

**20th International Conference
Artificial Intelligence and Soft Computing**

Program

**All times are in Warsaw (Warszawa), Poland, CEST — Central European Summer Time
<https://www.timeanddate.com/time/zone/poland/warsaw>**

Zakopane (online), Poland, June 21-23, 2021

Program at a glance

Monday, June 21

8:30 - 8:35

Opening Ceremony - Leszek Rutkowski

Invited Talks, Chair: Rafał Scherer

8:35 - 9:20

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| Nikhil R. Pal | Artificial Intelligence: "Winters", "Booms", and what we might be missing |
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9:25 - 10:10

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| Jan Chorowski | Representation learning for speech and handwriting |
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10:30 - 11:45

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| Session 1A: Neural Networks and Their Applications 1 | Session 1B: Bioinformatics, Biometrics and Medical Applications 1 |
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12:00 - 13:15

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| Session 2A: Neural Networks and Their Applications 2 | Session 2B: Artificial Intelligence in Modeling and Simulation |
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13:00 - 14:30

Break

Invited Talks, Chair: Marcin Woźniak

14:30 - 15:15

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| Włodzisław Duch | Brain-inspired cognitive computing |
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Invited Talks

15:20 - 16:05

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| Janusz Kacprzyk | Advice giving and taking in decision aid, recommendation and support: the role of human judge and advisor |
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Tuesday, June 22

9:00 - 10:15

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| Session 3A: Neural Networks and Their Applications 3 | Session 3B: Computer Vision, Image and Speech Analysis 1 |
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10:30-11:45

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| Session 4A: Neural Networks and Their Applications 4 | Session 4B: Various Problems of Artificial Intelligence 1 |
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12:00 - 13:15

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| Session 5A: Data Mining 1 | Session 5: Various Problems of Artificial Intelligence 2 |
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Wednesday, June 23

9:00 - 10:15

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| Session 6A: Data Mining 2 | Session 6B: Various Problems of Artificial Intelligence 3 |
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10:30-11:45

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| Session 7A: Evolutionary Algorithms and their Applications | Session 7B: Computer Vision, Image and Speech Analysis 2 |
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12:00 - 13:15

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| | Session 8: Various Problems of Artificial Intelligence 4 |
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Detailed Program

Monday, June 21**8:30 - 8:35****Opening Ceremony, Room: Tatry (by Zoom)****Leszek Rutkowski****Invited Talks, Chair: Rafał Scherer, Room: Tatry (by Zoom)****8:35 - 9:20**

Nikhil R. Pal – “Artificial Intelligence: "Winters", "Booms", and what we might be missing”

9:25 - 10:10

Jan Chorowski – "Representation learning for speech and handwriting"

Session 1A: Neural Networks and Their Applications 1

Date/Time: 10:30-11:45, Mon., June 21, 2021

Room: Tatry (by Zoom), Chair: Grzegorz Dudek

Financial portfolio construction for Quantitative Trading using Deep learning technique
*Rasha Abdelkawy, Walid Abdelmoez, Amin Shoukry*Spectroscopy-Based Prediction of In Vitro Dissolution Profile Using Artificial Neural Networks
*Mohamed Azouz Mrad, Kristóf Csorba, Dorián László Galata, Brigitta Nagy, Zsombor Kristóf Nagy*Integrate-and-Fire Neurons for Low-Powered Pattern Recognition
*Florian Bacho, Dominique Chu*Clustering-Based Adaptive Self-Organizing Map
*Dominik Olszewski*Data-Driven Learning of Feedforward Neural Network with Different Activation Functions
*Grzegorz Dudek***Session 1B: Bioinformatics, Biometrics and Medical Applications 1**

Date/Time: 10:30-11:45, Mon., June 21, 2021

Room: Zakopane (by Zoom), Chair: Robert Cierniak

A New Statistical Iterative Reconstruction Algorithm for a CT Scanner with Flying Focal Spot
*Robert Cierniak, Piotr Pluta*RNA Folding Codes Optimization using the Intel SDK for OpenCL
*Mateusz Grużewski, Marek Palkowski*A Comparison of Machine Learning Techniques for Diagnosing Multiple Myeloma
*Luveshan Marimuthu, Nelishia Pillay, Rivak Punchoo*A New Multi-Filter Framework with Statistical Dense SIFT descriptor for Spoofing Detection in Fingerprint Authentication Systems
*Rodrigo Contreras, Luis Nonato, Maurílio Boaventura, Ines Boaventura, Bruno Coelho, Monique Viana*Cluster analysis of co-occurring human personality traits and depression
Marta Emirsajłow

