

**Final Program**

**The 2024** **Second International Conference on Applied Intelligence**

**November 22-25, 2024 Zhengzhou, China**

**The 2024 Second International Conference on Applied Intelligence**

FINAL PROGRAM

**November 22-25, 2024**

**Zhengzhou, China**

**Outlines**

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**Welcome Message From General Chair**

The second International Conference on Applied Intelligence (ICAI 2024) will be held during November 22-25, 2024, Zhengzhou, Henan, China. The conference is started to provide an annual forum dedicated to the emerging and challenging topics in artificial intelligence, machine learning, pattern recognition, bioinformatics, and computational biology. It aims to bring together researchers and practitioners from both academia and industry to share ideas, problems, and solutions related to the multifaceted aspects of Applied Intelligence.

This year, the conference concentrated mainly on the theories and methodologies as well as the emerging applications of Applied Intelligence. Its aim was to unify the picture of contemporary Applied Intelligence techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications. Therefore, the theme for this conference was "Advanced Applied Intelligence Technology and Applications". Papers that focused on this theme were solicited, addressing theories, methodologies, and applications in science and technology.

ICAI 2024 received 228 submissions from 8 countries and regions. All papers went through a rigorous peer-review procedure and each paper received at least three review reports. Based on the review reports, the Program Committee finally selected 73 high-quality papers for presentation at ICAI 2024, included in volumes of proceedings published by Springer: two volumes of Communications in Computer and Information Science (CCIS).

The organizers of ICAI 2024, including the Society of International Computing, China, made an enormous effort to ensure the success of the conference. We hereby would like to thank the members of the Program Committee and the referees for their collective effort in reviewing and soliciting the papers. In particular, we would like to thank all the authors for contributing their papers. Without the high-quality submissions from the authors, the success of the conference would not have been possible. Finally, we are especially grateful to the International Neural Network Society, and the National Science Foundation of China for their sponsorship.

De-Shuang Huang

ICAI 2024 General Chair

**ICAI2024 Organization**

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Xiujin Wu

Xuan-Thuy Vo

Yan Wang

Yang Liu

Yang Lu

Yang Zhang

Yansen Su

Yao-Hong Tsai

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|  |  |
| --- | --- |
| **Co-organized by** | |
| 国际计算学会 | **国际计算学会**  **The Society of International Computing** |
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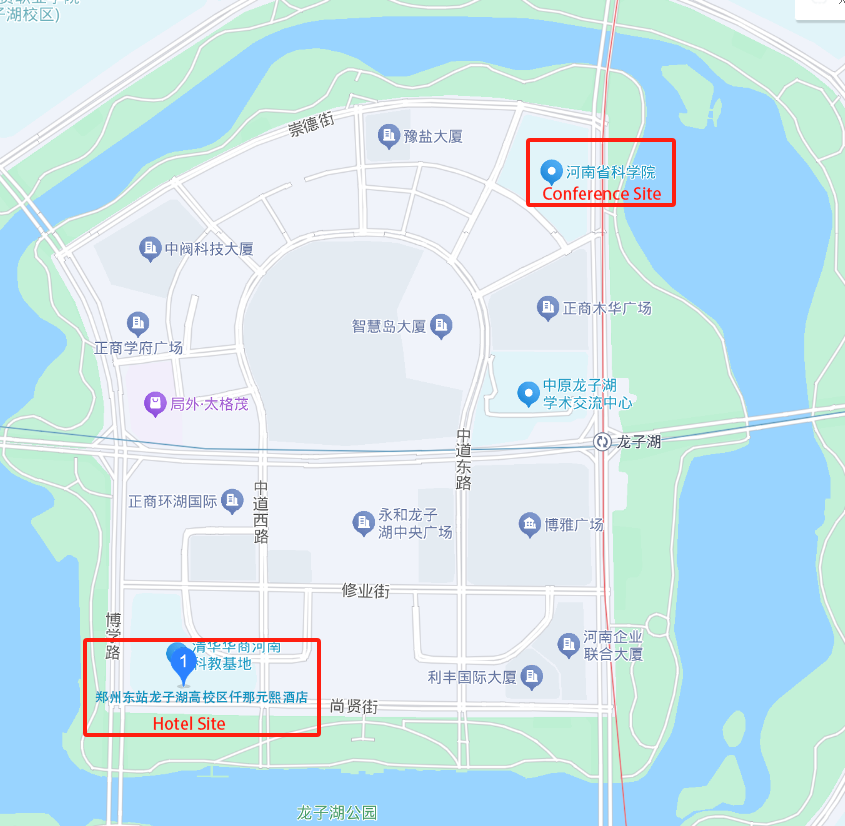
**The Location of Hotel and Conference Venues**

