# IJCRS 2023

## All times are in Central European Summer Time (CEST) UTC +2

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### SESSION 1A Distances & Similarities, 05.10.2023 (Thursday), 11:40 - 13:40

#### Session chair: András Pataricza

Searching of potentially anomalous signals in cosmic-ray particle tracks images using rough k-means clustering combined with eigendecomposition-derived embedding

Tomasz Hachaj, Marcin Piekarczyk, Jarosław Wąs

Decision rule clustering - Comparison of the algorithms

Agnieszka Nowak-Brzezińska, Igor Gaibei **Clusters Evolution Before, During and After the Pandemic** 

Raavee Kadam, Pawan Lingras

Classifying token frequencies using angular Minkowski p-distance

Oliver Urs Lenz, Chris Cornelis

On k-NN class weights for optimising G-mean and F1-score

Grzegorz Góra, Andrzej Skowron

Towards ML Explainability with Rough Sets, Clustering, and Dimensionality Reduction

Marek Grzegorowski, Andrzej Janusz, Grzegorz Śliwa, Łukasz Marcinowski, Andrzej Skowron

### SESSION 1B Foundations 1 (online), 05.10.2023 (Thursday), 11:40 - 13:40

Session chair: Stefania Boffa & A Mani

Deterministic and Nondeterministic Decision Trees for Decision Tables with Many-valued Decisions from Closed Classes

Azimkhon Ostonov, Mikhail Moshkov

Paraconsistent Logics: A Survey Focussing on the Rough Set Approach

Bidhan Saha, Mohua Banerjee, Soma Dutta

Hexagons of Opposition in Linguistic Three-Way Decisions

Stefania Boffa, Davide Ciucci

Algebraic Models for Qualified Aggregation in General Rough Sets, and Reasoning Bias Discovery A Mani

Algebraic, Topological, and Mereological Foundations of Existential Granules

A Mani

Rough Fuzzy Concept Analysis via Multilattice

G Nguepy Dongmo, BB Koguep Njionou, L Kwuida, M Onabid

### SESSION 2A Applications 1, 05.10.2023 (Thursday), 14:40 - 16:20

Session chair: Michinori Nakata

Application of federated learning to prediction of patient mortality in vasculitis disease

Jan G Bazan, Pawel Milan, Stanislawa Bazan-Socha, Krzysztof Wójcil

Navigational Strategies for Mobile Robots Using Rough Mereological Potential Fields and Weighted Distance to Goal Aleksandra Szpakowska, Piotr Artiemjew, Wojciech Cybowski

Rule-based action mining from survival data

Marek Hermansa, Marek Sikora, Beata Sikora, Łukasz Wróbel

Rough Set Theory as Guiding Heuristics in IT System Diagnosis

András Földvári, András Pataricza

Using Rough Sets for Assessment of Uncertain Properties of Pyrowear 53 Ring Gears External Carburized Layers after High Pressure Gas Quenching

Łukasz Rauch, Krzysztof Bzowski, Maciej Pietrzyk, Jakub Łazarski, Ivan Milenin

## SESSION 2B Granular Models, 05.10.2023 (Thursday), 14:40 - 16:20

#### Session chair: Salvatore Greco

Unsupervised KeyPhrase Extraction Based on Multi-granular Semantics Feature Fusion

Jie Chen, Hainan Hu, Shu Zhao, Yanping Zhang

Multi-Granularity Feature Fusion for Transformer-based Single Object Tracking

Ziye Wang, Duoqian Miao Multi-granularity network for time series forecasting on multivariate time series data

Zongqiang Wang, Yan Xian, Guoyin Wang, Hong Yu Adaptive Multi-Granularity Aggregation Transformer for Image Captioning

