2019 IEEE INTERNATIONAL CONFERENCE ON FUZZY SYSTEMS (FUZZ-IEEE)

NEW ORLEANS (USA)

JUNE 23-26
Registration Times

Sunday, June the 23rd
7am to 5pm

Monday, June the 24th
8am to 5pm

Tuesday, June the 25th
8am to 5pm

Wednesday, June the 26th
8am to 10am
# Conference Schedule, June 23rd, 24th, 25th, and 26th

## Sunday, June 23rd, 2019

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<th>Time</th>
<th>ILE DE FRANCE - Ballroom</th>
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<tbody>
<tr>
<td>8:00AM</td>
<td>TUT1: Non-standard Machine Learning and Data Science Problems with Fuzzy Logic: A Big Data Perspective</td>
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<td>10:00AM</td>
<td>TUT3: Support Fuzzy-Set Machines: From Kernels on Fuzzy Sets to Machine Learning Applications</td>
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<td>10:30AM</td>
<td>TUT4: Visual Assessment of Cluster Tendency</td>
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<td>12:30PM</td>
<td>TUT5: Fuzzy Fusion of Decisions from Heterogeneous Deep Machine Learning Models</td>
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<td>2:00PM</td>
<td>TUT6: Fuzzy-rough data mining: using the Weka Data mining suite</td>
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<td>4:00PM</td>
<td>TUT7: Sculpting the State Space: A New Way to Establish and Explain the Potential for Improved Performance When Using Rule-Based Fuzzy Systems</td>
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<td>Coffee Break</td>
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<td>7:00PM</td>
<td>Rec: Welcome Reception</td>
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## Monday, June 24th, 2019

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<tr>
<td>8:00AM</td>
<td>FLFS-1: Fuzzy Logic and Fuzzy Sets</td>
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<td>10:00AM</td>
<td>LE1: Learning Control and Knowledge Transfer Between Aerial Robots for Improved Accuracy in Trajectory Tracking</td>
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<td>11:00AM</td>
<td>LE2: Do Fuzzy Sets Matter? An Interdisciplinary Point of View</td>
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<td>1:30PM</td>
<td>BE1: Data Explainability Through Linguistic Expression of Extracted Knowledge</td>
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<td>2:45PM</td>
<td>PAN1: Panel: Fuzziness in AI</td>
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<td>4:45PM</td>
<td>SS4: The Theory of Type-2 Fuzzy Sets and Systems (T2-T)</td>
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## Tuesday, June 25th, 2019

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<tr>
<td>8:00AM</td>
<td></td>
<td>SS18-1: Special Session on Pre-Aggregation Functions and Generalized Forms of Monotonicity</td>
<td>SS10-1: Fuzzy System for Control and Diagnosis of Renewable Energy and Smart Grid</td>
<td>SS7-3: Advances on Explainable Artificial Intelligence</td>
<td>MF1-1: Medical, Financial, Industrial</td>
<td>FPR-2: Fuzzy Pattern Recognition</td>
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<td>9:30AM</td>
<td>Break</td>
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<td>9:40AM</td>
<td>Bf4: Rosenblatt Medal Winner's Presentation: Enrique Ruspin</td>
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<td>10:40AM</td>
<td>P: Coffee, Poster Session, and Late Breaking Research</td>
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<td>BE2: Fuzzy Rule-Based Classifier Design: Accuracy, Interpretability and Explanation Ability</td>
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<td>2:45PM</td>
<td>FA-1: Fuzzy Algorithms</td>
<td>MFI-2: Medical, Financial, Industrial</td>
<td>SS8-1: Linguistic Summarization and Description of Data</td>
<td>FLFS-2: Fuzzy Logic and Fuzzy Sets</td>
<td>SS15-1: Recent Advances in Fuzzy Control System Design and Analysis</td>
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<td>7:00PM</td>
<td>Banquet</td>
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## Wednesday, June 26th, 2019

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<tr>
<td>8:00AM</td>
<td>WCC1: FMI-Based Machine Learning Competition for Human and Smart Machine Co-Learning on Game of Go</td>
<td>FLFS-3: Fuzzy Logic and Fuzzy Sets</td>
<td>SS1819: Special Session on Pre-Aggregation Functions and Generalized Forms of Monotonicity and on Applications of Pre-Aggregation Functions</td>
<td>SS15-2: Recent Advances in Fuzzy Control System Design and Analysis</td>
<td>SS2: Fuzzy Natural Language Processing</td>
<td>SS3: Fuzzy Hybrid Computing Applications in Construction Engineering and Management</td>
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<td>9:30AM</td>
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<td>BfE3: Explorations in Big Data and sMail Data with a Fuzzy Perspective</td>
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Tutorials, June the 23rd

Tutorial 1: Non-standard Machine Learning and Data Science Problems with Fuzzy Logic: A Big Data Perspective
Sunday, June 23, 8:00AM-10:00AM, Room: CONDE/FRONTENAC, Instructor: Alberto Fernandez, Isaac Triguero, Mikel Galar

Tutorial 2: Deep Fuzzy Models
Sunday, June 23, 8:00AM-10:00AM, Room: MAUREPAS, Instructor: Joao Sousa, Uzay Kaymak, Alexander Gegov

Tutorial 3: Support Fuzzy-Set Machines: From Kernels on Fuzzy Sets to Machine Learning Applications
Sunday, June 23, 10:30AM-12:30PM, Room: MAUREPAS, Instructor: Jorge Guevara, Roberto Hirata, Stephane Canu

Tutorial 4: Visual Assessment of Cluster Tendency
Sunday, June 23, 2:00PM-4:00PM, Room: CONDE/FRONTENAC, Instructor: Jim Bezdek

Tutorial 5: Fuzzy Fusion of Decisions from Heterogeneous Deep Machine Learning Models
Sunday, June 23, 2:00PM-4:00PM, Room: MAUREPAS, Instructor: Grant Scott

Tutorial 6: Fuzzy-rough data mining: using the Weka Data mining suite
Sunday, June 23, 4:30PM-6:30PM, Room: CONDE/FRONTENAC, Instructor: Richard Jensen, Neil Mac Parthalain

Tutorial 7: Sculpting the State Space: A New Way to Establish and Explain the Potential for Improved Performance When Using Rule-Based Fuzzy Systems
Sunday, June 23, 4:30PM-6:30PM, Room: MAUREPAS, Instructor: Jerry Mendel
Rosenblatt Medal Winner, Plenary, and Invited Talks

Rosenblatt Medal Winner’s Presentation: Similarity and Fuzzy Logic in Cluster Analysis
Tue 9:40-10:40am, Room: ILE DE FRANCE – Ballroom, Speaker: Enrique Ruspini, Chair: James Bezdek

Plenary Talk: BE1: Data Explainability Through Linguistic Expression of Extracted Knowledge
Mon 1:30-2:30pm, Room: ILE DE FRANCE - Ballroom, Speaker: Marie-Jeanne Lesot, Chair: Tim Havens

Plenary Talk: BE2: Fuzzy Rule-Based Classifier Design: Accuracy, Interpretability and Explanation Ability
Tue 1:30-2:30pm, Room: ILE DE FRANCE - Ballroom, Speaker: Hisao Ishibuchi, Chair: James Keller

Plenary Talk: BE3: Explorations in BIG Data and sMall Data with a Fuzzy Perspective
Wed 1:30-2:30pm, Room: ILE DE FRANCE - Ballroom, Speaker: Lawrence Hall, Chair: James Keller

Invited Talk: LE1: Learning Control and Knowledge Transfer Between Aerial Robots for Improved Accuracy in Trajectory Tracking
Mon 10-11am, Room: CONDE, Speaker: Erdal Kaycan, Chair: Tim Havens

Invited Talk: LE2: Do Fuzzy Sets Matter? An Interdisciplinary Point of View
Mon 11-12pm, Room: CONDE, Speaker: Christian Wagner, Chair: Derek Anderson

Invited Talk: LE3: Process Data and Computing with Words: A Neglected Opportunity?
Wed 10-11am, Room: CONDE, Speaker: Anna Wilbik, Chair: Alina Zare

Invited Talk: LE4: My Computer Speaks Colors! Fuzzy Color Spaces for Image Understanding, Description and Retrieval
Wed 11-12pm, Room: CONDE, Speaker: Jesus Chamorro Martinez, Chair: Derek Anderson
Sessions

**Session FLFS-1: Fuzzy Logic and Fuzzy Sets**  
*Monday, June 24, 8:00AM-9:30AM, Room: CONDE, Chair: Irina Perfijeva*

8:00AM  Allocating Virtual Machines exploring Type-2 Fuzzy Logic and Admissible Orders [#191]  
Bruno Moura, Guilherme Schneider, Adenauer Yamin, Maurício Pilla and Renata Reiser  
Federal University of Pelotas (UFPEL), Brazil

8:18AM  n-Dimensional Interval Uninorms [#65]  
Ivan Mezzomo, Benjamin Bedregal, Thaddeu Milfont, Tiago Asmus and Humberto Bustince  
Universidade Federal Rural de Semi-Arido, Brazil; Universidade Federal do Rio Grande do Norte, Brazil; Universidad Publica de Navarra, Spain

8:36AM  Fuzzy Similarity Measures and Measurement Theory [#132]  
Giulianella Coletti and Bernadette Bouchon-Meunier  
University of Perugia, Italy; Sorbonne Universite, France

8:54AM  On D-Implications Derived by Grouping Functions [#159]  
Gracaliz Dimuro, Helida Santos, Benjamin Bedregal, Eduardo Borges, Eduardo Palmeira, Javier Fernandez and Humberto Bustince  
Universidade Federal do Rio Grande, Brazil; Universidade Federal do Rio Grande do Norte, Brazil; Universidad Publica de Navarra, Spain

9:12AM  Fuzziness Control of Fuzzimetric sets [#176]  
Issam Kouatli  
LAU, Lebanon

**Session IP: Image Processing**  
*Monday, June 24, 8:00AM-9:30AM, Room: FRONTENAC, Chair: Tsaipei Wang*

8:00AM  Fuzzy based Pooling in Convolutional Neural Network for Image Classification [#97]  
Teena Sharma, Vikas Singh, Siddharth Sudhakaran and Nishchal K. Verma  
Indian Institute of Technology Kanpur, India; NIT Tiruchirappalli, Tamil Nadu, India

8:18AM  Using Fuzzy Inference system for detection the edges of Musculoskeletal Ultrasound Images [#104]  
Shaima Jabbar, Charles Day and Edward Chadwick  
Al Furat Al Awsat Technical University, Babylon technical institute, Iraq; Keele university, United Kingdom

8:36AM  Intuitionistic Fuzzy Clustering Method with Spatial Information for MRI Image Segmentation [#147]  
Dhirendra Kumar, Ramesh Kumar Agrawal and Jyoti Singh Kirar  
Delhi Technological University, Delhi, India; Jawaharlal Nehru University, New Delhi, India; Shiv Nadar University, Uttar Pradesh, India

8:54AM  Fuzzy Pruning For Compression of Convolutional Neural Networks [#297]  
Weibin Zhao, Yue Li and Lin Shang  
Nanjing University, China
9:12AM  A Systematic Approach to Creating Fuzzy Region Objects from Real Spatial Data Sets [#275]
Anderson Chaves Carniel and Markus Schneider
Federal University of Technology - Parana, Brazil; University of Florida, United States

**Special Session SS16-1: Handling Uncertainties in Big Data by Fuzzy Systems**
*Monday, June 24, 8:00AM-9:30AM, Room: ORLEANS, Chair: Jie Lu and Vladik Kreinovich*

