IUKM 2023

The 10th International Symposium on
Integrated Uncertainty in Knowledge Modelling and Decision Making

Ishikawa, Japan, November 2 – 4, 2023

JAIST – ISHIKAWA HIGH-TECH CENTER

1-1 Asahidai, Nomi, Ishikawa 923-1211

THU, 2ND NOVEMBER [Japan Advanced Institute of Science and Technology]

8:00 – 9:00 **Registration**

9:00 – 9:30 **Opening** [KS Lecture Hall, 2nd floor, KS Building]

- **Greetings by JAIST Vice-President Youji Kohda**
- **Opening Remarks by General Chair Masahiro Inuiguchi**
- **IUKM 2023 Brief Summary: Katsuhiro Honda, Bac Le, Van-Nam Huynh**

9:30 – 10:30 Plenary 1 [KS Lecture Hall]

On Uncertainty in Partially Identified Models

Hung T. NGUYEN, New Mexico State University, USA; Chiang Mai University, Thailand

Chair: Vladik KREINOVICH

10:30 – 11:00 Coffee break [Entrance Door, ground floor of KS Building]

11:00 – 12:00 Plenary 2 [KS Lecture Hall]

Two Classes of Fuzzy Clustering: Their Theoretical Contributions

Sadaaki MIYAMOTO, University of Tsukuba, Japan

Chair: Masahiro INUIGUCHI

12:00 – 13:30 Lunch [Lunch boxes will be served]

13:30 – 15:30 Parallel Session 1: **Uncertainty Management and Decision Support I** [KS Lecture Hall]
Chair: Churn-Jung Liau

Many-valued Judgment Aggregation – Some New Possibility Results
Sebastian Uhl, Christian G. Fermuller

Free Quantification in Four-Valued and Fuzzy Bilattice-Valued Logics
Libor Behounek, Martina Daňková, Antonin Dvorak

Weighted Fuzzy Rules Based on Implicational Quantifiers
Martina Daňková

Differentially Private Probabilistic Social Choice in the Shuffle Model
Ding Qingyuan, Keke Sun, Lixin Jiang, HB Zhou, Chunlai Zhou

Exploring the Impact of Randomness in Roguelike Deck-Building Games: A Case Study of Slay the Spire
SangGyu Nam, Pavinee Rerkjirattikal

13:30 – 15:30 Parallel Session 2: **Pattern Classification and Data Analysis I** [Collaboration Room 3]

Chair: Yuchi Kanzawa

Rockfall Isolation Technique Based on DC-DBSCAN with k-Means Clustering and k-Nearest Neighborhood
Patthranit Kaewcharuay, Pannathorn Sathirasattayanon, Thanapat Khemniwat, Thanakon Augsondit, Kasorn Galajit, Jessada Karnjana, Sasiporn Usanavasin

A Novel Noise Clustering based on Local Outlier Factor
Yukihiro Hamasuna, Yoshitomo Mori

On Some Fuzzy Clustering Algorithms Based on Series Models
Tomoki Nomura, Yuchi Kanzawa

On Some Fuzzy Clustering for Series Data
Yuto Suzuki, Yuchi Kanzawa

Collaborative Filtering Based on Rough C-Means Clustering with Missing Value Processing
Seiki Ubukata, Kazushi Futakuchi

13:30 – 15:30 Parallel Session 3: **Economic Applications I** [Collaboration Room 1]

Chair: Roengchai Tansuchat

Variable Selection Methods-based Analysis of Macroeconomic Factors for an Enhanced GDP Forecasting: A Case Study of Thailand
Roengchai Tansuchat, Pichayakone Rakpho, Chaiwat Klinlampu

Revolutionizing SET50 Stock Portfolio Management with Deep Reinforcement Learning
Sukrit Thongkairat, Donlapark Ponnoprat, Phimphaka Taninpong, Woraphon Yamaka

Analysis of Exchange Rate Fluctuations in Japan and Thailand by Using Copula-based Seemingly Unrelated Regression Model
Kongliang Zhu, Xuefeng Zhang, Pensri Jaroenwanit

The Perspective for the Economy in Cambodia, Laos, Myanmar, Vietnam and Thailand: Economic Growth, Inequality, and Environmental Considerations
Chanamart Intapan, Chukiat Chaiboonsri, Banjaponn Thongkaw

