numeric, nominal, and ordinal attributes. It is shown how the mapping of ordinal attributes is optimized and how the underlying minimized objective function becomes minimized with the aid of gradient-based and population-based optimization methods. A detailed interpretation of produced clusters is provided, and a way of decision-making realized in incomplete information is delivered. The augmented clustering method is also proposed to address a challenging issue of consensus reaching. Subsequently, a series of detailed studies is covered.

Applications of Linguistic Z-Numbers in Decision Making, Social Networks, and Artificial Intelligence

Tofigh Allahviranloo

Istinye University, Istanbul, Turkey

Email: tofigh.allahviranloo@istinye.edu.tr

Tofigh Allahviranloo is a full professor of applied mathematics at Istinye University, Turkey. He previously worked at several universities like the IAU Science and Research branch in Iran, the University of Prince Edward Island in Canada, Izmir University, and Bahcesehir University in Turkey. As a trained mathematician and computer scientist, Prof. Allahviranloo has developed a passion for multi- and interdisciplinary research. He is not only deeply involved in fundamental research in fuzzy applied mathematics, especially fuzzy differential equations, but he also aims at innovative applications in the applied biological sciences. Tofigh is currently working on a new mathematical space with complicated uncertainties, and he tries to define a new concept of uncertainty.
Professor Allahviranloo is the author of more than 12 international books, 10 books in the Farsi language, and about 350 papers published by Elsevier, Springer, and Wiley. He also is the editor-in-chief of the book series entitled 'Uncertainty, Computational Techniques and Decision Intelligence' which is currently publishing by ELSEVIER. He actively serves the research community as the associate editor or editorial board member of several other reputed journals, including 'Information Sciences (ELSEVIER)', 'Fuzzy Sets and Systems (ELSEVIER)', 'Journal of Intelligent and Fuzzy Systems (IOS Press)', 'Iranian Journal of Fuzzy Systems', 'Mathematical Sciences (Springer)' and 'Journal of Computational Methods for Differential Equations (University of Tabriz)'. He currently is the Editor-in-Chief of the 'International Journal of Industrial Mathematics' and, the chairman of the 'International Conference on Decision Sciences (IDS)' and serves as managing editor of 'Journal of Mathematics and Computer Science' which is currently published by the International Scientific Research Publications. Besides Tofigh is a member of the Program Committee of FUZZ-IEEE, NAFIPS annual meetings, and IFSA conferences in North America.

Abstract

This abstract explores the transformative role of linguistic Z-numbers in decision-making, social networks, and artificial intelligence (AI). As an extension of Zadeh's Z-numbers, linguistic Z-numbers offer a mathematical framework to address information uncertainty, imprecision, and subjectivity, enhancing decision-making processes. In real-world applications, such as medical science, uncertainty associated with relative information is inevitable. For datasets where primary data is related to secondary data, decision-making based on linguistic Z-numbers proves to be an effective tool. Furthermore, we examine its potential in social networks for a comprehensive analysis of user behavior, sentiment (node character), and interactions (edge character), leading to improved understanding and prediction of network dynamics. This presentation highlights the pivotal role of linguistic Z-numbers in these domains, emphasizing their potential to revolutionize our ability to navigate and comprehend an increasingly complex and uncertain world. The insights gained could lead to the development of models for more human-centric decision-making, more insightful social network analysis, and more reliable and interpretable AI systems.

Sessions

Time	Monday, August 26, 2024
08:00 – 08:40	**Breakfast**
08:40 – 09:20	**Registration**
09:20 – 09:50	**Opening Ceremony**
09:50 – 10:30	***Keynote Speech*** **Chair: R. A. Aliev, Azerbaijan** **J. Kacprzyk:** A bipolar extension of the classic Bellman and Zadeh's model of decision making in a fuzzy environment
10:30 – 11:00	***Keynote Speech*** **Chair: J. Kacprzyk, Poland** **R. A. Aliev:** Multi-attribute dynamic decision analysis under bimodal information
11:00 – 11:20	**Tea/Coffee**
11:20 – 12:40	***Session A*** **Theory and Application of Soft Computing** **Chairman: R. R. Aliyev**
Lean Management - A Prerequisite for Digitization in the Automotive Industry **C. Veres, L. M. Păunescu, M. Anitei**	
Z-number-based Time Series Forecasting **L. A. Gardashova**	
Big Data Analytics in Healthcare: Challenges and Advancements **N. Sancar, A. F. Terry, Ch. O. Ihedirionye, K. A. Stanley, F. Milrich, N. Cavus**	
A Comprehensive and Practical Approach to Z-Decision Making for State Selection **O. H. Mirzayev, N. E. Adilova**	
Potential of Data Mining Models in Forecasting the Future Changes in Temperature: A Statistical Downscaling Approach **J. Abdullahi, F. Aslanova, G. Elkiran**	
12:40 – 14:00	***Session B*** **Decision theory with imperfect information** **Chairman: L. A. Gardashova**
Z-number-based clustering of medical dataset **Sh. A. Ahmadov**	
Comparison of Three Machine Learning Models for the Detection of Emails Spam **Sh. A. Khattab, R. N. Alkaied, M. Kh. Ma'aitah, A. Radwan**	
Implementation of fuzzy TOPSIS method for decision making in car selection **A. R. Aliyeva, H. Temizkan**	