Daitianxia Li, Ye Wang, Qun Liu

Granular Spectrum of Covering Rough Sets - Extended Abstract

Piotr Wasilewski, Dominik Ślęzak

SESSION 3A Rough Set Models, 06.10.2023 (Friday), 11:40 - 13:40					
Session chair: Jan Bazan					
Selected approaches to conflict analysis inspired by the Pawlak model - case study Małgorzata Przybyła-Kasperek, Rafał Deja, Alicja Wakulicz-Deja					
Challenges in Descriptor-Based Information Systems and Machine Learning by Rule Generation					
Hiroshi Sakai, Michinori Nakata					
Multi-heuristic Induction of Decision Rules					
Beata Zielosko, Evans Teiko Tetteh, Diana Hunchak					
Algebraic formulations and geometric interpretations of decision-theoretic rough sets					
Jianfeng Xu, Duoqian Miao, Li Zhang, Yiyu Yao					

Valuation Precision Rough Set Model and Generalized y-Decision Valuation

Soma Dutta, Dominik Ślęzak

Interrelationship between Discernibility and Monotonicity in Attribute Reduction Dominik Ślęzak, Soma Dutta

#### SESSION 3B Three-way Decisions, 06.10.2023 (Friday), 11:40 - 13:40

#### Session chair: Hong Yu

Three-way conflict analysis for three-valued situation tables with rankings and reference tuples

Shuting Liu, Mengjun Hu, Zhifei Zhang, Guangming Lang

Three-way social network analysis: Triadic measures at three levels

Yingxiao Chen, Yiyu Yao, Ping Zhu

Cognitive and Social Decision Making: Three-way Decision Perspectives

Yiyu Yao, JingTao Yao New models of three-way conflict analysis for incomplete situation tables

Chengmei Lin, Qimei Xiao, Huiying Yu, Guangming Lang

Granular-ball Three-way Decision

Xin Yang, Yanhua Li, Shuyin Xia, Xiaoyu Lian, Guoyin Wang, Tianrui Li

Normal fuzzy three-way decision based on prospect theory

Yanhua Li, Jiafen Liu, Yihua Zhong, Xin Yang

### SESSION 4A Cybersecurity & IoT, 06.10.2023 (Friday), 16:50 - 18:10

#### Session chair: Marcin Michalak & Piotr Synak

Preventing Text Data Poisoning Attacks in Federated Machine Learning by an Encrypted Verification Key Mahdee Jodayree, Wenbo He, Ryszard Janicki

Improving Detection Efficiency: Optimizing Block Size in the Local Outlier Factor (LOF) Algorithm Czesław Horyń, Agnieszka Nowak-Brzezińska

A New Data Model for Behavioral Based Anomaly Detection in IoT Device Monitoring

Marcin Michalak, Antoni Jamiołkowski, Błażej Adamczyk, Maksym Brzęczek, Marek Hermansa, Iwona Kostorz, Łukasz Wawrowski

Deriving Volumetric Anomalies from Huge Log Event Data Sets using Approximate SQL Engine (Extended Abstract) Janusz Borkowski, Agnieszka Chądzyńska-Krasowska, Joel Holland, Marcin Kowalski, Dominik Ślęzak, Piotr Synak, Arkadiusz Wojna, Jakub Wróblewski

## SESSION 4B Graphs & Complex Data, 06.10.2023 (Friday), 16:50 - 18:10

#### Session chair: Churn-Jung Liau

A Causal Disentangled Multi-Granularity Graph Classification Method

Yuan Li, Li Liu, Penggang Chen, Youmin Zhang, Guoyin Wang Link Prediction for Attribute and Structure Learning Based on Attention Mechanism

Renjuan Nie, Guoyin Wang, Qun Liu, Chengxin Peng

A Python Toolkit for Information Systems over Ontological Graphs

Krzysztof Pancerz

Mining Inter-sequence Patterns with Itemset Constraints

Anh Nguyen, Ngoc-Thanh Nguyen, Loan TT Nguyen, Bay Vo

#### SESSION 5A Foundations 2, 07.10.2023 (Saturday), 11:40 - 13:40

#### Session chair: Soma Dutta

Two-sorted Modal Logic for Formal and Rough Concepts

Prosenjit Howlader, Churn-Jung Liau

Kryszkiewicz's Relation for Indiscernibility of Objects in Data Tables Containing Missing Values