8:00AM  Fuzzy Deep Stack of Autoencoders for Dealing with Data Uncertainty [#82]
Bruno Costa and Jinesh Jain
Ford Motor Company, United States

8:18AM  Statistical Based Approach for Uncertainty Analysis in Life Cycle Assessment: A Case Study in Textile industry [#96]
Kaichen Wang, Xianyi Zeng, Ludovic Koehl, Xuyuan Tao and Yan Chen
ENSAIT/GEMTEX, France; Soochow University, China

8:36AM  A Noise-tolerant Fuzzy c-Means based Drift Adaptation Method for Data Stream Regression [#142]
Yiliao Song, Guangquan Zhang, Haiyan Lu and Jie Lu
Centre for Artificial Intelligence, University of Technology Sydney, Australia

8:54AM  A Novel Fuzzy Neural Network for Unsupervised Domain Adaptation in Heterogeneous Scenarios [#144]
Feng Liu, Guangquan Zhang and Jie Lu
Decision Systems and e-Service Intelligence (DeSI) Lab, Centre for Artificial Intelligence, University of Technology Sydney, Australia

9:12AM  Time series classification in cyber-physical system applications by intervals' numbers techniques [#74]
Vassilis Kaburlasos, Eleni Vrochidou, Fotios Panagiotopoulos, Charalampos Aitsidis and Alexander Jaki
Human-Machines Interaction Laboratory (HUMAIN-Lab), Greece

**Special Session SS1-1: Software for Soft Computing**
*Monday, June 24, 8:00AM-9:30AM, Room: ST CLAUDE, Chair: Jose Alonso and Luis Magdalena*

8:00AM  Tuning Fuzzy SPARQL Queries in a Fuzzy Logic Programming Environment [#78]
Jesus Manuel Almendros-Jimenez, Antonio Becerra-Teron, Gines Moreno and Jose Antonio Riaza
University of Almeria, Spain; University of Castilla-La Mancha, Spain

8:18AM  Mining Gradual Itemsets Using Sequential Pattern Mining [#80]
Said Jabbour, Jerry Lonlac and Lakhdar Sais
CRIL UMR 8188 - CNRS University of Artois, France

8:36AM  Improving EECluster to optimize the carbon footprint and operating costs of HPC clusters [#95]
Alberto Cocana-Fernandez, Emilio San Jose, Jose Ranilla and Luciano Sanchez
University de Oviedo, Spain

8:54AM  LFL Forecaster: Analysis, Forecasting and Mining Information from Time Series [#126]
Vilem Novak, Soheyla Mirshahi and Viktor Pavliska
University of Ostrava, IRAFM, Czech Republic
Session C-1: Clustering
Monday, June 24, 8:00AM-9:30AM, Room: ST. JEROME, Chair: Adnan Yazici

8:00AM  A new fuzzy clustering algorithm for interval-valued data based on City-Block distance [#61]
Sara Rodriguez and Francisco de Carvalho
Universidade Federal de Pernambuco - UFPE, Brazil

8:18AM  Clustering of Information Granules in Hotspot Identification [#110]
Yinghua Shen, Witold Pedrycz, Ronel Moraes, Xingchen Hu, Xianmin Wang and Adam Gacek
University of Alberta, Canada; Federal University of Paraiba, Brazil; National University of
Defense Technology, China; China University of Geosciences, China; Institute of Biomedical
Engineering, Poland

8:36AM  Evidential clustering for categorical data [#177]
Abdoul Jalil Djiberou Mahamadou, Violaine Antoine, Gregory J. Christie and Sylvain Moreno
LIMOS, UCA, France; Digital Health Hub, SFU, Canada

8:54AM  Sampling Using Fuzzy and Crisp Clustering to Improve Recall of Building Comfort Feedback
[#57]
Ross MacDonald, Nikita Neveditsin, Pawan Lingras, Zheng Qin and Trent Hillard
Saint Mary's University, Canada; Green Power Labs Inc., Canada

Session PM: Preference Modeling
Monday, June 24, 10:00AM-11:00AM, Room: FRONTENAC, Chair: Andrew Buck

10:00AM  Incorporating Ranking Rules into K Nearest Neighbours [#241]
Noelia Rico, Raul Perez-Fernandez and Irene Diaz
University of Oviedo, Spain

10:18AM  Fuzzy approach for group assessment based on the consistency of individual judgments [#70]
Tomoe Entani
University of Hyogo, Japan

10:36AM  Evaluating Path Costs in Multi-Attributed Fuzzy Weighted Graphs [#310]
Andrew Buck and James Keller
University of Missouri, United States

Session FPR-1: Fuzzy Pattern Recognition
Monday, June 24, 10:00AM-11:00AM, Room: ORLEANS, Chair: Laszlo Koczy

10:00AM  Linear Order Statistic Neuron [#195]
Charlie Veal, Alex Yang, Alex Hurt, Muhammad Islam, Derek Anderson, Grant Scott,
Timothy Havens, Keller James and Bo Tang
University of Missouri, United States; Mississippi State University, United States; Michigan
Technological University, United States

10:18AM  A New Algorithm for Designing Theta-Fuzzy Associative Memories Based on Subsethood
Measures [#290]
Peter Sussner, Estevao Esmi and Joao Florindo
University of Campinas, Brazil

10:36AM  An Approach for Optimization of Intuitionistic and Type-2 Fuzzy Systems in Pattern
Recognition Applications [#328]
Special Session SS7-1: Advances on eXplainable Artificial Intelligence
Monday, June 24, 10:00AM-11:00AM, Room: ST CLAUDE, Chair: Jose Alonso and Luis Magdalena

10:00AM FuzzAttention on Session-based Recommender System [#134]
Chi-Shiang Wang and Jung-Hsien Chiang
Dept. of Computer Science and Information Engineering, National Cheng Kung University, Taiwan

10:18AM On the Need of Interpretability for Biomedical Applications: Using Fuzzy Models for Lung Cancer Prediction with Liquid Biopsy [#182]
Nicolas Potie, Stavros Giannoukakos, Michael Hackenberg and Alberto Fernandez
University of Granada, Spain

10:36AM A Measure of Structural Complexity of Hierarchical Fuzzy Systems Adapted from Software Engineering [#222]
Tajul Rosli Razak, Jonathan M. Garibaldi and Christian Wagner
Laboratory for Uncertainty in Data and Decision Making (LUCID), School of Computer Science, University of Nottingham, United Kingdom.

Session C-2: Clustering
Monday, June 24, 10:00AM-11:00AM, Room: ST. JEROME, Chair: Thomas Runkler

10:00AM A Fuzzy Density-based Clustering Algorithm for Streaming Data [#213]
Andrea Aliperti, Alessio Bechini, Francesco Marcelloni and Alessandro Renda
Department of Information Engineering, University of Pisa, Italy

10:18AM A Swarm Intelligence Approach to Avoid Local Optima in Fuzzy C-Means Clustering [#225]
Caro Fuchs, Simone Spolaor, Marco S. Nobile and Uzay Kaymak
Eindhoven University of Technology, Netherlands; University of Milano-Bicocca, Italy

10:36AM Data Stream Trajectory Analysis Using Sequential Possibilistic Gaussian Mixture Model [#168]
Wenlong Wu, James Keller, Marjorie Skubic and Mihail Popescu
University of Missouri, Columbia, United States

Session FM: Fuzzy Mathematics
Monday, June 24, 11:00AM-12:00PM, Room: FRONTENAC, Chair: Humberto Bustince

11:00AM Distance Measures for Intuitionistic Fuzzy Sets and Interval Valued Intuitionistic Fuzzy Sets [#120]
Leila Baccour and Adel M. Alimi
National School of Engineers, Tunisia; National School of Engineers, Turks and Caicos Islands

11:18AM A Probabilistic Nested Relational Database Model with Fuzzy Probability Measures [#108]
Li Yan and Ma Zongmin
Nanjing University of Aeronautics and Astronautics, China
11:36AM  A Cohesion Measure for Improving the Weighting of Experts' subgroups in Large-scale Group Decision Making Clustering Methods [#188]
Alvaro Labella, Rosa M. Rodriguez, Guy De Tre and Luis Martinez
University of Jaen, Spain; University of Granada, Spain; University of Ghent, Belgium

Session DS: Data Summarization
Monday, June 24, 11:00AM-12:00PM, Room: ORLEANS, Chair: Daniel Sanchez

11:00AM Extracting Fuzzy Gradual Patterns from Property Graphs [#118]
Faaiz Shah, Arnaud Castelltort and Anne Laurent
LIRMM, University of Montpellier, CNRS, France

11:18AM OWA-based Summarization of Data using iPad-drawn Concepts [#299]
Nhuan D. To, Marek Z. Reformat and Ronald R. Yager
University of Alberta, Canada; Iona College, United States

11:36AM Feature Ranking using Robust Fuzzy Score Function for Gene Expression Data [#125]
Vikas Singh, Nishchal K Verma, Teena Sharma and Yan Cui
Indian Institute of Technology, Kanpur, India, India; University of Tennessee Health Science Center, Memphis, Tennessee, USA, United States

Special Session SS1-2: Software for Soft Computing
Monday, June 24, 11:00AM-12:00PM, Room: ST CLAUDE, Chair: Jose Alonso and Luis Magdalena

11:00AM DECSYS - Discrete and Ellipse-based response Capture SYStem [#130]
Zack Ellerby, Josie McCulloch, John Young and Christian Wagner
University of Nottingham, United Kingdom; National Cyber Security Centre, United Kingdom

11:18AM A software implementation of the fuzzy rule learning algorithm NSLVOrd for ordinal classification into KEEL [#210]
Juan Carlos Gamez-Granados, Jose Manuel Soto-Hidalgo, Giovanni Acampora, Antonio Gonzalez and Raul Perez
University of Cordoba, Spain; University of Naples Federico II, Italy; University of Granada, Spain

11:36AM Do we still need fuzzy classifiers for Small Data in the Era of Big Data? [#153]
Mikel Elkano, Humberto Bustince and Mikel Galar
Public University of Navarre, Spain

Special Session SS17-1: Biologically-inspired Intelligence based Fuzzy Logic for Robotics and Mechatronics
Monday, June 24, 11:00AM-12:00PM, Room: ST. JEROME, Chair: Chaomin Luo

11:00AM Semi-Uknown Environments Exploration Inspired by Swarm Robotics using Fuzzy Cognitive Maps [#143]
Marcio Mendonca, Henrique Seiti Kondo, Lucas Botoni de Souza, Rodrigo Henrique Cunha Palacios and Joao Paulo Lima Silva de Almeida
UTFPR-CP, Brazil; IF-PR, Brazil
11:18AM Optimization of fuzzy controllers for autonomous mobile robots using the grey wolf optimizer
Eufronio Hernandez, Oscar Castillo and Jose Soria
Tijuana Institute of Technology, Mexico

11:36AM Introduce a Novel "STEAMS" Methodology of Conducting Scientific Research
Mason Chen
Stanford University OHS, United States

Session DM: Data Mining
Monday, June 24, 2:45PM-4:15PM, Room: CONDE, Chair: Grant Scott

2:45PM Content And Concept Indexing For High-Dimensional Multimedia Data
Serdar Arslan and Adnan Yazici
PhD, Turkey; Prof. Dr., Turkey

3:03PM Processing Fuzzy Relational Queries Using Fuzzy Views
Emmanuel Doumard, Olivier Pivert, Gregory Smits and Virginie Thion
University of Rennes 1 / IRISA, France