Clustering in metamorphic rocks under Z-information **J. M. Babanli**	
Dynamic System Control Using Type-3 Fuzzy Logic System **S. Abizada, R. Abiyev**	
14:00 – 15:00	**Lunch**
15:00 – 15:30	***Keynote Speech*** **Chair: F. S. Sadikoglu, North Cyprus** **R. B. Eke:** Some of the Contributions of Fuzzy Logic and Artificial Intelligence to Rhetoric
15:30 – 16:00	***Keynote Speech*** **Chair: Ziya Selcuk, Turkey** **V. Nourani:** Comparative Evaluation of Shallow and Deep Learning Techniques for Groundwater Level Estimation
16:00 – 16:20	**Tea/Coffee**
16:20 – 18:00	***Session C*** **Theory and Application of Soft Computing** **Chairman: Liviu – George Maha**
EchoGuard: Identifying Plagiarism in Music Composition **M.-V. Cozmaciuc, A. Iftene**	
The use of Sentiment Analysis in Evaluating Movie Reviews **J. I. Ahmadova, Sh. A. Ahmadov**	
Granules - Fuzzy Remakes by Kamal Abdulla **L. Bejenaru**	
Investigation of reliability in personal relationships under fuzzy environment **K. Rizvanova**	
Fuzzy approach to controlling complex technological systems **E. A. Melikov, T. M. Magerramova, A. A. Safarova**	
09:00-18:00	***Flexible Session***
18:00	**Welcome reception**

Tuesday, August 27, 2024	
08:00 – 09:00	**Breakfast**
09:00 – 09:30	**Opening Ceremony**
09:30 – 10:10	***Keynote Speech*** **Chair: R. B. Eke, Turkey** **W. Pedrycz:** Models of Large Group Decision Processes in Data - Knowledge Environment
10:10-10:50	***Keynote Speech*** **Chair: W. Pedrycz, Canada** **T. Allahviranloo:** Applications of Linguistic Z-Numbers in Decision Making, Social Networks, and Artificial Intelligence
10:50 – 11:10	**Tea/Coffee**
11:10 - 13:00	***Session D*** **Artificial intelligence tools** **Chairman: Adrian Iftene**
Contractor selection problem with dependent criteria under bimodal information **A. V. Alizadeh, R. R. Aliyev**	
Advanced Face Recognition Techniques using Deep Learning Models **Z. Alwaeli, R. H. Abiyev**	
Z-Decision Making Approach to Health Assessment **N. E. Adilova**	
Multi-class Weather Conditions Classification using Transfer Learning **F. Sadıkoglu, S. U. Kocyigit, B. Sekeroglu**	
Z-number-based classification for dental disease **Sh. A. Ahmadov, J. I. Ahmadova**	
13:00 – 14:00	**Lunch**
14:00 - 15:30	***Session E*** **Theory and Application of Soft Computing** **Chairman: N. E. Adilova**
Application of Z-number-based multi-attribute decision-making to select and rank the post-mining land-use **L. A. Gardashova**	
A Clustering Algorithm based on Tessellation (CAT) for Wireless Sensor Networks **A. Radwan, M. Ma'aitah, A.Radwan, A. Helwan**	
Diagnostic programs analysis of "big data" for predicting changes in the state of objects **A. Jabiyeva**	
Iot Device Classification using Machine Learning and SMOTE **A. Alwhelat, R. H. Abiyev, L. Ibrahim**	
Fuzzy dynamic pattern recognition model for the assessment of Economic Uncertainty Index for Azerbaijan **G. Imanov, A. Aliyev, T. Suleymanli**	

15:30 – 16:00	**Round Table**
	Closing Ceremony
09:00 – 18:00	**Flexible Session**

