9th International Conference on Theory and Application of Soft Computing, Computing with Words and Perception (ICSCCW 2017)

Procedia Computer Science Volume 120

Budapest, Hungary
22 – 23 August 2017

Editors:

R.A. Aliev
M. Jamshidi
W. Pedrycz
J. Kacprzyk

ISBN: 978-1-5108-5591-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571

Some format issues inherent in the e-media version may also appear in this print version.

Copyright© by Elsevier B.V.
All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact Elsevier B.V.
at the address below.

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

http://www.elsevierpublishingsolutions.com/contact.asp

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 120 (2017) iii–x

Procedia Computer Science

www.elsevier.com/locate/procedia

Table of Contents

Preface
Rafik Aliev..... 1

Selected insights into building data associations and their granular augmentations
Witold Pedrycz..... 4

Informativeness of operations on Z-numbers
R.A. Aliev..... 5

A system of systems framework for autonomy with big data analytic and machine learning
Mo M. Jamshidi..... 6

On the road toward innovative solutions: Supporting agents via some fuzzy group decision models
Janusz Kacprzyk..... 7

Operations on Z-numbers with acceptable degree of specificity
R.A. Aliev..... 9

A sum of a large number of Z-numbers
R.A. Aliev, O.H. Huseynov, and R.R. Aliyev..... 16

A data mining approach for modeling churn behavior via RFM model in specialized clinics Case study: A public sector hospital in Tehran
Mehdi Mohammadzadeh, Zeinab Zare Hoseini, and Hamid Derafshi..... 23

A systematic mapping study on soft computing techniques to cloud environment
Obinna H. Ejimogu, and Seren Başaran..... 31

The application of bioinspired methods for solving vehicle routing problems
Leonid A. Gladkov, Sergey N. Scheglov, and Nadezhda V. Gladkova..... 39

Interval linear programming based decision making on market allocations
Rafig R. Aliyev..... 47

Fuzzy Cognitive Control System of Autonomous Vehicle: Brain Neurointerface and Soft Computing Modes
Sergey V. Ulyanov, Andrey G. Reshetnikov, and Alla A. Mamaeva..... 53

Selection of the best combination of bit types and technological parameters during drilling, taking into account uncertainty
Galib M. Efendiyev, Parviz Z. Mammadov, Igor A. Piriverdiyev, and Mansuk D. Sarbopeyeva..... 67

River water modelling prediction using multi-linear regression, artificial neural network, and adaptive neuro-fuzzy inference system techniques
S.I. Abba, Sinan Jasim Hadi, and Jazuli Abdullahi..... 75

Using simplified swarm optimization on path planning for intelligent mobile robot
Yoney Kirsal Ever..... 83

Integrating FAHP and TOPSIS to evaluate mobile learning applications for mathematics
Seren Başaran, and Yunusa Haruna..... 91

Use of DVB-T and DVB-S2 in telecardiology
Waleed Alsaadi, and Ali Serener..... 99

Synthesis of new materials by using fuzzy and big data concepts
M.B. Babanli..... 104

Fuzzy modeling for route characteristic
Asli Cekmis..... 112

Fuzzy methods and algorithms in data mining and formation of digital plan-schemes in earth remote sensing
Akperov Imran, Khramov Vladimir, Lukasevich Viktor, and Mityasova Olga..... 120

Breast cancer image classification using artificial neural networks
Sertan Kaymak, Abdulkader Helwan, and Dilber Uzun..... 126

Using statistical reasoning techniques to describe the relationship between Facebook advertising effectiveness and benefits gained
Ahmet Ertugan..... 132

Lung tumor segmentation algorithm
Selin Uzelaltinbulat, and Buse Ugur..... 140

Lane detection by estimating and using restricted search space in Hough domain
Umar Ozgunalp, and Sertan Kaymak..... 148

Effluent prediction of chemical oxygen demand from the astewater treatment plant using artificial neural network application
Sani Isa Abba, and Gozen Elkiran..... 156

Psychological distress, self esteem and emotional dependency of married individuals as predictors of marital adjustment
Fatma Gul Cirhinlioglu, Yeliz Kindap Tepe, and Zafer Cirhinlioglu..... 164