**Hotel Venue and Conference Venue**

The ICAI2024 hotel venue is Qianna Yuanxi Hotel (<http://www.qiannahotel.com/>) in Longzi Lake, Zhengzhou, located at Building A, No. 32 Shangxian Street, Boxue Road, Zhengdong New District. It is a five-star new Chinese style business hotel that integrates guest rooms, conference rooms, and catering services. The hotel covers an area of 22000 square meters and has a pleasant surrounding environment. Just 500 meters away from the hotel is the beautiful Longzi Lake. Surrounded by more than ten universities with a strong academic atmosphere, there are two large shopping malls, Taige Mao and Yonghe Time, located 1 kilometer away in the core area of the central island of Longzi Lake. It is a 10 minute drive from the high-speed railway east station and has convenient transportation. The hotel's Chinese elements cover various areas, leaving you with unforgettable memories after check-in. Longzi Lake Qianna Yuanxi Hotel is the ideal principle for your business meetings, tourism and vacation.

ICAI2024 conference venue is Henan Academy of Sciences (<https://www.hnskxy.com/>) in No. 228 Chongshili, Zhengdong New District, Zhengzhou City, Henan Province.

**Location for Qianna Yuanxi Hotel and Henan Academy of Sciences**

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**General Information**

**I. Conference Working Language**

English is the official language of the conference.

**II. Conference Registration**

The ICAI 2024 registration desk, located in the lobby of Qianna Yuanxi Hotel, Zhengzhou, the first floor, will be open during the following hour:

* November 22, 2024 (Friday) 4:00pm-8:00pm
* November 23, 2024 (Saturday) 8:00am-12:00am

**III. Virtual Meeting on 2024/11/24**

The used Virtual Meeting for ICAI2024 is VooV one based on Tencent Cloud, and the website is <https://voovmeeting.com/>. The Room information is as follows:  
**Virtual Room, 2024/11/24: ID number: 309-579-648**

**IV. Information for Oral Presenters**

* Please prepare a 15-minute PowerPoint (PPT) slide. Your actual presentation time may depend on the number of presentations in your session.
* Please check this Final Program for your presentation time and room. Please go to the room five minutes before the session starts and report to the Session Chair.
* Please follow the instructions of the Session Chair(s) not to exceed your time allotted to you by them.
* If the Session Chair(s) is/are absent from the session, the last speaker is requested to serve as the Session Chair.

**V. Information for Session Chairs**

The Organizing Committee would like to ask for your kind help as Session Chair (s). If you cannot fulfill your duties as session chair, please try to make sure that someone else will take your place as Session Chair(s).

As a Session Chair, you are kindly requested to help at the following:

* Arrive at the room of the session at least 5 minutes before the session starts and identify each of the speakers for the session.
* Calculate and announce the time allocated for each paper in your session for only the authors present before the session starts.
* The time allocated to a paper may be different in different sessions, due to uneven distribution of papers in different areas and a small number of absentees due to visa and other reasons. Request the presenters to leave 2 minutes for question and answers.
* Each oral presentation room is equipped with an LCD projector. If something is not working properly, please contact conference helper in the room.

**Schedule Overview**

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| --- | --- | --- | --- |
| **Date** | **Morning** | **Afternoon** | **Site** |
| November 22  Friday | **Registration (4:00pm -9:00pm)** | | **The Lobby of Qianna Yuanxi Hotel** |
| **Reception/ Banquet time** | | **Qianna Yuanxi Hotel** |
| November 23  Saturday | **Central Plains Artificial Intelligence Industry Technology Matchmaking Activity（中原人工智能产业技术对接活动）**  **Including onsite Plenary speech for** **Chuanlei Zhang** | **Oral presentation** | **Henan Academy of Sciences** |
| **Coffee Break** |
| **Oral presentation** |
| **Lunch time** | **Dinner time** | **Henan Academy of Sciences** |
| November 24  Sunday | **8:20am -9:00am: Online Plenary speech for Riad Taha Al-Kasasbeh** | **Free Activity** | **Henan Academy of Sciences** |
| **9:00am -12:30am: Online Oral presentation**  **(Coffee Break for all morning time)** |
| **Lunch time** | **Banquet time** | **Qianna Yuanxi Hotel** |
| November 25  Monday | **Free Activity** | |  |