Prediction of solar radiation potential in Libya using artificial neural networks **M. Kh. S. Ma'aitah, A. Helwan, A. Radwan, O. Al-Oran, A. M. S. Manasreh**
The Use of "Bıg Data" Technology in Thermal Power Plants **A. B. Sultanova**
Development of the Architecture of an Intelligent Decision-Making System for Managing Commercial Enterprises **T. Abdullayev, R. Alekperov, R. Imamguluyev, V. Salahli**
Examining the Foreign Language Speaking Anxiety of University Students in the Classroom Environment with Different Variables **M. Tezer, S. Sadikoglu, Sh. Akdag, R. K. Akdag**
Fuzzy epistemics in language **F. Huseynova**
Fuzzy logic in linguistics **K. Abdulla, R.A.Aliev**
Simplified and efficient method of digital image cryptography **A. Manasreh, Z. A Alqadi, M. Kh. S. Ma'aitah, A. Helwan, A. Radwan, M. A. Abudalou**
Simple arithmetic operations of Z-numbers based on kernel distribution function **A. V. Alizadeh, R. R. Aliyev, Rashad R. Aliyev**
Automatic Detection of Cancerous Lung Nodules Using Wavelet Transform **A. AbuBaker, A.Turani**
Predicting reservoir pressure from available field information based on the use of artificial intelligence methods **V. Mammadov, H. Hajiyev, N. Ismayilov**
An application of Z-numbers to a group decision making problem **K. I. Jabbarova**
Trust Dynamics Among Universities in Azerbaijan: A Comprehensive Analysis Using Quantitative and Qualitative Methods with Fuzzy Logic Applications **E. Bayramov, G. Bayramova, R. Imamguluyev**
Decision Making for Malaria Diagnosis using Expert System **G. Imanova, S. U. Adamu**
Investigation of the closing time of the executive element of shut-off valves in hydraulic and pneumatic systems **E. F. Akhundov, V. M. Fataliyev, A. M. Aliyev, F. F. Hasanov, I. A. Ismayil**
Effect of Change in Customer Expectatıons on Real Estate Industry During Covıd-19 Pandemic **G. Sadikoglu, B. C. Olaiya, S. Akyurek**
Fuzzy Knowledgeable System for Early Prostate Cancer Diagnosis **E. Imanov, A. M. Hadi**
Automatıc control system for direct current electric drive based on fuzzy logic **Z. Farkhadov, Sh. Rahimov, G. Mammadova**

Open-source software adoption in public sector **J. Salmanov**
Study of Drilling Mud Losses based on Fuzzy-Probabilistic Analysis of Information **G. M. Efendiyev, M. K. Karazhanova, I. A. Piriverdiyev, A. G. Kasanova, M. B. Asgarov**
Application of dynamic group decision making under Z-information using SAW method for capital investment **K. R. Aliyeva**
The Relationship between Perceived Service Quality, Customer Satisfaction and Customer Loyalty: The Case of Banking Sector **V. Ulusoy, S. Akyurek, G. Sadikoglu, N. M. Bahchelerli**
Evaluation of job satisfaction by using similarity-based reasoning with Z-valued rules **K.I.Jabbarova, A.R. Aliyev**
An Evaluation of the Influence of Amendments to Azerbaijan's Tax Legislation on Voluntary Compliance **Sh. G. Madatova, N. M. Vahabzada**
Z-number valued inference system **R. A. Aliev, A. V. Alizadeh, R. R. Aliyev**
Prediction of the Output Power of Two-Axis Tracking Grid-Connected Photovoltaic System located in 25 selected Coastal Mediterranean Cities **Y. Kassem, H. Gokcekus, Y.A.Osman**
Human Action Recognition Based on YOLOv7 **A. B. Sultanova**
Mathematical Modeling of Bending Vibrations of a Vertical Rod of Variable Section **B. H. Aliyev, A. H. Quliyev, A. M. Aliyev, F. F. Hasanov, I. A. Ismayil**
Regular Synthesis of Adaptive Control Systems for Uncertain Dynamic Objects **H. Z. Igamberdiev, A.N. Yusupbekov, U.F. Mamirov, Sh.D. Tulyaganov**
An application of lexicon-based sentiment analysis and Z-numbers to multicriteria hotel evaluation **O. Huseynov, A. Nuriyev, T. Masmaliyev**
Issues of Metrological Assurance of Coordinate Measuring Machine **Sh. Akhmedova-Davudova, E. Isgenderzade, I. Mammadova, U. Islamova**
Optimization of machines by the dynamic coefficient of electromechanical transmission **B. H. Aliyev, A. H. Guliyev**
Ab Initio Calculation of Electronic Band Structure of PbMnSe **M. M. Mehrabova, A. B. Zeynalova, S. S. Babayeva, S. I. Hasanova, G. R. Aliyeva, L.R. Rashidova**
Use of fuzzy logic and Ahangyol theories in determining the power and latent capabilities of a system **A. Gashamoglu**
Thermodynamical analysis of the reciprocating machines using computer software **V. Bakhshali, E. Aslanov, F. Hasanov, I. Ismayil**
Thermodynamic Calculation and 3D Modeling of Immiscibility Boundaries for Liquid Alloys of Copper, Lead and Sulfur **A. N. Mammadov, F.S. Ibragimova, D.B. Tagiev, M. B. Babanly**
Development of models and methods using fuzzy logic tools for diagnosing electrical equipment **S. I. Yusifov, R. A. Mayilov, I. Y. Bayramov, R. S. Safarov**