3:21PM A Probabilistic Relational Database Model with Fuzzy Attribute Values
Tru Cao, Hoa Nguyen, Atsushi Inoue and Duanning Zhou
Ho Chi Minh City University of Technology, Viet Nam; Saigon University, Viet Nam; Eastern Washington University, United States

3:39PM Personalized Queries under a Generalized User Profile Model based on Fuzzy SPARQL Preferences
Olfa Slama
UMANIS, France

Session AGG-1: Aggregation
Monday, June 24, 2:45PM-4:15PM, Room: FRONTENAC, Chair: Bernadette Bouchon-Meunier

2:45PM Fuzzy Integral Driven Ensemble Classification using A Priori Fuzzy Measures
Utkarsh Agrawal, Christian Wagner, Jonathan M. Garibaldi and Daniele Soria
University of Nottingham, Nottingham, United Kingdom; University of Westminster, London, United Kingdom

3:03PM A possibilistic counterpart to Shafer evidence theory
Didier Dubois, Francis Faux, Henri Prade and Agnes Rico
IRIT-CNRS, France; ERIC, France

3:21PM Machine Learning of Choquet Integral Regression with Respect to a Bounded Capacity (or Non-monotonic Fuzzy Measure)
Timothy Havens and Derek Anderson
Michigan Technological University, United States; University of Missouri, United States

3:39PM Compositions of Partial Fuzzy Relations and Fuzzy Quantifiers Employing Dragonfly Algebras

Nhung Cao, Martin Stepnicka and Michal Burda  
University of Ostrava, Czech Republic

3:57PM Transfer Learning for the Choquet Integral [#180] 
Bryce Murray, Muhammad Islam, Anthony Pinar, Derek Anderson, Grant Scott, Timothy Havens, Fred Petry and Paul Elmore  
University of Missouri, United States; Mississippi State University, United States; Michigan Technological University, United States; Naval Research Laboratory, United States

Special Session SS16-2: Handling Uncertainties in Big Data by Fuzzy Systems  
Monday, June 24, 2:45PM-4:15PM, Room: ORLEANS, Chair: Jie Lu and Vladik Krenovich

2:45PM A Constrained Interval-Valued Linear Regression Model: a New Heteroscedasticity Estimation Method [#158]  
Yu Zhong and Shoumei Li  
Beijing University of Technology, China

3:03PM Fuzzy Hot Spot Identification for Big Data: An Initial Approach [#253]  
Rebecca Tickle, Isaac Triguero, Grazziela P. Figueredo, Ender Ozcan, Mohammad Mesgharpour and Robert I. John  
Automated Scheduling, Optimisation and Planning Research Group, University of Nottingham, United Kingdom; The Advanced Data Analysis Centre, University of Nottingham, United Kingdom; Microlise, United Kingdom

3:21PM A complexity analysis of MPE inference in possibilistic networks [#260]  
Salem Benferhat, Karim Tabia and Amelie Levray  
CRIL Universite d’Artois, France; University of Edinburgh, United Kingdom

3:39PM Digital Coaching to Make Fuzzy Real Options Methods Viable for Investment Decisions [#42]  
Christer Carlsson  
IAMSR/Abo Akademi University, Finland

3:57PM In Its Usual Formulation, Fuzzy Computation Is, In General, NP-Hard, But a More Realistic Formulation Can Make It Feasible [#35]  
Martine Ceberio, Olga Kosheleva, Vladik Kreinovich and Luc Longpre  
University of Texas at El Paso, United States

Special Session SS1-3: Software for Soft Computing  
Monday, June 24, 2:45PM-4:15PM, Room: ST CLAUDE, Chair: Jose Alonso and Luis Magdalena

2:45PM A Graded Approach to Requirement Satisfaction for Evolving Systems [#242]  
Trevor Martin and Ratih Anggraini  
University of Bristol, United Kingdom

3:03PM VisualJFML: A Visual Environment for Designing Fuzzy Systems according to IEEE Std 1855-2016 [#291]  
Giovanni Acampora, Jesus Alcala-Fdez, Roberta Siciliano, Jose M. Soto-Hidalgo and Autilia Vitiello  
University of Naples Federico II, Italy; University of Granada, Spain; University of Cordoba, Spain

3:21PM Py4JFML: A Python wrapper for using the IEEE Std 1855-2016 through JFML [#39]  
Jesus Alcala-Fdez, Jose M. Alonso, Ciro Castiello, Corrado Mencar and Jose M. Soto-Hidalgo
3:39PM A New Fuzzy Rule Generation Scheme based on Multiple-Selection of Influencing Factors [#85]
Begum Mutlu and Ebru A. Sezer
Gazi University, Turkey; Hacettepe University, Turkey

Special Session SS11-1: Soft Computing in Computer Vision and Pattern Recognition
Monday, June 24, 2:45PM-4:15PM, Room: ST. JEROME, Chair: Stanton Price and Chee Seng

2:45PM Interval Type-2 Fuzzy Restricted Boltzmann Machine for the Enhancement of Deep Learning [#319]
Manvendra Janmaijaya, Amit K. Shukla, Taniya Seth and Pranab K. Muhuri
South Asian University, India

3:03PM Detection of Dynamic Objects in Videos Using LBSP and Fuzzy Gray Level Difference Histograms [#23]
Abimael Guzman-Pando and Mario I. Chacon-Murguia
Tecnologico Nacional de Mexico/ I.T. Chihuahua, Mexico

3:21PM Human Image Complexity Analysis Using a Fuzzy Inference System [#89]
Luis Madrid-Herrera, Mario I Chacon-Murguia, Daniel A Posada-Urrutia and Juan A Ramirez-Quintana
Chihuahua Institute of Technology, Mexico

3:39PM People Detection in Downward-Viewing Fisheye Camera Networks Using Fuzzy Integral [#305]
Tsaipei Wang and Chih-Hao Liao
Department of Computer Science, National Chiao Tung University, Taiwan

Special Session SS4: The Theory of Type-2 Fuzzy Sets and Systems (T2-T)
Monday, June 24, 4:45PM-6:15PM, Room: CONDE, Chair: Robert John, Josie McCulloch, and Simon Coupland

4:45PM A New Insight on the Mappings of Type-2 Fuzzy Logic Systems [#36]
Tufan Kumbasar
Istanbul Technical University, Turkey

5:03PM Managing the Doubt in Fuzzy Clustering by Means of Interval-Valued Fuzzy Sets [#234]
Aranzazu Jurio, Humberto Bustince and Vicenc Torra
Universidad Publica de Navarra, Spain; Maynooth University, Ireland

5:21PM Leveraging IT2 Input Fuzzy Sets in Non-Singleton Fuzzy Logic Systems to Dynamically Adapt to Varying Uncertainty Levels [#185]
Direnc Pekaslan, Christian Wagner and Jonathan M. Garibaldi
University of Nottingham, United Kingdom

5:39PM Measuring Inter-group Agreement on zSlice Based General Type-2 Fuzzy Sets [#295]
Javier Navarro and Christian Wagner
University of Nottingham, United Kingdom
Special Session SS16-3: Handling Uncertainties in Big Data by Fuzzy Systems  
Monday, June 24, 4:45PM-6:15PM, Room: FRONTENAC, Chair: Jie Lu and Vladik Kreinovich

4:45PM Fuzzy Option Pricing Using a Novel Data-Driven Feed Forward Neural Networks Volatility Model [#106]  
Aerambamoorthy Thavaneswaran, Ruppa Thulasiram, Julieta Frank, Zimo Zhu and Manmohit Singh  
University of Manitoba, Canada

5:03PM A clustering algorithm based on fuzzy sets and its application in learning analytics [#155]  
Jun Ma, Jie Yang and Sarah Howard  
University of Wollongong, Australia

5:21PM Domain Selection of Transfer Learning in Fuzzy Prediction Models [#136]  
Hua Zuo, Guangquan Zhang, Witold Pedrycz and Jie Lu  
University of Technology Sydney, Australia; University of Alberta, Canada

5:39PM Exploring Type-2 Fuzzy Logic with Dynamic Rules in IoT Resources Classification [#194]  
Amanda Argou, Renato Dilli, Renata Reiser and Adenauer Yamin  
UFPeL, Brazil

5:57PM Ontology-Based Representation and Reasoning about Precise and Imprecise Time Intervals [#304]  
Ghorbel Fatma, Hamdi Faycal and Metais Elisabeth  
University of Sfax, Tunisia; CEDRIC, Conservatoire National des Arts et Metiers, France

Special Session SS12-1: Human Symbiotic Systems  
Monday, June 24, 4:45PM-6:15PM, Room: ORLEANS, Chair: Tomoiro Yoshikawa and Yoichiro Maeda

4:45PM Gaussian noise and the intersection problem in Human-Robot Systems - analytical and fuzzy approach [#12]  
Rainer Palm and Achim Lilienthal  
Oerebro University, Sweden

5:03PM A Study on Not-Boring Oddball Task for Users by Adopting Elements of Games [#156]  
Tadashi Koike, Tomohiro Yoshikawa and Takeshi Furuhashi  
Nagoya University, Japan

5:21PM A Consideration on Initial Parameter Setting using Onomatopoeias for Interactive Design Tools [#170]  
Yuki Sawamura, Keima Osuka, Tsuyoshi Nakamura, Masayoshi Kanoh and Koji Yamada  
Nagoya Institute of Technology, Japan; Chukyo University, Japan; Institute of Advanced Media Arts and Sciences, Japan

5:39PM Human Intention Estimation Using Fuzzy Inference Based on Gaze Tracking and Saliency Map [#239]  
Yoichiro Maeda and Jiaao Niu  
Ritsumeikan University, Japan

5:57PM Proposal and Analysis of Driver Support System to Verify Driver's Overconfidence and Dependence Bias [#294]  
Junya Matsukawa, Tomoki Miyamoto, Daisuke Katagami, Takahiro Tanaka, Hitoshi Kanamori,  
Yuki Yoshihara and Kazuhiro Fujikake  
Tokyo Polytechnic University, Japan; Nagoya University, Japan
Special Session SS7-2: Advances on eXplainable Artificial Intelligence
Monday, June 24, 4:45PM-6:15PM, Room: ST CLAUDE, Chair: Jose Alonso and Luis Magdalena

4:45PM Depicting Decision-Making: A Type-2 Fuzzy Logic Based Explainable Artificial Intelligence System for Goal-Driven Simulation in the Workforce Allocation Domain [#227]
Emmanuel Ferreyra, Hani Hagras, Mathias Kern and Gilbert Owusu
University of Essex, Great Britain; BT, Great Britain

5:03PM LEAFAGE: Example-based and Feature importance-based Explanations for Black-box ML models [#248]
Ajaya Adhikari, David M.J. Tax, Riccardo Satta and Matthias Faeth
TNO, Netherlands; TU Delft, Netherlands

5:21PM Natural Language Generation of Explanations of Fuzzy Inference Decisions [#264]
Ismail Baaj and Jean-Philippe Poli
CEA, France

5:39PM Improved Deep Fuzzy Clustering for Accurate and Interpretable Classifiers [#268]
Mojtaba Yeganejou and Scott Dick
University of Alberta, Canada

Special Session SS11-2: Soft Computing in Computer Vision and Pattern Recognition
Monday, June 24, 4:45PM-6:15PM, Room: ST. JEROME, Chair: Stanton Price and Chee Seng