| Session 2A: Neural Networks and Their Applications 2 Date/Time: 12:00-13:15, Mon., June 21, 2021 Room: Tatry (by Zoom), Chair: Maciej Jaworski | Session 2B: Artificial Intelligence in Modeling and Simulation Date/Time: 12:00-13:15, Mon., June 21, 2021 Room: Zakopane (by Zoom), Chair: Wojciech Rafajłowicz |
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| <p>Time-domain signal synthesis with style-based Generative Adversarial Networks applied to guided waves <i>Mateusz Heesch, Krzysztof Mendrok, Ziemowit Dworakowski</i></p> <p>Artificial Neural Network Based Empty Container Fleet Forecast <i>Joan Meseguer Llopis, Salvador Furió Prunonosa, Miguel Llop Chabrera, Francisco Javier Cubas Rodriguez</i></p> <p>Trend estimation under heteroscedasticity: Robust neural networks versus taut string <i>Jan Kalina, Petra Vidnerová, Jan Tichavský</i></p> <p>Convolutional Autoencoder Based Textile Defect Detection under Unconstrained Setting <i>Deepak Nagaraj, Pramod Vadiraja, Nalbach Oliver</i></p> <p>Quantifying the Severity of Common Rust in Maize Using Mask R-CNN <i>Nelishia Pillay, Mia Gerber, Dave Berger, Katherina Holan</i></p> | <p>Intelligent Virtual Environments with Assessment of User Experiences <i>Ahmet Kose, Eduard Petlenkov, Aleksei Tepljakov</i></p> <p>Intelligent performance prediction for powerlifting <i>Wojciech Rafajłowicz, Joanna Marszałek</i></p> <p>An approach to contextual time series analysis <i>Anton Romanov, Aleksey Filippov, Nadezhda Yarushkina</i></p> <p>Decision-making problems with local extremes: comparative study case <i>Bartłomiej Kizielewicz, Andrii Shekhovtsov, Wojciech Salabun, Andrzej Piegat</i></p> <p>Learning Shape Sensitive Descriptors for Classifying Functional Data <i>Wojciech Rafajłowicz, Ewaryst Rafajłowicz</i></p> |

Invited Talks, Chair: Marcin Woźniak, Room: Tatry (by Zoom)**14:30 - 15:15**

Włodzisław Duch – Brain-inspired cognitive computing

15:30 - 16:15

Janusz Kacprzyk – Advice giving and taking in decision aid, recommendation and support: the role of human judge and advisor

Tuesday, June 22

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| <p>Session 3A: Neural Networks and Their Applications 3 Date/Time: 9:00-10:15, Tuesday, June 22, 2021 Room: Tatry (by Zoom), Chair: Dawid Połap</p> | <p>Session 3B: Computer Vision, Image and Speech Analysis 1 Date/Time: 9:00-10:15, Tuesday, June 22, 2021 Room: Zakopane (by Zoom), Chair: Piotr Milczarski</p> |
| <p>Graph-based CNN-LSTM Stock Price Prediction Algorithm with Leading Indicators <i>Jimmy Ming-Tai Wu, Zhongcui Li, Youcef Djenouri, Dawid Polap, Gautam Srivastava, Jerry Chun-Wei Lin</i></p> <p>Federated learning model with augmentation and samples exchange mechanism <i>Dawid Polap, Gautam Srivastava, Jerry Chun-Wei Lin, Marcin Woźniak</i></p> <p>Applying Convolutional Neural Networks for Stock Market Trends Identification <i>Ekaterina Zolotareva</i></p> <p>Canine Behavior Interpretation Framework using Deep Graph Model <i>Lim Jongmin, Kim Donghee, Kim Kwangsu</i></p> <p>Factor Augmented Artificial Neural Network vs Deep Learning for Forecasting Global Liquidity Dynamics <i>David Alaminos</i></p> | <p>Classification of Dermatological Asymmetry of the Skin Lesions using Pretrained Convolutional Neural Networks <i>Michał Beczkowski, Norbert Borowski, Piotr Milezarski</i></p> <p>Active Learning Strategies and Convolutional Neural Networks for Mammogram Classification <i>Joao Marcelo Tozato, Pedro Henrique Bugatti, Priscila Tiemi Maeda Saito</i></p> <p>Contextual image classification through fine-tuned graph neural networks <i>Walacy S. Campos, Luis G. Souza, Priscila T. M. Saito, Pedro H. Bugatti</i></p> <p>A Computer Vision based approach for Driver Distraction Recognition using Deep Learning and Genetic Algorithm based Ensemble <i>Ashlesha Kumar, Kuldip Singh Sangwan, Dhiraj .</i></p> <p>RGB-D Odometry for Autonomous Lawn Mowing <i>Ochman Marcin, Skoczeń Magda, Krata Damian, Panek Marcin, Pawłowski Andrzej, Spyra Krystian</i></p> |
| <p>Session 4A: Neural Networks and Their Applications 4 Date/Time: 10:30-11:45, Tuesday, June 22, 2021 Room: Tatry (by Zoom), Chair: Mateusz Modrzejewski</p> | <p>Session 4B: Various Problems of Artificial Intelligence 1 Date/Time: 10:30-11:45, Tuesday, June 22, 2021 Room: Zakopane (by Zoom), Chair: Marcin Zalasinski</p> |
| <p>Possibilistic Classification Learning Based on Contrastive Loss in Learning Vector Quantizer Networks <i>Syedfakhredin Musavishavazi, Marika Kaden</i></p> <p>Quantum-hybrid Neural Vector Quantization – A Mathematical Approach <i>Thomas Villmann, Alexander Engelsberger</i></p> <p>Polynomial neural forms using feedforward neural networks for solving differential equations <i>Toni Schneiderei, Michael Breuß</i></p> <p>Efficient recurrent neural network architecture for musical style transfer <i>Mateusz Modrzejewski, Konrad Bereda, Przemysław Rokita</i></p> <p>Flexible Data Augmentation in Off-policy Reinforcement Learning</p> | <p>Impact of ELM parameters and investment horizon for currency exchange prediction <i>Jakub Morkowski</i></p> <p>Polynomial algorithm for solving cross-matching puzzles <i>Josef Hynek</i></p> <p>AI Alignment of Disaster Resilience Management Support Systems <i>Andrzej M.J. Skulimowski, Victor A. Banuls</i></p> <p>Simultaneous Contextualization and Interpretation with Keyword Awareness <i>Teppai Yoshino, Shoya Matsumori, Yosuke Fukuchi, Michita Imai</i></p> <p>Promises and Challenges of Reinforcement Learning Applications in Motion Planning of Automated Vehicles</p> |