**Introduction of Plenary Speakers**

**Plenary Speaker I: Riad Taha Al-Kasasbeh**

**Bioimpedance Spectroscopy for Disease Assessment Using Intelligent Classifiers and Voigt Model Optimization**

Riad Taha Al-Kasasbeh PhD. Professor

Postdoctoral Fellow of Konstanz University (Germany)

Mechatronics engineering-School of Engineering, the University of Jordan

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**Abstract:** A novel bioimpedance spectroscopy method is introduced; the proposed method can help in the development of objective and accessible criteria for disease assessment, in addition to evaluating the effectiveness of treatment methods. The proposed method can be utilized to develop criteria for conservative therapy options and surgical interventions in severe cases. The method employs a recurrent Voigt model to represent biomaterial segment impedance. For each biomaterial segment model, a Cole plot is drawn in a given frequency range. The model parameters allow the formation of descriptors for multimodal classifiers of the functional state of living systems and parameters of the model links. To confirm the validity of the classifier, a group of patients diagnosed with pneumonia have been tested. To obtain bioimpedance analysis data, an electrode belt was placed on the chest of each patient, and impedance diagrams corresponding to a certain combination of electrodes were determined. The quality indicators of various classifier models reached 78% and were above 62%.

**Bio-Sketch:** Riad Taha Al-Kasasbeh earned his MS in Engineering Science and Ph.D. in Controlling Biological and Electronic Equipment from Saint-Petersburg Electrotechnical University ETU “LETI”. He furthered his academic pursuits as a postdoctoral fellow at Konstanz University (Germany). Currently, he holds the position of Professor at the University of Jordan. He is a prolific researcher and has co-authored over 120 papers published in reputable journals and conferences including Springer, IEEE, Taylor & Francis, IASTED, Inderscience, and Elsevier. Professor Al-Kasasbeh has held Visiting Professorships at several esteemed universities, including Philadelphia University, Konstanz University (Germany) (HTWG), Karaganda State Industrial University (Kazakhstan), and "Moscow Power Engineering Institute" (MPEI). He has also served as a Research Fellow of DFG at the HTWG. His research interests encompass a wide array of topics, including Artificial Intelligence, Biomedical Instrumentation, Biophysics, Acupuncture, Fuzzy Logic Decision-Making, Medical and Ecology Information Systems, and Ergonomics. He is a sought-after keynote speaker at international conferences, where he presents his groundbreaking work.

Professor Al-Kasasbeh's contributions to the field include the development of novel clinical methods for predicting and diagnosing heart and stomach diseases. He has also devised features for determining the level of psycho-emotional tension in man-machine system operators using bio-active points based on fuzzy logic rules. Furthermore, he has successfully managed research and development projects that conduct scientific research for both local and international industry and medical departments and organizations.

**Plenary Speaker Ⅱ: Chuanlei Zhang**

**Three-way Decision in Artificial Intelligence**

Chuanlei Zhang Prof. & Ph.D

School of Artificial Intelligence, Tianjin University of Science and Technology, Tianjin, China

[97313114@tust.edu.bn](mailto:97313114@tust.edu.bn)

**Abstract:** A theory of three-way decision concerns thinking, problem solving, and computing in threes or through triads. The triad of Symbols-Meaning-Value spaces combines three powerful ideas, namely, a trilevel categorization of communications problems in terms of the symbols-meaning-effectiveness of a message, the data-knowledge-wisdom (DKW) hierarchy in information science, and the triad of perception-cognition-action in cognitive science and psychology. In this presentation, Professor Zhang will explain artificial intelligence (AI) from the perspective of cognitive computing based three-way decision (3WD) theory. Professor Zhang also propose a Machine-People-Government triangular model for smart agriculture (MPGSA), emphasizing the roles of machines, human contributors, and government. Additionally, Professor Zhang introduce a conceptual three-level framework based on the Symbol-Meaning-Value (SMV) space (SMV4SA) for smart agriculture. This framework delineates the nine critical roles of machine, people, and government across three layers: agricultural data acquisition, knowledge discovery, and decision-making.