4:45PM Introducing Fuzzy Layers for Deep Learning [#277]
Stanton Price, Steven Price and Derek Anderson
U.S. Army Engineer Research and Development Center, United States; Mississippi College, United States; University of Missouri, United States

5:03PM A Fuzzy Linearity-based Approach for Contour Salience Points Selection [#309]
Jesus Chamorro-Martinez, Alejandro Torres-Aguiera, Antonio Garrido and Pedro M. Martinez-Jimenez
University of Granada, Spain; University of Cadiz, Spain

5:21PM Interval-Valued Fuzzy Thresholding Approach for Image Segmentation
Le Thi Cam Binh, Ngo Thanh Long, Pham Van Hai, Pham Van Nha and Pham The Long
Academy of Military Science and Technology, Viet Nam; Le Quy Don Technical University, Viet Nam; Hanoi University of Science and Technology, Viet Nam

5:39PM Incremental Cauchy Non-Negative Matrix Factorization and Fuzzy Rule-Based Classifier For Acoustic Source Separation [#211]
Achyut Mani Tripathi and Rashmi Dutta Baruah
Indian Institute of Technology Guwahati, Assam, India; Indian Institute Of Technology Guwahati, India

Special Session SS18-1: Special Session on Pre-Aggregation Functions and Generalized Forms of Monotonicity
Tuesday, June 25, 8:00AM-9:30AM, Room: CONDE, Chair: Gracaliz Dimuro and Humberto Bustince

8:00AM Types of Recursive Computable Aggregations [#99]
Luis Magdalena, Luis Garmendia, Daniel Gomez, Ramon Gonzalez del Campo, J.Tinguaro Rodriguez and Javier Monterro
Where the domination of maxitive kernels is extended to signed values. [#112]
Olivier Strauss and Agnes Rico
LIRMM, Univ. Montpellier, CNRS, France; ERIC, Claude Bernard University Lyon 1, France

On Generalized Intuitionistic Fuzzy Interaction Partitioned Bonferroni Mean Operators [#270]
Rajkumar Verma and Jose M Merigo
University of Chile, Chile

Analyzing the Performance of Different Fuzzy Measures with Generalizations of the Choquet Integral in Classification Problems [#128]
Giancarlo Lucca, Jose Antonio Sanz, Gracaliz Dimuro, Eduardo Borges, Helida Santos and Humberto Bustince
Universidade Federal do Rio Grande, Brazil; Universidad Publica de Navarra, Spain

Distances between Interval-valued Fuzzy Sets Taking into Account the Width of the Intervals [#173]
Zdenko Takac, Javier Fernandez, Javier Fumanal, Cedric Marco-Detchart, Ines Couso, Gracaliz Dimuro, Helida Santos and Humberto Bustince
Slovak University of Technology, Slovakia; Universidad Publica de Navarra, Spain; Universidad de Oviedo, Spain; Universidade Federal do Rio Grande, Brazil

Special Session SS10-1: Fuzzy System for Control and Diagnosis of Renewable Energy and Smart Grid
Tuesday, June 25, 8:00AM-9:30AM, Room: FRONTENAC, Chair: Faa-Jeng Lin

Neuro-Fuzzy Controller for AFPM Gearless Generator [#10]
Sedat Nazlibilek and Esmail Mohammed
Baskent University, EE Department, Turkey; The Higher Institute of Science and Technology, Libya

Fuzzy Control Techniques Applied to Wind Turbine Systems and Hydroelectric Plants [#15]
Silvio Simani, Stefano Alvisi and Mauro Venturini
Department of Engineering, University of Ferrara, Italy

Improved LVRT Performance of PV Power Plant Using Intelligent Control Under Grid Fault and Weak Grid Conditions [#16]
Faa-Jeng Lin, Kuang-Hsiung Tan, Wen-Chou Luo and Guo-Deng Xiao
Dept. of Electrical Engineering, National Central University, Taiwan; Dept. of Electrical and Electronic Engineering, Chung Cheng Institute of Technology, National Defense University, Taiwan

Application of a Fuzzy Logic based Controller for Peak Load Shaving in a Typical Household [#103]
Krishna Sharma and Nicholas Baine
Grand Valley State University, United States

Special Session SS7-3: Advances on eXplainable Artificial Intelligence
Tuesday, June 25, 8:00AM-9:30AM, Room: ORLEANS, Chair: Jose Alonso and Luis Magdalena
8:00AM Explaining What a Neural Network has Learned: Toward Transparent Classification [#271]
Kasun Amarasinghe and Milos Manic
Virginia Commonwealth University, United States

8:18AM ExpliClas: Automatic Generation of Explanations in Natural Language for Weka Classifiers [#38]
Jose M. Alonso and Alberto Bugarin
Universidade de Santiago de Compostela, Spain

8:36AM Explainable AI For Dataset Comparison [#111]
Akshay Jain, James Keller and Mihail Popescu
University of Missouri, United States

8:54AM Explainable Decisions under incomplete knowledge with Supports and Weights [#181]
Florence Dupin de Saint-Cyr, Romain Guillaume and Umar Mushtaq
Irit, France; Lemma, France

Session MFI-1: Medical, Financial, Industrial
Tuesday, June 25, 8:00AM-9:30AM, Room: ST CLAUDE, Chair: Mihai Popescu and Mary Tom

8:00AM Sepsis Prediction: An Attention-Based Interpretable Approach [#285]
Kourosh Baghaei and Shahram Rahimi
Mississippi State University, United States

8:18AM Fuzzy Logic based Pricing combined with Adaptive Search for Reserve Price Optimization in Online Ad Auctions [#301]
Jason Rhuggenaath, Alp Akcay, Yingqian Zhang and Uzay Kaymak
Eindhoven University of Technology, Netherlands

8:36AM Cardiovascular Conditions Classification Using Adaptive Neuro-Fuzzy Inference System [#307]
Jason Rivera, Kelsey Rodriguez and Xiao-Hua Yu
California Polytechnic State University, SLO, United States

8:54AM Transfer Learning based GDP Prediction from Uncertain Carbon Emission Data [#314]
Sandeep Kumar, Amit K. Shukla, Pranab K. Muhuri and Q. M. Danish Lohani
South Asian University, India

9:12AM An Architecture Based on Fuzzy Systems for Personalized Medicine in ICUs [#318]
Joao Sousa, Susana Vieira, Joao Carvalho, Sara Madeira, Stan Finkelstein and Leo Celi
IDMEC, Instituto Superior Técnico, Universidade de Lisboa, Portugal; INESC-ID, Instituto Superior Técnico, Universidade de Lisboa, Portugal; LASIGE, Faculdade de Ciências, Universidade de Lisboa, Portugal; Laboratory for Computational Physiology, Massachusetts Institute of Technology, Cambridge, MA, USA, United States; Institute for Data, Systems, and Society, Massachusetts Institute of Technology, Cambridge, MA, USA, United States

Session FPR-2: Fuzzy Pattern Recognition
Tuesday, June 25, 8:00AM-9:30AM, Room: ST. JEROME, Chair: David Heise

8:00AM Distance Measures between Interval Valued Intuitionistic Fuzzy Sets and Application in Multi-Criteria Decision Making [#257]
Belahssan Fares, Leila Baccour and Adel Alimi
REsearch Groups in Intelligent Machines, Tunisia
8:18AM  A Preliminary Approach for the Exploitation of Citizen Science Data for Fast and Robust Fuzzy k-Nearest Neighbour Classification [#273]
Manuel Jimenez, Mercedes Torres Torres, Robert John and Isaac Triguero
University of Nottingham, United Kingdom

8:36AM  A Statistical Random Variable Approach to Fuzzy Cognitive Map Modeling [#209]
Vesa Niskanen
University of Helsinki, Dept. of Econ. and Management, Finland

8:54AM  A Multilayer Fuzzy Extreme Learning Machine for Regression and Classification Problems [#203]
Adrian Rubio-Solis and George Panoutsos
University Of Sheffield, United Kingdom; University of Sheffield, United Kingdom

9:12AM  Notes on the Dynamics of Hyperbolic Tangent Fuzzy Cognitive Maps [#63]
Istvan Harmati and Laszlo Koczy
Szechenyi Istvan University, Hungary

Poster Session and Late Breaking Research
Tuesday, June 25, 10:40AM-12:00PM, Room: ILE DE FRANCE Ballroom, Chair: Marek Reformat

P101  Operations on Hybrid Linguistic Representations [#51]
Xingli Wu, Huchang Liao and Abdullah Al-Barakati
Business School, Sichuan University, China; King Abdulaziz University, Saudi Arabia

P102  Reachable Estimation and Compensation Boundaries for the Large-Scale Interconnected Fuzzy Systems [#45]
Zhixiong Zhong, Hao Ying, Zhijie Huan, Wenzhong Lin and Xingyi Wang
Minjiang University, China; Wayne State University, United States; Xiamen University of Technology, China

P103  Bid evaluation for contractor selection using ELECTRE III with complex linguistic evaluations [#205]
Zhen-Song Chen, Xuan Zhang, Sheng-Hua Xiong, Wen-Tao Kong, Kwai-Sang Chin and Martinez Luis
Wuhan University, China; Civil Aviation Flight University of China, China; City University of Hong Kong, Hong Kong; University of Jaen, Spain

P104  Mutational Intuitionistic Fuzzy Venture Group [#31]
Fan Chuan-qiang and Liu Feng
Liaoning Shihua University, China; Northeastern University, China

P105  Evidential reasoning with linguistic belief structures [#258]
Huchang Liao, Ran Fang, Jian-Bo Yang and Dong-Ling Xu
Sichuan University, China; University of Manchester, United Kingdom

P106  On Representation of Seminormed Integral Using Level Dependent Boolean Capacities [#133]
Jana Borzova, Lenka Halcinova and Ondrej Hutnik
Institute of Mathematics, Pavol Jozef Safarik University in Kosice, Slovakia

P107  Switching Motion Control of the Climbing Robot for Aircraft Skin Inspection [#135]
Congqing Wang, Jiayue Gu and Zhiyu Li
Nanjing University of Aeronautics and Astronautics, China

P108  Dynamic Scaling Adaptive Fuzzy Output Feedback Control of Nonstrict-Feedback Systems [#52]
Jeng-Tze Huang and Yu-Cheung Law  
Chinese Culture University, Taiwan; Chinese Culture University, Hong Kong

Xingchen Hu, Huangke Chen, Chao Chen, Boliang Sun, Jincai Huang and Kuihua Huang  
College of Systems Engineering, National University of Defense Technology, China

P110 Application of Information Sets in Accommodation Preferences of Fresh Graduates [169]  
Manish Aggarwal and Madasu Hanmandlu  
IIM Ahmedabad, India; MVSR Engineering College, India

P111 Comparison between Composite Index Solution Surfaces with Fuzzy Composite Index Decision Surfaces [192]  
J. Ruben G. Cardenas, Angela Nebot and Francisco Mugica  
Understanding and Managing Extremes School, Italy; Universitat Politècnica de Catalunya (UPC-BarcelonaTech), Spain

P112 Exploring the Impact of Evolutionary Computing based Feature Selection in Suicidal Ideation Detection [54]  
Ranit Sawhney, Rajiv Ratn Shah, Vedant Bhatia, Chin-Teng Lin, Sagar Aggarwal and Mukesh Prasad  
Netaji Subhas Institute of Technology, India; MIDAS IIIT-D, India; IIIT-D, India; FEIT, University of Technology Sydney, Australia