Economic Condition, Multidimensional Poverty and NEETs in Thailand [Online]
Supanika Leurcharusmee, Piyaluk Buddhawongsa

15:30 – 16:00 Coffee break [Entrance Door, ground floor of KS Building]

16:00 – 17:40 Parallel Session 4: **Machine Learning I** [KS Lecture Hall]

Chair: Canh-Hao Nguyen

Inference Problem in Probabilistic Multi-Label Classification
Vu-Linh Nguyen, Xuan-Truong Hoang, Van-Nam Huynh

A Federated Learning Model for Linear Fuzzy Clustering with Least Square Criterion
Katsuhiro Honda, Ryosuke Amejima

Joint Multiple Efficient Neighbors and Graph Learning Method for Multi-view Clustering
Vicenç Torra, Fatemeh Sadjadi

Maximum-Margin Nearest Prototype Classifiers with the Sum-over-others Loss Function and a Performance Evaluation
Yoshifumi Kusunoki

16:00 – 17:40 Parallel Session 5: **Optimization and Statistical Methods I [**Collaboration Room 1**]**
Chair: Bao Q. Ta

The a Priori Procedure for Estimating the Cohen's Effect Size under Independent Skew Normal Settings
Cong Wang, Tonghui Wang, Xiangfei Chen, David Trafimow, Tingting Tong, Liqun Hu, S. T. Boris Choy

Fast - Asymptotically Optimal - Methods for Determining the Optimal Number of Features
Saeid Tizpaz-Niari, Luc Longpre, Olga Kosheleva, Vladik Kreinovich

Immune-Based Algorithm for the Multi-Server Home Care Service Problem with Various Frequencies: An Example of Taiwan
Yi-Chih Hsieh, Peng-Sheng You, Ta-Cheng Chen

0-1 Combinatorial Optimization Problems with Qualitative and Uncertain Profits [Online]
Tuan Anh VU, Sohaib AFIFI, Eric Lefèvre, Frédéric Pichon

16:00 – 17:40 Parallel Session 6: **Security and Privacy in Machine Learning [**Collaboration Room 3**]**
Chair: Vicenç Torra

A Novel Privacy-preserving Federated Learning Model based on Secure Multi-party Computation
Sang Pham Xuan, Tu Anh Tran, The Dung Luong

An Elliptic Curve-based Privacy-Preserving Recommender System
Van Vu-Thi, The Dung Luong

A Method against Adversarial Attacks to Enhance the Robustness of Deep Learning Models
Phi Ho Truong, Duy Trung Pham

Orand - A Fast, Publicly Verifiable, Scalable Decentralized Random Number Generator based on Distributed Verifiable Random Functions [Online]
Minh Nhat Pham, Dung Anh Tran, Khuong Nguyen-An

18:00 – 19:00 Move to Kanazawa International Hotel

19:00 – 21:00 Welcome Reception [Kanazawa International Hotel]
(After the reception, buses will transport participants to Kanazawa station, Komatsu station, and High-Tech Center/JAIST)

FRI, 3RD NOVEMBER [Ishikawa High-Tech Center]

9:00 – 10:00 Plenary 3 [Conference Hall]

Contrastive Discovery of Hierarchical Achievements in Reinforcement Learning

Hyun Oh SONG, Seoul National University, Korea

Chair: Katsuhiro HONDA

10:00 – 10:30 Coffee break

10:30 – 12:30 Parallel Session 7: **Uncertainty Management and Decision Support II**

Chair: Hung-Son Nguyen

Application of Interval Valued Fuzzy Sets in Attribute Ranking
Bich Khue Vo, Hung-Son Nguyen

Utilization of Data Envelopment Analysis for Grid Traffic Accident Data
Daisuke Maruyama, Masahiro Inuiguchi, Naoki Hayashi, Hirosato Seki

Different Types of Decision Criteria in a Decision Problem
Tomoe Entani

Reasoning about Games with Possibilistic Uncertainty
Churn-Jung Liau

Extending Kryszkiewicz's Formula of Missing Values in Terms of Lipski's Approach
Michinori Nakata, Norio Saito, Hiroshi Sakai, Takeshi Fujiwara

10:30 – 12:30 Parallel Session 8: **Machine Learning II**

Chair: Anand Nayyar

Predicting Stock Price Fluctuations Considering the Sunny Effect
Tomoya Matsuki, Kenta Nakaniwa, Makishi Iguchi, Notsu Akira, Katsuhiro Honda