Determining the effect of using social media as a MOOC tool
Huseyin Bicen..... 172

The purpose of students' social media use and determining their perspectives on education
Erkan Bal, and Huseyin Bicen..... 177

Statistical reasoning the link between energy demand, CO2 emissions and growth: Evidence from China
Ergin Akalpler, and Musa Esuwa Shingil..... 182

Analysis of motivational strategies used by English language teachers teaching at secondary schools
Esen Sucuoglu..... 189

Statistical reasoning for developing an attitude scale for health tourism stakeholders in North Cyprus context
Ahmet Savaşan, Mesut Yalvaç, and Ediz Tuncel..... 196

Perception of tourism students toward training program
Saide Sadikoglu, and Serdar Oktay..... 204

Integrated assessment and ranking of universities by fuzzy inference
Misir Mardanov, Ramin Rzayev, Zenal Jamalov, and Alla Khudatova..... 213

Predicting efficiency of flat-plate solar collector using a fuzzy inference system
Lida Ebrahimi Vafaei, and Melike Sah..... 221

Modelling the impact of energy consumption and environmental sanity in Turkey: A STIRPAT framework
Saifullahi Sani Ibrahim, Aysem Celebi, Huseyin Ozdeser, and Nuriye Sancar……. 229

Monthly streamflow estimation using wavelet-artificial neural network model: A case study on Çamlıdere dam basin, Turkey
Gökçen Uysal, and Ali Ünal Şorman……. 237

Fuzzy logic model for prediction of cold filter plugging point of biodiesel from various feedstock
Filiz Al-Shanableh, Evcil Ali, and Mahmut Ahsen Savaş……. 245

Simulation-based identification of optimal combination of drug candidates for spinal muscular atrophy
Recep Duranay, Rza Bashirov, and Adil Şeytanoğlu……. 253

IBFDS: Intelligent bone fracture detection system
Kamil Dimililer……. 260

Cardiac arrhythmia detection using deep learning
Ali Isin, and Selen Ozdalili…….. 268

Prediction of the future impact of climate change on reference evapotranspiration in Cyprus using artificial neural network
Jazuli Abdullahi, and Gozen Elkiran……. 276

The expert system virtual ophthalmologist
Aynur Jabiyeva……. 284

Software for Z-arithmetic
R.A. Aliev, and V.H. Salimov…….. 290

Estimation the confidentiality degree of classified information on the base of expert information processing
Ramin Rzayev, Afet Suleymanova, and Sevinj Babayeva……. 296

Flight information system by using fuzzy expert inference
Elbrus Imanov, Orhan Ozkilic, and Gunay Imanova…….. 304

Prediction of biodiesel density for extended ranges of temperature and pressure using adaptive neuro-fuzzy inference system (ANFIS) and radial basis function (RBF)
Youssef Kassem, and Hüseyin Çamur……. 311

Genetic algorithms for music variation on genom platform
Vsevolod Arutyunov, and Alexey Averkin……. 317

Integration of fuzzy logic and computer vision in intelligent quality control of celiac-friendly products
Fatemeh Rezagholi, and Mohammad Ali Hesarinejad…….. 325

Estimation of impact of the changes made to the tax legislation to the tax receipts through fuzzy numbers
Akif Musayev, Selin Uzelaltinbulat, Samira Mammadova, Latafat Gardashova, and Aygun Musayeva…… 333

Analysis of socioeconomic development by intuitionistic linguistic fuzzy numbers
Gorkmaz Imanov, Emin Garibli, and Rovshan Akbarov……. 341

An introduction to the arithmetic of Z-numbers by using horizontal membership functions
R.A. Aliev, A.V. Alizadeh, and O.H. Huseynov…….. 349

Child perception-based plant species identification
Ehsan Kiani, Mohamad Al Shahadat, and Fahreddin Sadikoglu……. 357

Application of markov chains-fuzzy states to gold price
Berna Uzun, and Ersin Kıral…….. 365

The assessment of regional economic potential based on the methodology of fuzzy set theory
Akperov Imran, and Kurianov Nikolai……. 372

Application of back propagation neural networks on maize plant detection
Kamil Dimililer, and Ehsan Kiani……. 376