P113 Charting Perceptual Spaces with Fuzzy Rules [212]  
Ivan Paz, Angela Nebot, Romero Enrique and Francisco Mugica  
Universitat Politècnica de Catalunya, Spain

P114 A Choquet Fuzzy Integral Vertical Bagging Classifier for Mobile Telematics Data Analysis [86]  
Mohammad Siami, Mohsen Naderpour and Jie Lu  
University of Technology Sydney, Australia

P115 Comparison of Time Series Approaches applied to Greenhouse Gas Analysis: ANFIS, RNN, and LSTM [66]  
Simone Ludwig  
North Dakota State University, United States

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<td>Elizabeth Gilmour, Kristen Nock</td>
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<td>On Fuzzy Features of Sound Mass and Perception of Soundscapes</td>
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<td>Ontology-based FML Agents for Real World; Applications on Robotic Edutainment and Co-Learning</td>
<td>Chang-Shing Lee, Yi-Lin Tsai, Mei-Hui Wang, Rin-Pin Chang, Naoyuki Kubota</td>
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<td>Mason Chen</td>
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<td>The Effects of the And-Or Operators in a Fuzzy Controllers Applied to a Plant With and Without Uncertainties</td>
<td>Eduardo Gomez-Ramirez, Julio C. Cortes-Rios, Hector A. Ortiz-de-la-Vega, Elba P. Melin-Olmeda &amp; Oscar Castillo-Lopez</td>
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LB7  Fuzzy Logic-Based Fusion of Deep Learners in Remote Sensing
Blake Ruprecht, Charlie Veal, Bryce Murray, Muhammad, Aminul Islam, Derek Anderson, Fred Petry, James Keller, Grant Scott, and Curt Davis

LB8  The Choquet Integral Neuron, Its PyTorch Implementation, and Application to Decision Fusion
Muhammad Aminul Islam, Derek Anderson, Anthony Pinar, Timothy Havens, Grant Scott, and James Keller

LB9  Fuzzy Aggregation of Deep Networks in Real Time on a NVIDIA Jetson Platform
Charlie Veal, Bryce Murray, Grant Scott, James Keller, Dominic Ho, Mihail Popescu, Derek Anderson

LB10 Development of a Fuzzy-Functional Health Index for Older Adults using Geriatric Assessments
Anup K. Mishra, Marjorie Skubic, Mihail Popescu, James Keller, Andrew Buck, Laurel A. Despins, Marilyn Rantz, and Kari Lane

LB11 Interactive Consumer Interface Design for Older Adults Using Fuzzy-Based Linguistic Summaries
Shradha Shalini, Amanda Hill Akshay Jain, Marjorie Skubic, James M Keller

LB12 Linguistic summaries as explanation mechanism for clustering results
Anna Wilbik and Remco Dijkman

LB13 An ANFIS framework for PyTorch
James F. Power, Michael Ryan, John Yanz

Session FA-1: Fuzzy Algorithms
Tuesday, June 25, 2:45PM-4:15PM, Room: CONDE, Chair: Sansanee Auephanwiriyakul

2:45PM  Measuring Similarity Between Discontinuous Intervals - Challenges and Solutions [#163]
Shaily Kabir, Christian Wagner, Timothy C. Havens and Derek T. Anderson
Intelligent Modelling and Analysis (IMA) Group and Lab for Uncertainty in Data and Decision Making (LUCID), School of Computer Science, University of Nottingham, Nottingham, UK, United Kingdom; ICC and Department of Electrical and Computer Engineering, Michigan Technological University, Houghton, MI, USA, United States; Department of Electrical Engineering and Computer Science, University of Missouri, Columbia, MO, USA, United States

3:03PM  A (Soft) Robustness for Possibilistic Optimization Problems [#75]
Adam Kasperski and Pawel Zielinski
Wroclaw University of Science and Technology, Poland

3:21PM  Pole Determination for Takagi-Sugeno Fuzzy Laguerre Models [#265]
Tim Oliver Heinz, Tobias Ebert and Oliver Nelles
University of Siegen, Germany

3:39PM  Multistep Prediction using Point-Cloud Approximation of Continuous Belief Functions [#157]
Thierry Denoeux and Orakanya Kanjanatarakul
Universite de Technologie de Compiègne, France; Chiang Mai Rajabhat University, Thailand

3:57PM  Group decision making techniques for risk assessment: a literature review and research directions [#178]
Rafael Arantes and Luiz Carpinetti
University of Sao Paulo Sao Carlos School of Engineering, Brazil

Session MFI-2: Medical, Financial, Industrial
Tuesday, June 25, 2:45PM-4:15PM, Room: FRONTEAC, Chair: Mika Sato-licc
2:45PM  Optimal ranking of factors affecting students' academic performance based on belief and plausibility measures [#11]
Satish Salunkhe, Yashwant Joshi and Ashok Deshpande
Terna Engineering College, Mumbai University, India; Shri Guru Gobind Singh Institute of Engineering and Technology, SRTMU, Nanded, India; BISC -SIG-EMS, Berkeley, CA 94720-5800, United States

3:03PM  Caregiver Assessment Using Smart Gaming Technology: A Feasibility Study [#91]
Garrett Goodman, Tanvi Banerjee, William Romine, Cogan Shimizu and Jennifer Hughes
Wright State University, United States

3:21PM  A Comparative Study on Air Data System Calibration Methods based on Machine Learning [#146]
Hansoo Lee, Jonggeun Kim, Sungshin Kim and Jaeyong Kim
Pusan National University, Korea (South); Korea Aerospace Industries, Ltd., Korea (South)

3:39PM  High Concentrations Naturally Lead to Fuzzy-Type Interactions and to Gravitational Wave Bursts [#152]
Oscar Galindo, Olga Kosheleva and Vladik Kreinovich
University of Texas at El Paso, United States

3:57PM  Fuzzy Modeling of Survival Associated to Insulin Therapy in the ICU [#187]
Aldo Arevalo, Bernardo M. Firme, Susana M. Vieira, Leo Celi, Stan N. Finkelstein and Joao M. C. Sousa
IDMEC, Instituto Superior Tecnico, Universidade de Lisboa, Portugal; Laboratory for Computational Physiology, Massachusetts Institute of Technology, United States; Institute for Data, Systems, and Society, Massachusetts Institute of Technology, United States

Special Session SS8-1: Linguistic Summarization and Description of Data
Tuesday, June 25, 2:45PM-4:15PM, Room: ORLEANS, Chair: Daniel Sanchez

2:45PM  FRELS: Fast and Reliable Estimated Linguistic Summaries [#243]
Gregory Smits, Pierre Nerzic, Marie-Jeanne Lesot and Olivier Pivert
Universite Rennes, IRISA, France; Sorbonne Universite, CNRS, Laboratoire d'Informatique de Paris 6, France

3:03PM  Compound Bipolar Queries: The Case of Data with a Variable Quality [#276]
Janusz Kacprzyk and Slawomir Zadrozny
Systems Research Institute, Polish Academy of Sciences, Poland

3:21PM  Referring under Uncertainty [#219]
Nicolas Marin, Gustavo Rivas-Gervilla and Daniel Sanchez
University of Granada, Spain

3:39PM  Method Selecting Correct One Among Alternatives Utilizing Intuitionistic Fuzzy Preference Relation Without Consensus Reaching Process [#71]
Zhang Hengshan, Zheng Qinghua, Wang Zhongmin, Chen Yanping, Liu Ting and Chen Tianhua
Xi'an University of Posts and Telecommunications, China; Xi'an Jiaotong University, China; University of Huddersfield, United Kingdom

Session FLFS-2: Fuzzy Logic and Fuzzy Sets
Tuesday, June 25, 2:45PM-4:15PM, Room: ST CLAUDE, Chair: Janusz Kacprzyk
2:45PM An Epistemic Simplified Interval Temporal Logic of Moszkowski for Fuzzified Justification [296]
  Krystian Jobczyk and Antoni Ligeza
  AGH University of Technology, Poland
3:03PM Relevance of Polynomial Order in Takagi-Sugeno Fuzzy Inference Systems Applied in Diagnosis Problem [303]
  Emanuel Ontiveros-Robles, Patricia Melin and Oscar Castillo
  Tijuana Institute of Technology, Mexico
3:21PM Controllable Fuzziness of General Fuzzy Numbers Addition Based on Yager T-norms [306]
  Kuo-Ping Chiao
  Aletheia University, Taiwan
3:39PM A Neutrosophic Solid Transportation Model with Insufficient Supply [138]
  Nilabhra Paul, Deepshikha Sarma and Uttam Kuamr Bera
  NIT Agartala, India; NIT Agartala, India
3:57PM ParaFIS: A new online fuzzy inference system based on parallel drift anticipation [261]
  Clement Leroy, Eric Anquetil and Nathalie Girard
  Univ Rennes, CNRS, IRISA, France

Special Session SS15-1: Recent Advances in Fuzzy Control System Design and Analysis
Tuesday, June 25, 2:45PM-4:15PM, Room: ST. JEROME, Chair: Kevin Guelton and Zoltan Nagy

2:45PM Fuzzy Adaptive Dynamic Programming Minimum Energy Control Of Dielectric Elastomer Actuators [240]
  Paolo Roberto Massenio, Gianluca Rizzello and David Naso
  Department of Electrical and Information Engineering - Polytechnic University of Bari, Italy;
  Department of Systems Engineering and Department of Material Science and Engineering - Saarland University, Germany
3:03PM Observer-based controller design for Takagi-Sugeno fuzzy systems with local nonlinearities [269]
  Zoltan Nagy and Zsofia Lendek
  Technical University of Cluj Napoca, Romania
  Faycal Bourahala, Kevin Guelton and Adriano N.D. Lopes
  20 August University, Skikda, Algeria; CReSTIC EA3804, University of Reims Champagne-Ardenne, France
3:39PM A Sorting Method: BWMSort in Interval Type-2 Fuzzy Environment [41]
  Jun Liu, Zhou Xu and Jindong Qin
  School of Management, Wuhan University of Technology, China
3:57PM Nonlinear Fuzzy State-Space Modeling and LMI Fuzzy Control of Overhead Cranes [149]
  Daniel Leite, Charles Aguiar, Daniel Pereira, Gustavo Souza and Igor Skrjanc
  Federal University of Lavras (UFLA), Brazil; University of Ljubljana, Slovenia

Special Session SS8-2: Linguistic Summarization and Description of Data
Tuesday, June 25, 4:45PM-6:15PM, Room: CONDE, Chair: Daniel Sanchez
4:45PM Wu-Mendel Approach for Linguistic Summarization: Practical Considerations and Solutions [#9]
Vugar Mirzakhanov and Latafat Gardashova
Azerbaijan State Oil and Industry University, Azerbaijan

5:03PM Using Taxonomy Tree to Generalize a Fuzzy Thematic Cluster [#166]
Dmitry Frolov, Susana Nascimento, Trevor Fenner and Boris Mirkin
Dept. of Data Analysis and AI, National Research University, Higher School of Economics, Moscow, Russian Federation; Dept. of Computer Science and NOVA LINCS, Universidade Nova de Lisboa, Lisbon, Portugal; Dept. of Computer Science, Birkbeck University of London, London, United Kingdom; Dept. of Data Analysis and AI, HSE University, Moscow, and Dept. of Computer Science, Birkbeck University of London UK, Russian Federation

5:21PM Generalized Intermediate Syllogisms with More Premises [#235]
Petra Murinova
University of Ostrava-IRA FM, Czech Republic