Proposal of New Classification Method Using Rule Table and Its Consideration
Yuichi Kato, Tetsuro Saeki

TouriER: Temporal Knowledge Graph Completion by Leveraging Fourier Transforms
[Online]
Thanh Vu, Huy Ngo, Ngoc-Trung Nguyen, Thanh N Le

Controlling LIME Kernel Width to Achieve Comprehensible Explanations on Tabular Data
[Online]
Hai Duong, Lam Hoang, Bac Le

Machine Learned KPI Goal Preferences for Explainable AI-based Production Sequencing
[Online]
Rudolf Felix

10:30 – 12:30 Parallel Session 9: **Pattern Classification and Data Analysis II**

Chair: Yoshifumi Kusunoki

Identifying Topics on Social Impact from S&P1500 CSR/ESG Reports
Farukh Hamza, Ping-Yu Hsu, Wan-Yu Yang, Ming Shien Cheng, Yu-Chun Chen

Descriptor-based Information Systems and Rule Learning from Different Types of Data Sets with Uncertainty
Hiroshi Sakai, Michinori Nakata

MFG-HUI: An Efficient Algorithm for Mining Frequent Generators of High Utility Itemsets
[Online]
Hai Duong, Thong Tran, Tin Truong, Bac Le

Negative Sentiments Make Review Sentences Longer: Evidence from Japanese Hotel Review Sites
Takumi Kato

Collaborative Filtering Based on Probabilistic Rough Set C-Means Clustering
Seiki Ubukata, Kazuma Ehara

12:30 – 13:30 Lunch [Lunch boxes will be served]

13:30 – 14:30 Plenary 4 [Conference Hall]

Random Fuzzy Sets and Belief Functions: Application to Machine Learning

Thierry DENOEUX, University of Technology of Compiegne, France

Chair: Van-Nam HUYNH

14:30 – 15:00 Coffee break

15:00 – 17:00 Parallel Session 10: **Optimization and Statistical Methods II**

Chair: Tonghui Wang

Forecasting Precious Metals Prices Volatility with the Global Economic Policy Uncertainty Index: the GARCH-MIDAS Technique for Different Frequency Data
Rungrapee Phadkantha, Roengchai Tansuchat, Payap Tarkhamtham, Wiranya Puntoon

Lasso and Ridge for GARCH-X Models
Woraphon Yamaka, Paravee Maneejuk, Sukrit Thongkairat

Mean-Variance Portfolio Allocation using ARMA-GARCH-Stable and Artificial Neural Network Models
Nguyen T. Anh, Mai D. Lam, and Bao Q. Ta

Predicting Maize Yields with Satellite Information [Online]
Singh Ratna, Ping-Yu Hsu, You-Sheng Shih, Ming-Shien Cheng, Yu-Chun Chen

Why Inverse Layers in Pavement? Why Zipper Fracking? Why Interleaving in Education? A General Explanation
Edgar Daniel Rodriguez Velasquez, Aaron Velasco, Olga Kosheleva, Vladik Kreinovich

15:00 – 17:00 Parallel Session 11: **Machine Learning III**

Chair: Hiroshi Sakai

Unearthing Undiscovered Interests: Knowledge-enhanced Representation Aggregation for Long-tail Recommendation
Zhipeng Zhang, Yuhang Zhang, Tianyang Hao, Zuoqing Li, Yao Zhang, Masahiro Inuiguchi

A Novel Methodology for Real-time Face Mask Detection using PSO Optimized CNN Technique
Anand Nayyar, Nhu Gia Nguyen, Sakshi Natani, Ashish Sharma, Sandeep Vyas

A Computer Vision-Based Framework for Behavior Monitoring and Estrus Detection through Dynamic Behavioral Analysis
Panisara Kanjanarut, Warut Pannakkong, Sun Olapiriyakul, Nuttapong Sanglerdsinlapachai, Shoichi Hasegawa

Information Fusion for Enhancing Presentation Attack Detection in Iris Recognition [Online]
Kharidtha Ruangsariyanont, Jittarin Chaivong, Suradej Duangpummet, Waree Kongprawechnon

Score-level Fusion Based on Classification Tree for Improving Iris Verification Systems
Oranus Kotsuwan, Puntika Leepagorn, Suradej Duangpummet, Jessada Karnjana