Short term load forecasting using particle swarm optimization neural network
Ozgur Cemal Ozerdem, Ebenezer O. Olaniyi, and Oyebade K. Oyedotun…….. 382

Prediction of Body Mass Index: A comparative study of multiple linear regression, ANN and ANFIS models
Sahar S. Tabrizi, and Nuriye Sancar……. 394

Machine learning techniques for classification of breast tissue
Abdulkader Helwan, John Bush Idoko, and Rahib H. Abiyev……. 402

Soft computing models in an intellectual open-pit mines transport control system
Temkin Igor, Deryabin Sergey, and Konov Ilya…….. 411

Lie detection on pupil size by back propagation neural network
Fatih Veysel Nurçin, Elbrus Imanov, Ali Işın, and Dilber Uzun Ozsahin…….. 417

Electromyogram (EMG) signal detection, classification of EMG signals and diagnosis of neuropathy muscle disease
Fahreddin Sadikoglu, Cemal Kavalcioglu, and Berk Dagman……. 422

Fuzzy cognitive model development for monitoring of results and reporting within the UN FAO food security program
Elkhan Aliyev, Inara Rzayeva, and Nijat Askerov…….. 430

Prediction of network traffic based on neural-fuzzy analysis of changes in the volume of IP-packets
Vasif Hasanov, Hafiz Bayramov, and Tahir Mehdiyev……. 438

Positional-binary recognition of cyclic signals by fuzzy analyses of their informative attributes
Oktay Nusratov, Asker Almasov, and Aytakin Mammadova……. 446

One approach to optimizing the measures of effectiveness of the university organization
Oktay Nusratov, Zeynal Jamalov, and Hajar Shikhaliyeva……. 454

Application of soft computing to research of transient processes in the gas pipelines
Ramiz Ismailov……. 461

Comparison of measures of specificity of Z-numbers
Ahmed A. Valiev, Tarlan S. Abdullayev, Akif V. Alizadeh, and Nigar E. Adilova……. 466

Application of Z-number concept to supplier selection problem
Aynur I. Jabbarova……. 473

Decision making during treatment of bottomhole zone by polymeric systems on the basis of indefinite cluster analysis
T.Sh. Salavatov, A.S. Strekov, M.K. Karazhanova, and B.N. Koilybayev…….. 478

Statistical reasoning of methodological intervention to a language teaching program
Ediz Tuncel, and Saide Sadikoglu……. 481

Optimization of the structure of the control system using the fuzzy controller
E.A. Muraveva, E.A. Shulaeva, P.N. Charikov, R.R. Kadyrov, M.I. Sharipov, A.V. Bondarev, and A.F. Shishkina……. 487

Fuzzy logic modelling of the impact of using technology on anxiety and aggression levels of students
Konul Memmedova…….. 495

One mobile application for the development of programming skills of secondary school students
M.A. Salahli, E. Yildirim, T. Gasimzadeh, F. Alasgarova, and A. Guliyev..... 502

Demand forecasting for manufacturing under Z-Information
Kamala Aliyeva..... 509

Multi-criteria house buying decision making based on type-2 fuzzy sets
Kamala Aliyeva..... 515

Adaptive neuro-fuzzy inference system (ANFIS) and response surface methodology (RSM) prediction of biodiesel dynamic viscosity at 313 K
Youssef Kassem, Hüseyin Çamur, and Engin Esenel..... 521

Determining student satisfaction in distance education courses
Semih Caliskan, Sibel Suzek, and Deniz Ozcan..... 529

Selection of an optimal treatment method for acute pulpitis disease
Bahadur F. Aliev, and Latafat A. Gardashova..... 539

Thermodynamic and acoustic properties of binary liquid mixture under uncertainty
V. Hasanov, G. Aliyeva, A. Zeynalova, and A. Muslumov..... 547

Synthesis of intelligent control system with coordinate and parametric feedback
S.M. Jafarov, and A.S. Aliyeva..... 554

Identification of dynamic objects under uncertainty and non-stationarity using etalon transformers
S.M. Jafarov, and A.M. Mustafayeva..... 561

A fuzzy mathematic model of progress in management of social systems through ahangyol methods
Ahmad Gashamoglu..... 568