Session MFI-3: Medical, Financial, Industrial
Tuesday, June 25, 4:45PM-6:15PM, Room: FRONTENAC, Chair: Uzay Kaymak

4:45PM Between Dog and Wolf: A Continuous Transition from Fuzzy to Probabilistic Estimates [#34]
Martine Ceberio, Olga Kosheleva, Vladik Kreinovich and Luc Longpre
University of Texas at El Paso, United States

5:03PM Sentiment Classification of Drug Reviews Using Fuzzy-rough Feature Selection [#62]
Tianhua Chen, Pan Su, Changjing Shang, Richard Hill, Hengshan Zhang and Qiang Shen
University of Huddersfield, United Kingdom; Chinese Academy of Sciences, China; Aberystwyth University, United Kingdom; Xi'an University of Posts and Telecommunications, China

5:21PM Modeling Supply Chain Quality Management using Multi-Layer Fuzzy Cognitive Maps [#116]
Juan Cogollo and Alexander Correa
Instituto Tecnolóógico Metropolitano, Colombia; Universidad Nacional de Colombia, Colombia

Special Session SS9-1: Advances to Type-2 Fuzzy Logic Control
Tuesday, June 25, 4:45PM-6:15PM, Room: ORLEANS, Chair: Tufan Kumbasar, Erdal Kayacan, and Hao Ying

4:45PM An Intelligent Control of an Inverted Pendulum Based on an Adaptive Interval Type-2 Fuzzy Inference System [#69]
Ayad Al-Mahturi, Fendy Santoso, Matthew A. Garratt and Sreenatha G. Anavatti
School of Engineering and Information Technology, The University of New South Wales, Canberra, ACT, 2612, Australia, Australia

5:03PM Learning Control of Tandem-Wing Tilt-Rotor UAV with Unsteady Aerodynamic Model [#115]
Yunus Govdeli, Sheikh Moheed Bin Muzaffar, Raj Raunak, Basman Elhadidi and Erdal Kayacan
Nanyang Technological University, Singapore; Aarhus University, Denmark

5:21PM A Novel Non-Iterative Parameter Estimation Method for Interval Type-2 Fuzzy Neural Networks Based on a Dynamic Cost Function [#322]
Khansesar Mojtaba Ahmadieh, Hassan Saima, Cambria Erik and Kayacan Erdal
Special Session SS10-2: Fuzzy System for Control and Diagnosis of Renewable Energy and Smart Grid
Tuesday, June 25, 4:45PM-6:15PM, Room: ST CLAUDE, Chair: Faa-Jeng Li

4:45PM  K Nearest Neighbour Optimal Selection in Fuzzy Inductive Reasoning for Smart Grid Applications [#154]
Sergio Jurado, Angela Nebot and Francisco Mugica
Universitat Politecnica de Catalunya, Spain

5:03PM  Model-based Fuzzy Control of Renewable Energy Power Plants: A holistic approach [#289]
Horst Schulte, Florian Poeschke and Zeineb Rania Labidi
University of Applied Sciences Berlin (HTW) Faculty 1: School of Engineering - Energy and Information Science, Germany; University Tunis El Manar Faculty of Sciences of Tunis, Tunisia

Session FA-2: Fuzzy Algorithms
Tuesday, June 25, 4:45PM-6:15PM, Room: ST. JEROME, Chair: Muhammad Amnul Islam

4:45PM  Fuzzy Type Input-Output Monadic Automata [#50]
Jiri Mockor
Ostrava University, Czech Republic

5:03PM  Orderings of Extensional Fuzzy Numbers [#121]
Martin Stepnicka, Michal Holcapek and Skorupova Nicole
University of Ostrava, Czech Republic

5:21PM  Fuzzy Initial Value Problems for Fuzzy Hypocycloid Curves [#320]
Daniel Sanchez, Vinicius Wasques, Estevao Esmi, Laecio Barros and Peter Sussner
University Austral of Chile, Chile; University of Campinas, Brazil

Session FLFS-3: Fuzzy Logic and Fuzzy Sets
Wednesday, June 26, 8:00AM-9:30AM, Room: CONDE, Chair: Giulianella Coletti

8:00AM  On pseudo-homogeneity of t-subnorms [#179]
Lucelia Lima, Marcus Rocha, Annaxsuel De Lima, Benjamin Bedregal and Humberto Bustince
University of the Amazon, Brazil; Federal University of Para, Brazil; Federal University of Rio Grande do Norte, Brazil; Public University of Navarre, Spain

8:18AM  Rotational Inverted Pendulum Controller Design using Indirect Adaptive Fuzzy Model Predictive Control [#193]
Roja Eini and Sherif Abdelwahed
PhD student, United States; Professor, United States

8:36AM  Interval Extension of the Generalized Atanassov's Intuitionistic Fuzzy Index using Admissible Orders [#216]
Lidiane Costa, Monica Matzenauer, Adenauer Yamin, Renata Reiser and Benjamin Bedregal
UFPe, Brazil; UFRN, Brazil

8:54AM  Fuzzy Octonion Numbers and Fuzzy Hypercomplex Numbers [#233]
Ricardo Augusto Watanabe, Estevao Esme Laureano and Cibele Trinca Watanabe
IMEC-UNICAMP, Brazil; FEEC-UNICAMP, Brazil

9:12 AM  A Functional Equation Stemming from a Characterization of Power-based Implications [#256]
Michal Baczynski, Wlodzimierz Fechner and Sebastia Massanet
University of Silesia in Katowice, Institute of Mathematics, Poland; Lodz University of Technology, Institute of Mathematics, Poland; University of the Balearic Islands, Department of Mathematics and Computer Science, Spain

Special Session SS1819: Special Session on Pre-Aggregation Functions and Generalized Forms of Monotonicity and on Applications of Pre-Aggregation Functions
Wednesday, June 26, 8:00 AM-9:30 AM, Room: FRONTENAC, Chair: Humberto Bustince, Gracaliz Dimuro, and Benjamin Bedregal

8:00 AM  Interval-valued pre-aggregation functions: a study of directional monotonicity of interval-valued functions [#266]
Mikel Sesma-Sara, Laura De Miguel, Radko Mesiar, Javier Fernandez and Humberto Bustince
Public University of Navarra, Spain; Slovak University of Technology, Slovakia

8:18 AM  The Mode of Interval-Valued Data [#313]
Tim Wilkin and Gleb Beliakov
Deakin University, Australia

8:36 AM  OWA Operators Based on Admissible Permutations [#230]
Daniel Paternain, Jin LeSheng, Radko Mesiar, Lucia Vavrikova and Humberto Bustince
Universidad Publica de Navarra, Spain; Nanjing Normal University, China; Slovak University of Technology, Slovakia

8:54 AM  Equivalence measures for Atanassov intuitionistic fuzzy setting used to algorithm of image processing [#184]
Barbara Pekala, Urszula Bentkowska, Javier Fernandez and Humberto Bustince
University of Rzeszow, Poland; Public University of Navarra, Spain

9:12 AM  On the Application of Preaggregation Functions to Fuzzy Pattern Tree [#207]
Pan Su, Tianhua Chen, Haoyu Mao, Jianyang Xie, Yitian Zhao and Jiang Liu
Chinese Academy of Sciences, China; University of Huddersfield, United Kingdom; Southern University of Science and Technology, China

Special Session SS15-2: Recent Advances in Fuzzy Control System Design and Analysis
Wednesday, June 26, 8:00 AM-9:30 AM, Room: ORLEANS, Chair: Kevin Gueton and Zoltan Nagy

8:00 AM  Robust Granular Feedback Linearization [#26]
Lucas Oliveira, Valter Leite, Anderson Bento and Fernando Gomide
CEFET-MG / Department of Mechatronics Engineering, Brazil; CEFET-MG / Department of Mechatronics Engineering, Brazil; UNICAMP / Department of Computer Engineering and Automation, Brazil

8:18 AM  Control Synthesis for Fuzzy Systems with Local Nonlinear Models Subject to Actuator Saturation [#214]
Anh-Tu Nguyen, Pedro Coutinho, Thierry-Marie Guerra and Reinaldo Palhares
On Robust Switched Controller Design to Minimize the Guaranteed Cost of Polynomial Fuzzy Systems [100]

Igor Thiago Minari Ramos, Uiliam Nelson Lendzion Tomaz Alves, Marcelo Carvalho Minhoto Teixeira, Edvaldo Assuncao, Rodrigo Cardim and Adalberto Zanatta Neder Lazarini
Sao Paulo State University (UNESP), School of Natural Sciences and Engineering, Ilha Solteira, Brazil; IFPR - Federal Institute of Education, Science and Technology of Parana - Campus of Jacarezinho, Brazil

Fuzziness Control of Fuzzimetric set

Issam Kouatli
LAU, Lebanon

Special Session SS2: Fuzzy Natural Language Processing
Wednesday, June 26, 8:00AM-9:30AM, Room: ST CLAUDE, Chair: Keeley Crockett and Joao Paulo Carvalho

2Gather4Health: Automatic Web Identification of Solutions in Patient Innovation [#250]
Joao N. Almeida, Salome Azevedo and Joao P. Carvalho
INESC-ID, Instituto Superior Tecnico, Universidade de Lisboa, Portugal; UCP - Catolica Lisbon School of Business and Economics, Portugal

Ontological and Fuzzy Set Similarity between Perception-Based Words [#196]
Valerie Cross, Valeria Mokrenko, Keeley Crockett and Naeemeh Adel
Miami University, United States; Manchester Metropolitan University, United Kingdom

Human Hedge Perception - and its Application in Fuzzy Semantic Similarity Measures [#221]
Naeemeh Adel, Keeley Crockett, Alan Crispin, Joao Paulo Carvalho and David Chandran
Manchester Metropolitan University, United Kingdom; Universidade de Lisboa, Portugal; Kings College London, United Kingdom

Special Session SS3: Fuzzy Hybrid Computing Applications in Construction Engineering and Management
Wednesday, June 26, 8:00AM-9:30AM, Room: ST. JEROME, Chair: Aminah Robinson

Consensus Building in Group Decision-Making for the Risk Assessment of Wind Farm Projects [#254]
Yajie Hao, Nebiyu Siraj Kedir, Nima Gerami Seresht, Witold Pedrycz and Aminah Robinson
Fayek
University of Alberta, Canada

Construction Industry Pursuit Intel Modeling Insights with FCM [#81]
Denise M. Case, Ty Blackburn and Chrysostomos Stylios
Northwest Missouri State University, United States; Burns and McDonnell Engineering Company, United States; University of Ioannina, Greece

A Fuzzy Novel Hybrid Genetic Algorithm for Time-Cost-Quality Trade-off Optimization in Project Scheduling [#315]
Nasser Shahsavari-Pour and Mojtaba Kazemi
8:54AM Feature Selection for Construction Organizational Competencies Impacting Performance [#102]
Getaneh Gezahegne Tiruneh and Aminah Robinson Fayek
University of Alberta, Canada

9:12AM On The Comparison of Fuzzy Interpolations and Neural Network Fitting Functions in Modeless Robot Calibrations [#46]
Ying Bai and Dali Wang
Johnson C. Smith University, United States; Christopher Newport University, United States

Special Session SS14-1: Recent Advances in Evolving Fuzzy Systems
Wednesday, June 26, 10:00AM-11:00AM, Room: FRONTE\-NAC, Chair: Igor Skrjanc and Fernando Gomide