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| <i>Panov Aleksandr, Rak Alexandra, Skrynnik Alexey</i> | <i>Nikodem Pankiewicz, Tomasz Wrona, Wojciech Turlej, Mateusz Orłowski</i> |
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| Session 5A: Data Mining 1 Date/Time: 12:00-13:15, Tuesday, June 22, 2021 Room: Zakopane (by Zoom), Chair: Janusz Starczewski | Session 5B: Various Problems of Artificial Intelligence 2 Date/Time: 12:00-13:15, Tuesday, June 22, 2021 Room: Zakopane (by Zoom), Chair: Christian Napoli |
| <p>Cognitive Consistency Models Applied to Data Clustering <i>Thales Maciel, Leonardo Emmendorfer</i></p> <p>Interactive Process Drift Detection Framework <i>Denise Maria Vecino Sato, Jean Paul Barddal, Edson Emilio Scalabrin</i></p> <p>Dynamic Ensemble Selection for imbalanced data stream classification with limited label access <i>Pawel Zyblewski, Michal Wozniak</i></p> <p>Pattern Mining in Conceptual Graphs <i>Adam Faci, Marie-Jeanne Lesot, Clair Laudy</i></p> <p>A Sparse Supervised Learning based on Combining Centroids: Optimization and Robustness <i>Jan Kalina, Ctirad Matonoha</i></p> | <p>Targeting the Most Important Words Across the Entire Corpus in NLP Adversarial Attacks <i>Reza Marzban, Johnson Thomas, Christopher Crick</i></p> <p>A Proposal for Hybrid Memories Management Exploring Fuzzy-Based Page Migration Policy <i>Lizandro Oliveira, Rodrigo Moura, Guilherme Schneider, Adenauer Yamin, Renata Reiser</i></p> <p>Selecting the Optimal Configuration of Swarm Algorithms for an NLP task <i>George Tambouratzis</i></p> <p>Simulation Analysis of Tunnel Vision Effect in Crowd Evacuation <i>Akira Tsurushima</i></p> <p>Exploiting Time Dynamics for One-Class and Open-Set Anomaly Detection <i>Christian Napoli, Stefano Simonazzi, Lorenzo Brigato, Riccardo Sartea, Alessandro Farinelli, Luca Iocchi</i></p> |