RDM interval arithmetic based decision making on port selection
Pınar Sharghi, Konul Jabbarova, and Kamala Aliyeva..... 572

Brain tumor segmentation based on a new threshold approach
Umit Ilhan, and Ahmet Ilhan..... 580

Diagnosis of heart disease using genetic algorithm based trained recurrent fuzzy neural networks
Kaan Uyar, and Ahmet İlhan..... 588

New design method for derivation of the amplitude distributions of an uniformly spaced n-element linear antenna array
Refet Ramiz..... 594

Financial time series prediction using artificial neural network based on Levenberg-Marquardt algorithm
Sadig Mammadli..... 602

Fuzzy control of omnidirectional robot
Rahib H. Abiyev, Irfan S. Günsel, Nurullah Akkaya, Ersin Aytac, Ahmet Çağman, and Sanan Abizada..... 608

Multi-station streamflow forecasting using wavelet denoising and artificial intelligence models
Vahid Nourani, Gholamreza Andalib, and Fahreddin Sadikoglu..... 617

Honeywell solutions for bumpless upgrade of tps system and experion pks integration in zakum complex central control room, Abu Dhabi, UAE
Yusupbekov Nodirbek Rustambekovich, Adilov Farukh Tulkunovich, Astafurov Maksim Fedorovich, and Ivanyan Arsen Ighatevich..... 625

Exchange market algorithm for multi-objective economic emission dispatch and reliability
Naser Ghorbani, Ebrahim Babaei, and Fahreddin Sadikoglu..... 633

Challenging the ways to determine the faults in software: Technique based on associative interconnections
Yusupbekov Nodirbek Rustambekovich, Sh. M. Gulyamov, N.B. Usmanova, and D.A. Mirzaev..... 641

Determination of how much the preservice teachers use and adopt the online social networks for educational purpose
Huseyin Uzunboylu, Zeynep Genç, and Vasfi Tugun..... 649

BEMA: Binary Exchange Market Algorithm
Naser Ghorbani, Ebrahim Babaei, and Fahreddin Sadikoglu..... 656

Applying fuzzy logic for sentiment analysis of social media network data in marketing
Karen Howells, and Ahmet Ertugan..... 664

The relationship between energy consumption and economic growth: Evidence from non-Granger causality test
Faisal Faisal, Turgut Tursoy, and Ozlem Ercantan..... 671

A novel precoding technique for non-orthogonal multiple access
Huseyin Haci..... 676

Fuzzy-based controller for DVR in the presence of DG
Mehrdad Tarafdar Hagh, Ayda Shaker, Farnaz Sohrabi, and Irfan S. Gunsel..... 684

Job satisfaction: An evaluation using a fuzzy approach
Serife Z. Eyupoglu, Konul Jabbarova, and Tulen Saner..... 691

Evaluating nuclear medicine imaging devices using fuzzy PROMETHEE method
Dilber Uzun Ozsahin, Berna Uzun, Musa Sani Musa, Niyazi Şentürk, Fatih Veysel Nurçin, and Ilker Ozsahin..... 699

Influence of energy use, foreign direct investment and population growth on unemployment for Russian Federation
Malika Sadikova, Faisal Faisal, and Nil Gunsel Resatoglu..... 706

Intelligent classification system for concrete compressive strength
Pinar Akpinar, and Adnan Khashman..... 712

Direction prediction assisted handover using the multilayer perception neural network to reduce the handover time delays in LTE networks
Jamal Fathi Abuhasnah, and Firudin Kh. Muradov..... 719

Fuzzy if-then rules based modelling of synergy effects in oil production
Jahid Karimov, and Rauf Malikov..... 728

Modeling people's anticipation for Cyprus peace mediation outcome using a neural model
Zeliha Khashman, and Adnan Khashman..... 734

Fuzzy DEMATEL method for identifying LMS evaluation criteria
Muhammad Nazir Muhammad, and Nadire Cavus..... 742

A conventional dynamic voltage restorer with fault current limiting capability
Hesam Nourmohamadi, Senol I. Bektas, Seyed Hossein Hosseini, Ebrahim Babaei, and Mehran Sabahi..... 750

