## **2023 IEEE 10th International Conference on Data Science and Advanced Analytics (DSAA 2023)**

Thessaloniki, Greece 9-13 October 2023

Pages 1-536



**IEEE Catalog Number: CFP23DSB-POD ISBN**:

979-8-3503-4504-9

### Copyright © 2023 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP23DSB-POD

 ISBN (Print-On-Demand):
 979-8-3503-4504-9

 ISBN (Online):
 979-8-3503-4503-2

#### **Additional Copies of This Publication Are Available From:**

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400

Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



# 2023 IEEE 10<sup>th</sup> International Conference on Data Science and Advanced Analytics (DSAA)

#### TABLE OF CONTENTS

#### **Research Track**

#### Research 1: Advanced Analytics and Knowledge Discovery Methods

Designing Concept Drift Detection Ensembles: A Survey Martin Trat and Jivka Ovtcharova	1
Sliding Window Sampling over Data Stream — A Solution Based on Devil's Staircases  Dominik Bojko, Jacek Cichoń and Mirosław Kutyłowski	11
slidSHAPs – sliding Shapley Values for correlation-based change detection in time series  Chiara Balestra, Bin Li and Emmanuel Müller	20
Measurement of Illegal Android Gambling App Ecosystem From Joint Promotion Perspective Yadi Han, Shanshan Wang, Yiwen Li, Xueyang Cao, Limei Huang and Zhenxiang Chen	30
Research 2: Advanced Classification Methods	
Evaluating Explanation Methods of Multivariate Time Series Classification through Causal Lenses  Etienne Vareille, Adel Abbas, Michele Linardi and Vassilis Chrsitopides	41
Interpretable Time Series representation for Classification Purposes  Etienne Le Naour, Ghislain Agoua, Nicolas Baskiotis and Vincent Guigue	51
LSFuseNet: Dual-Fusion of Landsat-8 and Sentinel-2 Multispectral Time Series for Permutation Invariant Applications  Arshveer Kaur, Poonam Goyal and Navneet Goyal	61
A Novel Method for Temporal Graph Classification Based on Transitive Reduction Carolina Jeronimo, Zenilton Patrocínio Jr., Simon Malinowski, Guillaume Gravier and Silvio Guimaraes	71
Research 3: Time Series and Forecasting	
Combining Forecasts using Meta-Learning: A Comparative Study for Complex Seasonality  Grzegorz Dudek	81
Deep Spectral Copula Mechanisms Modeling Coupled and Volatile Multivariate Time Series Yang Yang, Zhilin Zhao and Longbing Cao	91
Spatial-Temporal Residual Multi-Graph Convolution Network for Traffic Forecasting	101

Ruoxuan Zhu, Yi Qian, Hui Zheng, Xing Wang, Junlan Feng, Lin Zhu and Chao Deng	
Adversarial Mutual Learning Neural Network for Non-AutoRegressive Multi-Horizon Time Series Forecasting Yang Lin	111
Research 4: Knowledge Graphs and Graph Learning	
Knowledge Graph-based Embedding for Connecting Scholars in Academic Social Networks Prasad Calyam, Xiyao Cheng, Yuanxun Zhang, Harsh Joshi and Mayank Kejriwal	121
Knowledge Enhanced Graph Neural Networks for Graph Completion Luisa Werner, Nabil Layaïda, Pierre Genevès and Sarah Chlyah	131
Lightweight Graph Convolutional Collaborative Filtering Recommendation Approach Incorporating Social Relationships Xiangfu Meng, Hongjin Huo, Xiaoyan Zhang and Wanchun Wang	141
Are GNNs the Right Tool to Mine the Blockchain? The Case of the Bitcoin Generator Scam Sam Yuen, Paula Branco, Aaron Chew, Guy-Vincent Jourdan, Fabian Lim and Laura Wynter	150
Research 5: Feature and Label Learning	
Sample Topology Exploration for Label Distribution Learning Yan-Wen Xiong, Heng-Ru Zhang, Fan Min and Peng-Cheng Li	161
Causal Feature Selection: Methods and a Novel Causal Metric Evaluation Framework  Rezaur Rashid, Jawad Chowdhury and Gabriel Terejanu	170
ProPML: Probability Partial Multi-label Learning Łukasz Struski, Adam Pardyl, Jacek Tabor and Bartosz Zieliński	179
CaFe DBSCAN: A Density-based Clustering Algorithm for Causal Feature Learning Pascal Weber, Lukas Miklautz, Akshey Kumar, Claudia Plant and Moritz Grosse- Wentrup	187
Research 6: Learning Methods and Theories	
Adaptive Clustered Federated Learning with Representation Similarity Chiyu Cai, Wei Wang and Yuan Jiang	197
Learning Representations through Contrastive Strategies for a more Robust Stance Detection  Udhaya Kumar Rajendran, Amine Trabelsi and Amir Ben Khalifa	205
Toward a Realistic Benchmark for Out-of-Distribution Detection  Pietro Recalcati, Fabio Garcea, Luca Piano, Fabrizio Lamberti and Lia Morra	214
On the Independence of Adversarial Transferability to Topological Changes Carina Newen and Emmanuel Müller	224