10:00AM Multiobjective Optimization of Fully Autonomous Evolving Fuzzy Granular Models [#150]
Daniel Leite, Fernando Gomide and Igor Skrjanc
Federal University of Lavras (UFLA), Brazil; University of Campinas, Brazil; University of Ljubljana, Slovenia

10:18AM Adaptive Nonparametric Evolving Fuzzy Control for Uncertain Nonlinear Systems [#162]
Zhao-Xu Yang, Hai-Jun Rong, Plamen Angelov and Guang-She Zhao
Xi'an Jiaotong University, China; Lancaster University, United Kingdom

10:36AM Incremental clustering based on decomposed Cauchy-like density for imbalanced data classification from data stream [#164]
Igor Skrjanc, Saso Blazic, Goran Andonovski, Jose Iglesias, Araceli Sanchis and Daniel Leite
University of Ljubljana, Slovenia; Carlos III University of Madrid, Spain; Universidade Federal de Lavras, Brazil

Special Session SS19-1: Special Session on Applications of Pre-Aggregation Functions
Wednesday, June 26, 10:00AM-11:00AM, Room: ORLEANS, Chair: Gracaliz Dimuro and Humberto Bustice

10:00AM An intelligent and private method to profile social network users [#224]
Carmen De Maio, Carlo Blundo, Mimmo Parente and Luisa Siniscalchi
Dipartimento di Ingegneria dell'Informazione ed Elettrica e Matematica Applicata Universita' degli Studi di Salerno, Italy; Dipartimento di Scienze Aziendali, Management and Innovation Systems Universita' degli Studi di Salerno, Italy; Dipartimento di Ingegneria dell'Informazione ed Elettrica e Matematica Applicata, Universita' degli Studi di Salerno, Italy

10:18AM Generalized Fuzzy Partition in Galerkin Method for the Boundary Valued Problem [#183]
Linh Nguyen, Irina Perfilieva and Michal Holcapek
Institute for Research and Applications of Fuzzy Modelling, NSC IT4Innovations, University of Ostrava, Czech Republic

10:36AM Existence of Atanassov's Intuitionistic Fuzzy Definite Integrals [#228]
Mohd Shoaib Khan, Q. M. Danish Lohani and Zubair Ashraf
Session T2-1: Type 2 Fuzzy Sets  
*Wednesday, June 26, 10:00AM-11:00AM, Room: ST CLAUDE, Chair: Robert John*

10:00AM Hybrid Model of Interval Type-2 Neural Fuzzy Inference System and Mutual Subsethood with Applications [#232]
Sumati Vuppuluri, Patvardhan Chellapilla, Sandeep Paul, Lotika Singh and Mehar Swarup Vuppuluri  
Algoleap Technologies Pvt Ltd, India; Dayalbagh Educational Institute, India; Cisco Systems, United States

10:18AM Interval Type-2 fuzzy logic for dynamic parameter adjustment in the imperialist competitive algorithm [#321]
Emer Bernal, Oscar Castillo, Jose Soria and Fevrier Valdez  
Tijuana Institute of Technology, Mexico

10:36AM Just-In-Time Supply Chain Management Using Interval Type-2 Fuzzy Decision Making [#7]
Thomas Runkler, Chao Chen, Simon Coupland and Robert John  
Siemens AG, Germany; University of Nottingham, United Kingdom; De Montfort University, United Kingdom

Special Session SS5: Business Processes and Fuzzy Logic (BPFL)  
*Wednesday, June 26, 10:00AM-11:00AM, Room: ST. JEROME, Chair: Mario Luca Bernardi*

10:00AM A fuzzy logic based machine learning tool for supporting big data business analytics in complex artificial intelligence environments [#300]
Seokjin Ahn, Stefan Couture, Alfredo Cuzzocrea, Kevin Dam, Giorgio Grasso, Carson Leung, Kaleigh McCormick and Bryan Wodi  
University of Manitoba, Canada; University of Trieste, Italy; University of Messina, Italy

10:18AM Learning Analytics to Improve Coding Abilities: a Fuzzy-based Process Mining Approach [#283]
Pasquale Ardimento, Mario Luca Bernardi, Marta Cimitile and Giuseppe De Ruvo  
University of Bari, Italy; Giustino Fortunato University, Italy; Unitelma Sapienza, Italy; Independent IEEE Member, Italy

Special Session SS14-2: Recent Advances in Evolving Fuzzy Systems  
*Wednesday, June 26, 11:00AM-12:00PM, Room: FRONTENAC, Chair: Igor Skranc and Fernando Gomide*

11:00AM RedPAC A Simple Evolving Neuro-Fuzzy-based Intelligent Control Framework for Autonomous Aerial Vehicles [#229]
Md Meftahul Ferdaus, Mohamad Abdul Hady, Mahardhika Pratama, Sreenatha G. Anavatti and Harikumar Kandath  
School of Engineering and IT, UNSW Canberra, Australia; School of Computer Science and Engineering, Nanyang Technological University Singapore, Singapore

11:18AM Robust Evolving Neuro-Fuzzy Control of a Novel Tilt-rotor Vertical Takeoff and Landing Aircraft [#218]
Harikumar Kandath, Hady Abdul, Mahardhika Pratama and Bing Feng Ng
School of computer science and engineering, Nanyang Technological University, Singapore; School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore

11:36AM Modeling of Fuzzy Rule-base Algorithm for the Time Dependent Traveling Salesman Problem [#284]
Laszlo T. Koczy, Peter Foldesi, Boldizsar Tuu-Szabo and Ruba Almahasneh
Szechenyi Istvan University, Gyor, Hungary; Budapest University of Technology and Economics Budapest, Hungary, Hungary

Session C-3: Clustering
Wednesday, June 26, 11:00AM-12:00PM, Room: ORLEANS, Chair: Mika Sato-Ilic

11:00AM Optimizing the Performance of Rule-Based Fuzzy Routing Algorithms in Wireless Sensor Networks [#190]
Seyyit Alper Sert and Adnan Yazici
NATO Supreme Headquarters Allied Powers Europe (S.H.A.P.E.) Strategic Development and Preparation Directorate, Belgium; Department of Computer Science, School of Science and Technology, Nazarbayev University, Kazakhstan

11:18AM Quantification and Visualization for Difference of Fuzzy Clustering Results [#288]
Mika Sato-Ilic
University of Tsukuba, Japan

11:36AM A New Incremental Cluster Validity Index for Streaming Clustering Analysis [#122]
Omar Ibrahim, James Keller and Mihail Popescu
Department of Electrical Engineering and Computer Science, University of Missouri-Columbia, United States; Health Management and Informatics Department, University of Missouri-Columbia, United States

Session T2-2: Type 2 Fuzzy Sets
Wednesday, June 26, 11:00AM-12:00PM, Room: ST CLAUDE, Chair: Jon Garibaldi

11:00AM Autonomous Landing of UAV: a Comparison Between Type-1 and Type-2 Fuzzy Logic Systems [#6]
Eduardo Queiroz, Rodrigo Costa, Andre Marcato and Eduardo Aguiar
Pontifical Catholic University of Rio de Janeiro, Brazil; Federal University of Juiz de Fora, Brazil

11:18AM Type-2 Fuzzy Logic System Applied to a Temperature Control of an Electric Oven [#25]
Leonardo Serapiao, Eduardo Queiroz, Alexandre Santos, Tiago Coelho, Daniel Silveira and Eduardo Aguiar
Federal University of Juiz de Fora, Brazil; Pontifical Catholic University of Rio de Janeiro, Brazil

11:36AM On the Concept of Meaningfulness in Constrained Type-2 Fuzzy Sets [#175]
Pasquale D’Alterio, Jonathan Garibaldi and Robert John
University of Nottingham, United Kingdom

Special Session SS6-1: Fuzzy Logic for Security and Forensics
Wednesday, June 26, 11:00AM-12:00PM, Room: ST. JEROME, Chair: Longzhi Yang and Nitin Nik
11:00AM Improving Data Privacy using Fuzzy Logic and Autoencoder Neural Network [#90]
Sayantica Pattanayak and Simone A. Ludwig
North Dakota State University, United States

11:18AM Cyberthreat Hunting-Part 1: Triaging Ransomware using Fuzzy Hashing, Import Hashing and YARA Rules [#244]
Nitin Naik, Paul Jenkins, Nick Savage and Longzhi Yang
Ministry of Defence, United Kingdom; University of Portsmouth, United Kingdom; Northumbria University, United Kingdom

11:36AM Cyberthreat Hunting-Part 2: Tracking Ransomware Threat Actors using Fuzzy Hashing and Fuzzy C-Means Clustering [#245]
Nitin Naik, Paul Jenkins, Nick Savage and Longzhi Yang
Ministry of Defence, United Kingdom; University of Portsmouth, United Kingdom; Northumbria University, United Kingdom

Session AGG-2: Aggregation
Wednesday, June 26, 2:45PM-4:15PM, Room: CONDE, Chair: Marie-Jeanne Lesot

2:45PM Study of an Abating Aggregation Operator in Many-Valued Logic [#8]
Adrien Revault d’Allonnes and Marie-Jeanne Lesot
LIASD - Paris 8 University, France; LIP6 - Sorbonne University, France

3:03PM On obtaining Consensus Institute Rankings through Average Fuzzy Preference Aggregation [#226]
Sheikh Amanur Rahman, Md. Muzakkir Hussain and M. M. Sufyan Beg
Aligarh Muslim University, India

3:21PM The OWAWA operator with bonferroni means [#37]
Fabio Blanco-Mesa, Ernesto Leon-Castro and Jose M. Merigo
Universidad Pedagogica y Tecnologica de Colombia, Colombia; Universidad Catolica de la Santisima Concepcion, Chile; Universidad de Chile, Chile

3:39PM SENFIS - Selected Ensemble of Fuzzy Inference Systems [#189]
Errison Alves, Ricardo Tanscheit and Marley Vellasco
Pontificia Catholic University of Rio de Janeiro, Brazil

3:57PM An interval type-2 fuzzy MABAC group decision making approach based on non-additive fuzzy measure [#40]
Yingying Liang and Jindong Qin
School of Management, Wuhan University of Technology, China

Special Session SS6-2: Fuzzy Logic for Security and Forensics
Wednesday, June 26, 2:45PM-4:15PM, Room: FRONTENAC, Chair: Longzhi Yang and Nitin Naik

2:45PM Dendritic Cell Algorithm Enhancement Using Fuzzy Inference System for Network Intrusion Detection [#280]
Noe Elisa, Longzhi Yang, Xin Fu and Nitin Naik
Northumbria University, United Kingdom; Xiamen University, China; Ministry of Defense, United Kingdom

3:03PM Adaptive Activation Function Generation for Artificial Neural Networks through Fuzzy Inference with Application in Grooming Text Categorisation [#287]
An Intelligent Online Grooming Detection System Using AI Technologies [325]
Philip Anderson, Zheming Zuo, Longzhi Yang and Yanpeng Qu
Northumbria University, Great Britain; Dalian Maritime University, China

Fuzzy Rough Set Feature Selection to Enhance Phishing Attack Detection [267]
Mahdieh Zabihi, Dimitar Filev, Steven Szabowski and Reza Langari
Wright State University, United States

A Real-Time Fuzzy Learning Algorithm for Markov Chain and Its Application on Prediction of Vehicle Speed [316]
Qingyu Zhang, Dimitar Filev, Steven Szabowski and Reza Langari
Texas A-M University, United States; Ford Motor Company, United States

Special Session SS13: Adaptive Fuzzy Control for Nonlinear Systems
Wednesday, June 26, 2:45PM-4:15PM, Room: ORLEANS, Chair: Valentina Emilia Balas, Tsung-Chih Lin, and Rajeeb Dey