15:00 – 17:00 Parallel Session 12: **Economic Applications II**

Dynamics of Investor Behavior and Market Interactions in the Thai Stock Market: A Regime-switching Analysis
Panisara Phochanachan, Supanika Leurcharusmee, Nootchanat Pirabun

Does Cryptocurrency Improve Forecasting Performance of Exchange Rate Returns?
Somsak Chanaim, Chatchai Khiewngamdee

The perspective of the creative economy Stimulus on the Thai Economy: Explication by BSTS mixed with the CGE model
Kanchana Chokethaworn, Paponsun Eakkapun, Chukiat Chaiboonsri, Banjaponn Thongkaw

Spatial Spillover Effect of Provincial Institutional Quality in Vietnam
Viet Quoc Nguyen and Chon Van Le

Examining the Risk Contribution of Major Stock Markets to the Global Equity Market during the COVID-19 Pandemic
Namchok Chimprang, Nattakit Intawong, Woraphon Yamaka

17:00 – 18:00 Move to Kanazawa International Hotel (bus service is provided)

18:00 – 20:00 Gala Dinner

Chairs: **Masahiro Inuiguchi, Youji Kohda, Vladik Kreinovich, Katsuhiro Honda, Van-Nam Huynh**

- **Welcoming Speech by JAIST President TERANO Minoru**
- **Banquet with a Special Event to honor Prof. Hung T. Nguyen and Prof. Sadaaki Miyamoto**

(After the gala dinner, buses will transport participants to Kanazawa station, Komatsu station, and High-Tech Center/JAIST)

SAT, 4TH NOVEMBER [Japan Advanced Institute of Science and Technology]

9:00 – 10:40 Parallel Session 13: **Pattern Classification and Data Analysis III** [Collaboration Room 1]

Chair: Seiki Ubukata

On Parameter Extension of q-Divergence-based Fuzzy c-Means Clustering
Yuchi Kanzawa

On Some Fuzzy Clustering based on the Multivariate Power Exponential Distribution
Yuta Suzuki, Yuchi Kanzawa

Sustainable Perishable Food Distribution: Fresh Consumption and Waste Justice
Sun Olapiriyakul, Warut Pannakkong

Leveraging Artificial Neural Networks to Improve Profitability of Technical Trading Rules in Thailand SET 100 Index [Online]
Jantakarn Wannasuk, Rujira Chaysiri

9:00 – 10:40 Parallel Session 14: **Uncertainty Management and Decision Support III** [Collaboration Room 3]

Chair: Tomoe Entani

Application of Game Theory: Agricultural Land Fragmentation in Thailand [Online]
Natthawan Sriphong, Nantapath Trakultraipruk

Team Orienteering Problem: An Arc-Based Formulation [Online]
Nguyen Thuy Trang, Pham Duc Tai, Jirachai Buddhakulsomsiri, Parthana Parthanadee

A Measure of Similarity for Reference Class Forecasting in Projects
Seyed Ashkan Zarghami

An Evidential Reasoning Approach to Evaluating Health-care Waste Treatment Methods
Trong-Hiep Hoang, Vu Ngoc Thanh Le, Van-Nam Huynh

9:00 – 11:00 Parallel Session 15: **Economic Applications III [Collaboration Room 2]**

Chair: Chon Van Le

Efficiency of the ASEAN-5 Stock Markets: A Markov-Switching Model Estimation using Adjusted Market Inefficiency Magnitude
Wilawan Srichaikul, Somsak Chanaim, Woraphon Yamaka

Spatial Regression Analysis of FDI and Economic Development: The World Perspective
Rungrapee Phadkantha, Rossarin Osathanunkul, Jirapa Inthisang Trochim, Woraphon Yamaka

Predicting Chinese Stock Prices Using Convertible Bond: An Evidence-Based on Neural Network Approach
Namchok Chimprang, Paravee Maneejuk, Binxiong Zou

An Analysis of the Influence of the Ukraine-Russia Conflict on Renewable and Fossil Energy Price Cycles
Wiranya Puntoon, Nuttaphong Kaewtathip , Woraphon Yamaka, Paravee Maneejuk

Can Monetary Policy Uncertainty Predict Exchange Rate Volatility? New Evidence from Hybrid Neural Network-GARCH Model
Paravee Maneejuk, Terdthiti Chitksame, Pichayakone Rakpho

11:00 – 12:30 Closing and Farewell Lunch