**Bio-Sketch:** Chuanlei Zhang (M’07) from Yiyuan, China, born on Oct. 09, 1973, received the B.S. from Taiyuan University of Technology and M.S. & Ph.D. degrees from China University of Mining and Technology (Beijing), China, in 1995, 1998, and 2006, respectively, all in electrical engineering. Since Oct. 2013, he has been with the College of Artificial Intelligence at Tianjin University of Science and Technology, China, where he is now a full professor. Since Sept. 2010, he had been with the Department of Electrical and Computer Engineering, Ryerson University, Canada, as Post-doc of Communication and Signal Processing Applications Laboratory (CASPAL). From 2000 to 2010, he was a Software Manager, Senior Software Engineer at Motorola (China). His research interests include Pattern Recognition, Data Mining, Computational Intelligence and applications in Bioinformatics.

Professor Chuanlei Zhang ’s current research interests are theory of three-way decision, pattern recognition and understanding, image recognition, Internet of Things (IoT), deep learning. Chuanlei has published over 80 technical papers in these areas in international conferences, journals and jointly holds three Chinese national patents.

**Parallel Sessions Schedule**

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| **Time Room** | **Afternoon November 23, Saturday 13:30-18:00** |
| Room A | **Theories and Algorithms  Chair:** Wei Chen |
| Room B | **Models and Systems  Chair:** Lin Yuan |
| **Time Room** | **Morning November 24, Sunday 09:00-12:45** |
| Online | **Theories and Algorithms Chair:** Lingyue Li |