A Fuzzy Genetic System for Resilient Routing in Uncertain And Dynamic Telecommunication Networks [113]
Lewis Veryard, Hani Hagras, Andrew Starkey and Gilbert Owusu
University of Essex, United Kingdom; British Telecom, United Kingdom

Towards an Adaptive Control Strategy Based on Type-2 Fuzzy Logic for Autonomous Mobile Robots [312]
Felizardo Cuevas, Oscar Castillo and Prometeo Cortes-Antonio
Tijuana Institute of Technology, Mexico

Finite frequency state feedback controller design for T-S fuzzy continuous systems [55]
Abderrahim El-Amrani, Ahmed El Hajjaji, Ismail Boumhtiti and Abdelaziz Hmamed
USMBA, Morocco; University of Piccardie Jules Verne, France

Fuzzy Discrete Event Systems with Gradient-Based Online Learning [109]
Hao Ying, Feng Lin and Robert Sherwin
Wayne State University, United States

Session CWW: Computing with Words
Wednesday, June 26, 2:45PM-4:15PM, Room: ST CLAUDE, Chair: Mihail Popescu and Mary Tom

Linguistic optimization problems: solution methodology using perceptual reasoning [186]
Prashant Gupta and Pranab Muhuri
South Asian University, India

Computing with words for multi-objective linguistic optimization problems [204]
Prashant Gupta, Rahul Nath and Pranab Muhuri
South Asian University, India

A Linguistic Decision Making Model for Psychometric Tests [208]
Taniya Seth, Prashant Gupta and Pranab Muhuri
South Asian University, India
3:39PM A Study on the Interpretability of a Fuzzy System to Control an Inverted Pendulum [223]
Bahadir Zeren, Muhammet Deveci, Simon Coupland, Robert John and Ender Ozcan
University of Nottingham, United Kingdom; De Montfort University, United Kingdom

3:57PM On Comparing and Selecting Approaches to Model Interval-Valued Data as Fuzzy Sets [114]
Josie McCulloch, Zack Ellerby and Christian Wagner
University of Nottingham, United Kingdom

**Session RS: Rough Sets**
*Wednesday, June 26, 2:45PM-4:15PM, Room: ST. JEROME, Chair: Richard Jensen*

2:45PM Attribute Reduction for Fuzzy Relation Decision Systems on Two Universal Sets [44]
Qianchen Li and Zheng Hua
School of Information Science, Beijing Language and Culture University, China

3:03PM How to Merge Opinions by using Operations between Sequences of Orthopairs [237]
Stefania Boffa and Brunella Gerla
University of Insubria, Italy

3:21PM Exploiting Relevant Context with Soft-Rough sets in Context-Aware video recommender systems [317]
Syed Manzar Abbas and Khubaib Amjad Alam
National University of Computer and Emerging Sciences, Pakistan

3:39PM Effective Instance Selection Using the Fuzzy-Rough Lower Approximation [93]
Richard Jensen, Mehran Amiri and Neil Mac Parthalain
Aberystwyth University, United Kingdom; Universitat Hildesheim, Germany

3:57PM Strong law of large numbers for random variables valued by gradual numbers and closed
intervals of gradual numbers [165]
Michal Holcapek and Tomas Tichy
University of Ostrava, Czech Republic; TU-VSB Ostrava, Czech Republic

**Session MFI-4: Medical, Financial, Industrial**
*Wednesday, June 26, 4:45PM-6:15PM, Room: CONDE, Chair: Uzay Kaymak*

4:45PM A Novel Weighted Combination Method for Feature Selection using Fuzzy Sets [131]
Zixiao Shen, Xin Chen and Jonathan Garibaldi
University of Nottingham, United Kingdom

5:03PM Credit Score Modeling of Indonesian Micro, Small and Medium Enterprises Using Neuro-
Fuzzy Algorithm [282]
Felix Pasila
Petra Christian University, Indonesia

5:21PM Using hybrid systems in the construction of expert systems in the identification of cognitive and
motor problems in children and young people [92]
CEFET-MG, UNA Betim and UNI-BH, Brazil; UNA Contagem, Brazil; Una Betim, Brazil; UNA Betim, Brazil

5:39PM Fuzzy Multi-Constraint Programming Model for Weekly Meals Scheduling [151]
Mary Tom
Central Queensland University, Australia

**Session FR: Fuzzy Robotics**
*Wednesday, June 26, 4:45PM-6:15PM, Room: FRONTENAC, Chair: Gui DeSouza*

4:45PM  Fuzzy Approximated Optimal Trajectory Tracking of A Marine Vessel: Reinforcement Learning Approach [#67]
Xiaolei Li, Meng Joo Er, Shun-Feng Su and Ning Wang
Nanyang Technological University, Singapore; National Taiwan University of Science and Technology, Taiwan; Dalian Maritime University, China

5:03PM  Real-Time Mamdani-type Fuzzy Maneuvering Control of a Differential-Drive Mobile Robot [#278]
Thiago Ushikoshi, Rafael Nascimento, Pedro Coutinho, Thiago Chagas, Leizer Schnitman and Eduardo Palmeira
Universidade Estadual de Santa Cruz, Brazil; Universidade Federal de Minas Gerais, Brazil; Universidade Federal da Bahia, Brazil

5:21PM  A Study on Solving the Inverse Kinematics of Serial Robots using Artificial Neural Network and Fuzzy Neural Network [#311]
Jacket Demby's, Yixiang Gao and Guilherme DeSouza
University of Missouri-Columbia, United States

5:39PM  Development of Guide Robot that Lead and Consider Following User [#198]
Arakawa Toshiya and Kubota Naoyuki
Tokyo Metropolitan University, Japan

**Session FAPP: Fuzzy Applications**
*Wednesday, June 26, 4:45PM-6:15PM, Room: ORLEANS, Chair: Mika Sato-llic*

4:45PM  State Detection of Switch Cabinet Based on Multi-sensor Information Fusion [#98]
Lijun Lv, Kai Gao, Hua Huang, Gangjie Zhou, Xinlei Qiao and Lijun Jin
College of Electronics and Information Engineering, Tongji University, China; State Grid Shanghai Electric Power Research Institute, State Grid Shanghai Municipal Electric Power Company, China

5:03PM  Modelling of Hot Rolling in Metal Forming using an Interval Type-2 Fuzzy Extreme Learning Machine [#202]
Adrian Rubio-Solis, George Panoutsos, Ali Baraka and Tim Walker
University Of Sheffield, United Kingdom; University of Sheffield, United Kingdom; British Steel, United Kingdom

5:21PM  D-FRI-CiscoFirewall: Dynamic Fuzzy Rule Interpolation for Cisco ASA Firewall [#141]
Nitin Naik, Changjing Shang, Qiang Shen and Paul Jenkins
Ministry of Defence, United Kingdom; Dept. of Computer Science, Faculty of Business and Physical Sciences, Aberystwyth University, United Kingdom

**Session FA-3: Fuzzy Algorithms**
*Wednesday, June 26, 4:45PM-6:15PM, Room: ST CLAUDE, Chair: Muhammad Aminul Islam*
Chao Deng, Meng Joo Er and Ning Wang
Nanyang Technological University, Singapore; Dalian Maritime University, China

Soil Erosion Rate Prediction using Adaptive Neuro-Fuzzy Inference System (ANFIS) and Geographic Information System (GIS) of Wadi Sahel-Soummam Watershed (Algeria) [101]
Messaoud Djeddou, Ibrahim A. Hameed and Elhadj Mokhtari
Research Laboratory in Subterranean and Surface Hydraulics (LARHYSS), Faculty of Sciences and Technology, Mohamed Khider University of Biskra, Algeria. PO box 145 RP, 07000 Biskra, Algeria., Algeria; Department of ICT and Natural Sciences, Faculty of Information Technology and Electrical Engineering, Norwegian University of Science and Technology (NTNU), Postboks 1517, 6025 Alesund, Norway, Norway; Department of Hydraulic, Faculty of Technology, University of M'sila, M'Sila, Algeria., Algeria

Gene-Promoter-Sequence Recognition - an Interpretable and Accurate Fuzzy-Genetic Approach [73]
Marian B. Gorzalczany and Filip Rudzinski
Kielce University of Technology, Department of Electrical and Computer Engineering, Poland

Hierarchical Attention-based Fuzzy Neural Network for Subject Classification of Power Customer Service Work Orders [145]
Gangjie Zhou, Lijun Lv, Xinlei Qiao and Lijun Jin
Tongji University, China

Session FLFS4: Fuzzy Logic and Fuzzy Sets
Wednesday, June 26, 4:45PM-6:15PM, Room: ST. JEROME, Chair: Drew Buck

Modeling and control of nonlinear systems using an interactive software: A T-S fuzzy approach [249]
Michael Klug and Luis Filipe Pereira Silva
Federal Institute of Santa Catarina - IFSC, Brazil; Federal Center for Technological Education - CEFET, Brazil

The Natural Transformations with Fuzzified Commutativity [293]
Krystian Jobczyk and Patryk Galeczynski Patryk
AGH University of Technology, Poland

A debris removal plan for emergency response minimizing cost and time under Neutrosophic environment [140]
Deepshikha Sarma, Amrit Das and Uttam Kuamr Bera
NIT Agartala, India; VIT CHENNAI, India; NIT Agartala, India

Compatibility-Based Evidential Reasoning [327]
Mohammad Reza Rajati
University of Southern California, United States

A Novel Framework of Fuzzy Rule Interpolation for Takagi-Sugeno-Kang Inference Systems [64]
Pu Zhang and Qiang Shen
Aberystwyth University, United Kingdom
# FML-based Machine Learning Competition
for Human and Smart Machine Co-Learning on Game of Go
@ FUZZ-IEEE 2019

Website:
https://attend.ieee.org/fuzzieee-2019/competition/

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>8:00</td>
<td><strong>Session 1</strong>&lt;br&gt;Session Chairs: Chang-Shing Lee, Hung-Duen Yang, Li-Wei Ko, and Po-Hsun Cheng</td>
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<td>9:30</td>
<td>1. Go Game Demonstration with Brain-Computer-Interface (BCI)&lt;br&gt;Kai-Hsin Chang (5P, Black) vs. Facebook Open Source ELF OpenGo (White)&lt;br&gt;2. Competition Presentation on site or live on Facebook (video demo)&lt;br&gt;3. Game Demonstration for Human with BCI and Smart Machine Co-Learning on English/ Taiwanese Language</td>
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<td>9:30</td>
<td><strong>Break</strong></td>
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<tr>
<td>10:00</td>
<td><strong>Session 2</strong>&lt;br&gt;Session Chairs: Chang-Shing Lee, Hung-Duen Yang, Li-Wei Ko, and Po-Hsun Cheng</td>
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<tr>
<td>10:00</td>
<td>1. Go Game Demonstration with Brain-Computer-Interface (BCI)&lt;br&gt;Facebook Open Source ELF OpenGo (Black) vs. Kai-Hsin Chang (5P, White)&lt;br&gt;2. Game Demonstration for Human with BCI and Smart Machine Co-Learning on English/ Taiwanese Language&lt;br&gt;3. Game Demonstration for Human with BCI and Smart Machine Co-Learning on Robotic Edutainment (Music Demo)&lt;br&gt;4. Panel Discussion on Human and Smart Machine Co-Learning</td>
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Date: June 26, 2019  Place: Ile De France Ballroom