AI-Based Green Computing using Dimensional Reduction approach **G. Imanova, L. I. Aiyeyika**
Calculation of executive sizes of threaded signs and rings for the manufacturing plastic parts of oilfield equipment **A.A. Quliyev, N. A. Gasanova, A.V. Sharifova, R. S. Shahmarova**
Intelligent Mobile Robot Using hybrid Neuro-fuzzy Controller **A. AbuBaker, A.Turani**
Method for Multi-wave Photometric Determination of Fractal Dimension of Clouds **N. Javadov, A. Azizova, E. Isgenderzade**
Predicting of Logarithmic Scale of Dynamic Modulus Using Various Empirical Models **Y. Kassem, H. Gokcekus, A. S. Abdullahi**
Hedges in natural languages **F. Huseynova**
VBS_VPK_VR method for DCI cryptography **A. Manasreh, Z.A. Alqadi, M. Kh. S.Ma'aitah, A. Helwan, A. Radwan, M. A. Abudalou**
Dynamic fuzzy multi-attribute decision making by using Z-numbers for IT supplier selection in service systems **K. R. Aliyeva**
Integration of ML-based sentiment analysis and Z-number-based decision-making for hotel selection **A. Nuriyev, O. Huseynov, O. Mammadli**
The issue of designing flexible production process and its control system as applied to the machine-building technology park **R. Azizov, Y. Huseynov, G. Orujova, B. Amiraslanov**
The impact of climate changes on the temperature regime of the south and southeast parts of the Lesser Caucasus province **L. A. Gardashova, A. B. Sultanova, C. S. Huseynov, A. Sh.Tagiyev**
Decision making on motorcycle buying problem with dependent attributes **A. V. Alizadeh, R. R. Aliyev**
Development and implementation Digital Twins of Electrolyzers in Hydrogen Production industry **N. Yusupbekov, F. Adilov, I. Arsen**
Adaptive control of gas control systems based on dynamic neural networks **I. Habibov, S. Abasova, E. Sultanov**
The use of fuzzy logic methods and Naive Bayes Classification in examining the factors affecting the birth rate **V. Salahli, T. Gasimzade, F. Alasgarova, A. Guliyev**
ID3 Algorithm Based on Z-information **L. M.Zeinalova, E. Muravyova, I. Seyidova**
Sensitivity analysis of the model for selection of new digital marketing technologies **G. E. Imanova, G. Imanova**

General Information

1. Location

Hotel Slovenska
Hotel Slovenska Plaža, Trg Slobode 1, 85310 Budva, Montenegro

Phone: +382 33 402 456
Web: *https://www.hgbudvanskarivijera.com/me/slovenska-plaza-resort*

2. Conference Secretariat

N. E. Adilova

Azadlig Ave. 34, AZ 1010, Baku, Azerbaijan
Tel: +99 412 598 45 09; +99 412 493 45 38
Fax: +99 412 598 45 09
E-mail: *nigar.adilova@asoiu.edu.az*

During the conference
During the conference the secretariat will be located in the reception area of the conference room. The secretariat will be opened for registration and distribution of the conference material during the conference times.

3. Conference Fee

€300
Registration fee entitles you to:
- access to the conference sessions;
- get a copy of the final program and the proceedings;
- get a list of conference participants;
- have coffee during breaks.

4. Conference Language

The conference language is English. There is no simultaneous translation available.

5. How to get to Hotel Slovenska

The Hotel Slovenska can be reached by bus or taxi from Tivat Airport.

ICSCCW 2024

https://icsccw2024.com/