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| **Detailed Parallel Sessions for Oral Presentations** | | |
| Afternoon, November 23, Saturday, 13:30-18:00, Room A | | |
| **Theories and Algorithms** | | |
| **Chair: Wei Chen** | | |
| Paper 166 13:30-13:48 | **Performance Analysis of Image Augmentation Driven by Language Based on Diffusion Models** *Wei Chen, Peng Zhou, Lina He, Huan Wang, and Bingyu Cao* |
| Paper 118 13:48-14:06 | **The Future of Edge Detection in Image Processing** *Prashan Premaratne, Peter Vial, and Zijian Ye* |
| Paper 125 14:06-14:24 | **Research on Emotional Interaction in Anthropomorphic AI Systems** *Chengcong Yao, Zetian Dai, and Zhiqiang Dai* |
| Paper 174 14:24-14:42 | **Underwater Image Enhancement Method Based on Contrast Stretching and Lab Color Space Correction** *Jianlei Chen, Zuheng Wang, Jun Hu, Quanyu Wang, and Guanyu Chen* |
| Paper 179 14:42-15:00 | **Research on temperature adaptive wavelength assignment based on improved ant colony algorithm in photonic network on chip** *Aijun Zhu, Liyun Cao, Cong Hu, Chuanpei Xu, and Zhanqi Gu* |
| Paper 188 15:00-15:18 | **Environmental sound recognition based on multi-scale parallel convolutional network model** *Ruixia Jin, Yingge Zhao, Liang Chen, Zhichong Geng, Shuaibin Wang, and Lixue Zheng* |
| Paper 192 15:18-15:36 | **EEG Epileptic Seizure Detection Based on Fused Brain Functional Networks** *Pengfei Zhou, Yijie Pan, Xun Zhang, Jibin Shou, Jiayang Guo, Meiyan Xu, and Peipei Gu* |
| 15:36-16:06 | **Coffee Break** |
| Paper 202 16:06-16:24 | **A transient overvoltage suppression method for photovoltaic devices based on particle swarm algorithm** *Lin Cheng, Yuwei Ju, Ning Chen, Yichao Jia, and Hongying Zhang* |
| Paper 206 16:24-16:42 | **A Graph Partitioning Optimization Method for Distributed GNN Training** *Yunfei Li, He Li, Shuqi Yang, Sihao Zhang, and Jianbin Huang* |
| Paper 221 16:42-17:00 | **Antenna Optimization based on Neural Network for M2I Underground Wireless Sensor Network** *Yibin Zhang, Xiurui Shang, Xumin Jia, and Jianjun Hao* |
| Paper 236 17:00-17:18 | **Occluded Pedestrian Re-Identification Based on Deep Multi-scale Generative Adversarial Networks** *Di Wu, KaiLi Shao, and Bing Hu* |
| Paper 145 17:18-17:36 | **Research on PM2.5 Concentration Prediction Based on SARIMA-RBF Concatenated Modeling** *FengYue Jiang, YinTong Zhang, ChenXi Zhao, Zhen Shen, BaoSheng Wang, and Wei Liu* |
| Paper 171 17:36-17:54 | **Research on Automatic Voiceprint Acquisition Method based on Deep Learning** *Quan Sun, Ronghua Zhang, Yingchun Liu, Zemeng Liu, and Wei Chen* |
| Afternoon, November 23, Saturday, 13:30-18:00, Room B | | |
| **Models and Systems** | | |
| **Chair: Lin Yuan** | | |
| Paper 139 13:30-13:48 | **Design and Implementation of Takeaway Ordering Recommendation System Based on Python and Flask** *Junjie Cao, Wendong Yu, Hongwei Wei, Lin Yuan, and Zhujun Li* |
| Paper 162 13:48-14:06 | **Deep Supervised Cone-Based Nonnegative Matrix Factorization in Image Pattern Space** *Jinghui He, Wen-Sheng Chen, Binbin Pan, and Bo Chen* |
| Paper 173 14:06-14:24 | **The GraphRAG-Driven Automated Analysis Method for Coal Mine Dispatch Room Calls** *Quan Sun, Ronghua Zhang, Yingchun Liu, Zemeng Liu, Jueting Liu, and Wei Chen* |
| Paper 177 14:24-14:42 | **Two-Stage Speech Emotion Recognition Method for Coal Mining Applications** *Zhao Xiaohua, Xu Lihua, Zhang Ronghua, Gong Min, Lin Guoyuan, Chen Wei, Li Hengbo, and Liu Yingchun* |
| Paper 181 14:42-15:00 | **A Survey to Time Series Anomaly Detection in Different Data Structures** *Yinglun Dong, Chuanlei Zhang, Bing Zhen, and Yuchao Zhu* |
| Paper 207 15:00-15:18 | **Simplify prompt template and optimum Label-Select for few-shot NER** *Xiao Qin, Sijing Tan, Xin Chun, Zhengyou Qin, Yongyu Li, Yunqing Fu, Wenji Wang, and Jinyong Zhang* |
| Paper 116 15:18-15:36 | **Single Cell RNA-seq Analysis Reveals Similarities between Colorectal, Liver and Lung T cells’ Populations** *Bacem Saada, Chen Qu, Estevao Siga, and Jing Zhang* |
| 15:36-16:06 | **Coffee Break** |
| Paper 156 16:06-16:24 | **Causal Inference-based Feature Selection Method for Identifying Alzheimer's Disease Biomarker** *Jingxin Wu, Zhao Liu, Xiaolong Zhou, Yuchen Huang, Caihua Liu, and Chaowang Lan* |
| Paper 189 16:24-16:42 | **RECNN: A Novel Deep Learning Model to Predict 8-state Protein Secondary Structure** *Long Cheng, Yiyi Xia, Yiming Lu, Jiyun Shen, Yi Qiu, Haipeng Zhao, and Weizhong Lu* |
| Paper 154 16:42-17:00 | **Leptotrichia Wadei Classification with Machine Learning** *Zhenyu Hao, Qi Wang, and Wenzheng Bao* |
| Paper 155 17:00-17:18 | **Prevotella’s Genomics Sequence Classification with Artificial Intelligence** *Shutting Li, Qi Wang, Wenzheng Bao, and Xunguang Ju* |
| Paper 157 17:18-17:36 | **Proteobacteria Genomics Sequence Identification with Ensemble Classification Model** *Shuting Li, Qi Wang, Wenzheng Bao, and Xunguang Ju* |
| Paper 158 17:36-17:54 | **Staphylococcus Genomics Sequence Identification with Gradient Boosting Machine** *Shutting Li, Qi Wang, Wenzheng Bao, and Xiangying Dang* |
| Paper 138 17:54-18:12 | **A New and Efficient IT knowledge Exchange Platform** *Jinting Sha, Wendong Yu, Hongwei Wei, Lin Yuan, and Zhujun Li* |