Identification of usual numbers
Zeinalova M. Lala..... 758

Dynamic reverse droop power sharing in microgrid based on neural networks
Mehrdad Tarafdar Hagh, Sam Roozbehani, and Saeed Ghasemzadeh..... 766

Modular multilevel converter circulating current control using model predictive control combined with genetic algorithm
Ardavan Mohammad Hassani, Senol I. Bektas, and Seyed Hossein Hosseini..... 780

Application of RDM interval arithmetic in decision making problem under uncertainty
Zeinalova M. Lala..... 788

The impact of environmental, social and governance dimensions of corporate social responsibility: Australian evidence
Ismail Sila, and Kemal Cek..... 797

Modeling of the travelers' shopping motivation and their buying behavior using fuzzy logic
Gunay Sadikoglu..... 805

Teaching signals and systems at undergraduate level
Fahreddin Sadikoglu, and Dogan Ibrahim..... 812

Application of fuzzy set theory in agro-meteorological models for yield estimation based on statistics
Sakharova Luydmila, Strukov Mikhail, Akperov Imran, Alekseychik Tamara, and Chuvenkov Anatoliy 820

The choice of transport for freight and passenger traffic in the region, using econometric and fuzzy modeling
Alekseychik Tamara, Bogachev Taras, Bogachev Viktor, and Bruhanova Natalia..... 830

The principles of formation of united geo-informational space based on fuzzy triangulation
Kramarov Sergey, Temkin Igor, and Khramov Vladimir..... 835

The realization of elastic fuzzy operators based on optic-electronic technology
Vovchenko Natalia, Kramarov Sergey, Sokolova Olga, and Bocharov Anatoliy..... 844

Time series analysis based on the biologically inspired modular approach
Sergey Yarushev, and Alexey Averkin..... 848

Algorithms of adaptive identification of uncertain operated objects in dynamical models
Husan Z. Igamberdiyev, Azizbek N. Yusupbekov, Orıpcan O. Zaripov, and Jasur U. Sevinov..... 854

An analytical study to identify and determine the usage frequency of sales and marketing strategies for 5 star hotels in the Antalya region
Serdar Oktay..... 862

Examining studies on learning management systems in SSCI database: A content analysis study
Fatih Soykan, and Burak Şimşek..... 871

Detecting static and dynamic novelties using dynamic neural network
Emre Özbilge..... 877

Postgraduate thesis assessment in educational management supervision and planning
Gülsün Başarı, Ali Aktepebaşı, Emete Yagci, and Sahin Akdag..... 887

Identification of plant disease infection using soft-computing: Application to modern botany
Ehsan Kiani, and Tofik Mamedov..... 893

Analysis of chaos and nonlinearities in a foreign exchange market
Sadig Mammadli..... 901

Development of fuzzy logics: from universal logic tools to natural pragmatics and non-standard scales
Valery B. Tarassov..... 908

Decision support systems for teambuilding
Natalia Yanova..... 916

Fuzzy equations and Z-numbers for nonlinear systems control
Sina Razvarz, and Mohammad Tahmasbi..... 923

Healthcare professionals' exposure to mobbing behaviors and relation of mobbing with job satisfaction and organizational commitment
Vesile Erdogan, and Aytolan Yildirim..... 931

Chain model of knowledge base of telecommunication systems dielectric structures
Volodymyr Shulha, Valerii Kozlovskyi, Tetiana Prykhodko, Roman Korzh, and Denys Nevinskyi..... 939

Decision-making in the fuzzy environment on the basis of various compromise schemes
Batyr Orazbayev, Erbol Ospanov, Nurgul Kissikova, Nurlan Mukataev, and Kulman Orazbayeva..... 945

Linear adjustment of a search space in genetic algorithm
Adil Amirjanov, and Fahreddin Sadikoglu..... 953

Identification of potential therapeutic role of thymus capitatus essential oil using cellular imaging
Dudu Özkum Yavuz, Merdiye Mavis, Gülperi Ateş, Azmi Hanoğlu, Duygu Yiğit Hanoğlu, K. Hüsnü Can Başer, and Nedime Serakıncı..... 961

The accessibility of Cyprus Islands' Higher Education Institution Websites
Erkut İ. İşeri, Kaan Uyar, and Ümit İlhan..... 967