Wednesday, June 23

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| Session 6A: Data Mining 2 Date/Time: 9:00 - 10:15, Wednesday, June 23, 2021 Room: Tatry (by Zoom), Chair: Rafał Gryczuk | Session 6B: Various Problems of Artificial Intelligence 3 Date/Time: 9:00 - 10:15, Wednesday, June 23, 2021 Room: Zakopane (by Zoom), Chair: Piotr Duda |
| <p>Towards Synthetic Multivariate Time Series Generation for Flare Forecasting <i>Yang Chen, Dustin Kempton, Azim Ahmadzadeh, Rafal Angryk</i></p> <p>Constrained Clustering Problems: New Optimization Algorithms <i>Hatem Ibn-Khedher, Makhlof Hadji, Mohamed Ibn Khedher and Selma Khebbache</i></p> <p>Mining of High-Utility Patterns in Big IoT-based Databases <i>Jimmy Ming-Tai Wu, Gautam Srivastava, Jerry Lin, Youcef Djenouri, Min Wei, Dawid Polap</i></p> <p>Recommendation system for signal processing in SHM <i>Jakub Górski, Michał Dziendzikowski, Ziemowit Dworakowski</i></p> <p>The Extreme Value Evolving Predictor in Multiple Time Series Learning <i>Amanda O. C. Ayres, Fernando J. Von Zuben</i></p> | <p>Applying Machine Learning Techniques to Identify Damaged Potatoes <i>Alexey Osipov, Andrey Filimonov, Stanislav Suvorov</i></p> <p>Applying and Comparing Policy Gradient Methods to Multi-echelon Supply Chains with Uncertain Demands and Lead Times <i>Julio Cesar Alves, Diego Mello Silva, Geraldo Robson Mateus</i></p> <p>Study of the Influences of Stimuli Characteristics in the Implementation of Steady State Visual Evoked Potentials based Brain Computer Interface Systems <i>José Luis Murillo López, Johanna Carolina Cerezo Ramírez, Sang Guun Yoo</i></p> <p>Credit Risk Assessment in the Banking Sector based on Neural Network Analysis <i>Vera Ivanyuk, Egor Slovesnov</i></p> <p>Neural Network Model for the Multiple Factor Analysis of Economic Efficiency of an Enterprise <i>Vera Ivanyuk</i></p> |

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| Session 7A: Evolutionary Algorithms and their Applications Date/Time: 10:30-11:45, Wednesday, June 23, 2021 Room: Tatry (by Zoom), Chair: Krystian Łapa | Session 7B: Computer Vision, Image and Speech Analysis 2 Date/Time: 10:30-11:45, Wednesday, June 23, 2021 Room: Zakopane (by Zoom), Chair: Marcin Wozniak |
| <p>Multiobjective Evolutionary Algorithm for Classifying Cosmic Particles <i>Krzysztof Pytel</i></p> <p>Genetic algorithms in data masking: towards privacy as a service <i>Noel Hendrick, Torra Vicenc</i></p> <p>A new genetic improvement operator based on frequency analysis for Genetic Algorithms applied to Job Shop Scheduling Problem <i>Monique Viana, Rodrigo Contreras, Orides Morandin Junior</i></p> <p>A Learning Automata-based Approach to Lifetime Optimization in Wireless Sensor Networks <i>Jakub Gąsior</i></p> <p>Transmission of genetic properties in permutation problems: study of Lehmer code and Inversion table encoding</p> | <p>Using PMI to rank and filter edges in graphs of words <i>Marcela Ribeiro de Oliveira, Eduardo Jaques Spinosa</i></p> <p>An Efficient Technique for Filtering of 3D Cluttered Surfaces <i>Piyush Joshi, Alireza Rastegarpanah, Rustam Stolkin</i></p> <p>Multimodal Image Fusion Method Based on Multiscale Image Matting <i>Sarmad Maqsood, Robertas Damasevicius, Jakub Silka, Marcin Wozniak</i></p> <p>Architecture Monitoring and Reliability Estimation based on DIP Technology <i>Shah Faisal, Shah Zohaib, Sarmad Maqsood, Robertas Damasevicius, Michał Wieczorek, Marcin Wozniak</i></p> <p>Development and Research of Quantum Models for Image Conversion <i>Viktor Potapov, Sergey Gushanskiy, Alexey Samoylov</i></p> |

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| <p><i>Carine Khalil, Wahabou Abdou</i></p> <p>Harris hawks optimisation: using of an archive</p> <p><i>Bujok Petr</i></p> | |
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| | <p>Session 9B: Various Problems of Artificial Intelligence 4 Date/Time: 12:00 - 13:15, Wednesday, June 23, 2021 Room: Zakopane (by Zoom), Chair: Patryk Najgebauer</p> |
| | <p>The Usage of Possibility Degree in the Multi-Criteria Decision-Analysis Problems <i>Wojciech Salabun, Andrii Shekhovtsov, Bartłomiej Kizielewicz, Andrzej Piegat</i></p> <p>Ant-Based Hyper-Heuristics for the Movie Scene Scheduling Problem <i>Emilio Singh, Nelishia Pillay</i></p> <p>Time Dependent Fuel Optimal Satellite Formation Reconfiguration Using Quantum Particle Swarm Optimization <i>Olukunle Soyinka, Nwanze Nzekwu, Henry Akoma</i></p> <p>Generative Design Method Based on a Graph Transformation System <i>Grazyna Slusarczyk, Barbara Strug</i></p> <p>Aiding long-term investment decisions with XGBoost machine learning model <i>Ekaterina Zolotareva</i></p> |