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| Morning, November 24, Sunday, 09:00-12:45, Online | | |
| **Theories and Algorithms** | | |
| **Chair: Lingyue Li** | | |
| Paper 101 09:00-09:15 | **Decoding The Emerging Technological Patterns And The Spatial Structure in Inventive Yangtze River Delta, China: A Patent Data Analysis** *Lingyue Li, Lie Wang, Yiwen Chen, and Huizhi Geng* |
| Paper 163 09:15-09:30 | **Enhancing Satellite Image Resolution Using Super Resolution Techniques** *Vladimir Berezovsky, Alexander Kamenev, Ivan Sharshov, Kseniya Shoshina, Irina Vasendina, Roman Aleshko, and Tatyana Desyatova* |
| Paper 169 09:30-09:45 | **Super-resolution of satellite images using Landsat data** *Ivan Sharshov, Vladimir Berezovsky, Kseniya Shoshina, Roman Aleshko, and Irina Vasendina* |
| Paper 106 09:45-10:00 | **Product Detection in Unmanned Supermarkets Based on Optimized YOLOv8** *Fujun Zhao, Lekai Gao, He Yang, and Lin Gan* |
| Paper 150 10:00-10:15 | **Research on Exchange Rate Forecasting Based on LSTM-Transformer Fusion Model** *Yihan Zhao, Jiayao Xu, Sida Yang, and Yuhong Guo* |
| Paper 187 10:15-10:30 | **Motor Imagery EEG Signals Decoding with Multi-view Weighted Features** *Nan Li, Wangsen Li, Tingting Zhang, Dong Huang, Junfeng Han, and Xiangzeng Kong* |
| Paper 103 10:30-10:45 | **Classifiers of the functional state of living systems based on Voigt model optimization** *Riad Taha. Al-kasasbeh, Sergey Filist, Ashraf Shaqadan, Olga Shatolova, Evgeny Starkov, Nikolay A. Korenevskiy, Osama M. Al-Habahbeh, Emad Saleh Tarawneh, Ilyash Maksim, Karina Miroshnikova, Andrey Miroshnikov, and Altyn A. Aikeyeva* |
| Paper 160 10:45-11:00 | **A Prompt and Contrastive Learning-Based Model for Plant Antimicrobial Peptide Prediction** *Zhaojing Qin, Jun Meng, Haibin Li, Youwei Tang, and Yushi Luan* |
| Paper 212 11:00-11:15 | **Adaptive Nuclear Norm Regularization Model for Prediction of Potential Small Molecule–miRNA Associations** *Ran Tao, HongJie Wu, Cen Gu, and Jing Chen* |
| Paper 218  11:15-11:30 | **Domain Adaptation for Semantic Segmentation of Cataract Surgical Images based on Masked Image Consistency**  *Yuzhu Zhang, Yijie Pan, Mingyang Ou, Guanghui Gong, and Heng Li* |
| Paper 107 11:30-11:45 | **Computational Analysis of a Virtual Assistant Supporting the Use of Home Health Devices: an Adaptive Network Model** *Jildou Bezembinder, Miriam Cadoni, Ashley de Waal, Charlotte Hoffmans, Judith van Ommen, Niek Jan van den Hout, Jan Treur, and Peter H.M.P. Roelofsma* |
| Paper 108 11:45-12:00 | **Electromagnetic Signature Management on the Battlefield: Computational Analysis by Adaptive Network Modelling** *Raymon de Jong, Dannah Geerman, Amy Oduber, Bjorn Paterson, Katya Popova, Natalia Zwarts, Debby Bouma, Jan Treur, and Peter H.M.P. Roelofsma* |
| Paper 110 12:00-12:15 | **Breaking through Escalation of Commitment and Groupthink in Cyber Risk Management by AI Coaching: a Network-Oriented Computational Analysis** *Ertan Belkuyu, Thomas Bijl, Joao Reis Nobre Dos Santos, Jan Ioannis Sevdalakis, Charlotte Hoffmans, Jan Treur, and Peter H.M.P. Roelofsma* |
| Paper 111 12:15-12:30 | **Analysis of Management of Phishing Attack Risks Based on an Adaptive Network Model** *Flavia Lepădatu, Teodora Mihăilescu, Senne Spaan, Paula Ţiţei, Marjolein van der Vossen, Niek Jan van den Hout, Charlotte Hoffmans, Jan Treur, and Peter H.M.P. Roelofsma* |
| Paper 112 12:30-12:45 | **Enhancing Cyber Resilience Securing Governmental Applications for Citizens: Computational Analysis** *Yusuf Babayusuf, Debby Bouma, Anastasia Feteasco, Lowna van Hekezen, Jane Vasov, Natalia Zwarts, Jan Treur, and Peter H.M.P. Roelofsma* |



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