Michinori Nakata, Norio Saito, Hiroshi Sakai, Takeshi Fujiwara

Aggregation Operators on Shadowed Sets Deriving from Conditional Events and Consensus Operators

Stefania Boffa, Andrea Campagner, Davide Ciucci, Yiyu Yao

Pawlak, Belnap and the magical number seven

Salvatore Greco, Roman Słowiński A note on NP-hardness of deriving the simplest ensembles of rough-set-based decision models from the data -- the cases of decision bireducts and generalized decisions (Extended Abstract)

Dominik Ślezak

Symmetry of Attribute Decompositions Based on Generalized Decision Functions (Extended Abstract) Dominik Ślęzak

# SESSION 5B Feature Selection, 07.10.2023 (Saturday), 11:40 - 13:40

#### Session chair: Beata Zielosko

An Acceleration Method for Attribute Reduction Based on Attribute Synthesis

Chengzhi Shi, Taihua Xu, Fuhao Cheng, Xibei Yang, Jianjun Chen

Attribute Reduction Based on the Multi-annulus Model

Yan Liu, Jingjing Song, Taihua Xu, Jianjun Chen Monte Carlo Feature Filtering

Krzysztof Mnich, Witold R Rudnicki

Resilient feature subsets selection with approximate decision reducts and clustering for p-resilient e-constraint ensemble blending

Marek Grzegorowski, Eyad Kannout, Michał Grodzki, Hung Son Nguyen

Robust Aggregative Feature Selection to gain insight into the data Radosław Piliszek, Witold R Rudnicki

Reduction of binary attributes: rough set theory versus formal concept analysis Piotr Wasilewski, Janusz Kacprzyk, Sławomir Zadrożny

#### SESSION 6A Hybrid Approaches, 07.10.2023 (Saturday), 16:50 - 18:10 Session chair: Marcin Szczuka

Crisp-Fuzzy Concept Lattice Based on Interval-Valued Fuzzy Sets

Tong-Jun Li, Yi-Qian Wang

Rough-Fuzzy Hybrid Approach to Attribute Importance and Ranking

Sinh Hoa Nguyen, Hung Son Nguyen

A Probabilistic Rough Set Model Based on Bayesian Learning

Yoshifumi Kusunoki

On Several New Dempster-Shafer-inspired Uncertainty Measures Applicable for Active Learning Daniel Kałuża, Andrzej Janusz, Dominik Ślęzak

## SESSION 6B Applications 2 (online), 07.10.2023 (Saturday), 16:50 - 18:10

Session chair: Tomasz Hachaj

Clustering methods for adaptive e-commerce user interfaces

Adam Wasilewski, Mateusz Przyborowski

A Novel Hybrid Wind Speed Interval Prediction Model using Rough Stacked Autoencoder and LSTM

Qiuyu Mei, Hong Yu, Guoyin Wang

Time Factor in Diachronic Embedding for Temporal Knowledge Graph Completion

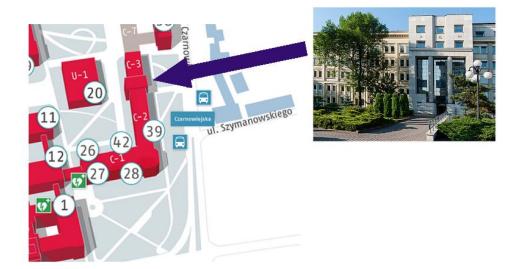
Thuy-Anh Nguyen Thi, Hieu Cong Nguyen, Xuan-Hieu Phan, Quang-Thuy Ha

Handling intra-class dissimilarity and inter-class similarity for imbalanced skin lesion images classification Shengdan Hu, Zhifei Zhang, Jiemin Yang

**Contributions** can be downloaded from <a href="https://ijcrs2023.agh.edu.pl/contributions.zip">https://ijcrs2023.agh.edu.pl/contributions.zip</a>

Password to archive will be sent to participants in e-mail.

The conference will be held in building C-2. The entrance is from Czarnowiejska street.



Room A - building C2 / 224 - 2nd floor Room B - building C2 / 221 - 2nd floor Lunch Room - building C2 / 429 - 4th floor