#### **Research 7: Optimization**

AdaSub: Stochastic Optimization Using Second-Order Information in Low- Dimensional Subspaces João Victor Galvão da Mata and Martin Skovgaard Andersen	232
ISGP: Influence Maximization on Dynamic Social Networks Using Influence SubGraph Propagation Wan-Jhen Wu, Shiou-Chi Li and Jen-Wei Huang	239
HyperTab: Hypernetwork Approach for Deep Learning on Small Tabular Datasets Witold Wydmański, Oleksii Bulenok and Marek Śmieja	249
Organizational Resource Scheduling using Deep Reinforcement Learning Lihi Idan	N/A
Research 8: Algorithms for Learning and Testing	
Tackling Model Mismatch with Mixup Regulated Test-Time Training Bochao Zhang, Rui Shao, Jingda Du, Pc Yuen and Wei Luo	265
Natural Language Inference by Integrating Deep and Shallow Representations with Knowledge Distillation Pei-Chang Chen, Hao-Shang Ma and Jen-Wei Huang	275
Rapid and Scalable Bayesian AB Testing Srivas Chennu, Andrew Maher, Christian Pangerl, Subash Prabanantham, Jae Hyeon Bae, Jamie Martin and Bud Goswami	285
Finite-Sample Bounds for Two-Distribution Hypothesis Tests Cynthia Hom, William Yik and George Montanez	295
<b>Application Track</b>	
Application 1: Business and Industry	
Electricity Price Forecasting Based on Order Books: A Differentiable Optimization Approach Léonard Tschora, Tias Guns, Erwan Pierre, Marc Plantevit and Celine Robardet	306
Contextual Advertising Strategy Generation via Attention and Interaction Guidance Issam Benamara and Emmanuel Viennet	316
HRGCN: Heterogeneous Graph-level Anomaly Detection with Hierarchical Relation-augmented Graph NeuralNetworks  Jiaxi Li, Guansong Pang, Ling Chen and Mohammad-Reza Namazi-Rad	326
FIW-GNN: A Heterogeneous Graph-based Learning Model for Credit Card Fraud Detection  Kuan Yan, Junbin Gao and Dmytro Matsypura	336
Application 2: Business and Education	

Supplier Qualification Document Recognition through Open-set Recognition Giuseppe Rizzo and Angelo Impedovo	356
Identifying Survival-Changing Sequential Patterns for Employee Attrition Analysis Youssef Oubelmouh, Frédéric Fargon, Cyril de Runz, Arnaud Soulet and Cyril Veillon	366
Towards Deep Learning Models for Automatic Computer Program Grading Peter Nagy and Heidar Davoudi	376
Application 3: Society and Human	
Classification with Explanation for Human Trafficking Networks Detection Fabien Delorme, David Ing, Said Jabbour, Nelly Robin and Lakhdar Sais	386
Towards a (Semi-)Automatic Urban Planning Rule Identification in the French Language Maksim Koptelov, Margaux Holveck, Bruno Cremilleux, Justine Reynaud, Mathieu Roche and Maguelonne Teisseire	396
To Personalize or Not To Personalize? Soft Personalization and the Ethics of ML for Health  Alessandro Falcetta, Massimo Pavan, Stefano Canali, Viola Schiaffonati and Manuel Roveri	406
MINDSET: A benchMarking suIte exploring seNsing Data for SElf sTates inference Christina Karagianni, Eva Paraschou, Sofia Yfantidou and Athena Vakali	416
Application 4: Science and Environment	
Disaster Image Classification Using Pre-trained Transformer and Contrastive Learning Models Soudabeh Taghian Dinani and Doina Caragea	426
Non-Redundant Image Clustering of Early Medieval Glass Beads Lukas Miklautz, Andrii Shkabrii, Collin Leiber, Bendeguz Tobias, Benedict Seidl, Elisabeth Weissensteiner, Andreas Rausch, Christian Böhm and Claudia Plant	437
Exploring Deep Learning for Full-disk Solar Flare Prediction with Empirical Insights from Guided Grad-CAM Explanations Chetraj Pandey, Anli Ji, Trisha Nandakumar, Rafal Angryk and Berkay Aydin	449
Utilizing MODIS Fire Mask for Predicting Forest Fires Using Landsat-9/8 and Meteorological Data  Yash Gupta, Navneet Goyal, Vishal John Varghese and Poonam Goyal	459
Application 5: Medicine	
A Framework for Context-Sensitive Prediction in Time Series – Feasibility Study for Data-Driven Simulation in Medicine Fatoumata Dama, Christine Sinoquet and Corinne Lejus-Bourdeau	469
Optimizing Resource Allocation for Tumor Simulations over HPC Infrastructures Errikos Streviniotis, Nikos Giatrakos, Yannis Kotidis, Thalia Ntiniakou and Miguel Ponce de Leon	481
Death after Liver Transplantation: Mining Interpretable Risk Factors for Survival Prediction	491

Veronica Guidetti, Giovanni Dolci, Erica Franceschini, Erica Bacca, Giulia Burastero, Davide Ferrari, Valentina Serra, Fabrizio Di Benedetto, Cristina Mussini and Federica Mandreoli

### **Special Sessions**

#### Session 1: Private, Secure, and Trust Data Analytics I

Stochastic Perturbation Averaging Boosts Transferability of Adversarial Examples Rongbo Yang, Qianmu Li and Shunmei Meng	501
Novel Few-shot Learning Based Fuzzy Feature Detection Algorithms Yun Luo, Liangfu Lu, Xudong Cui, Yan Du, Yingying Bi, Limin Zhu and Christy Jie Liang	508
A Contextualized Transformer-Based Method for Cyberbullying Detection Nabi Rezvani, Amin Beheshti and Xuyun Zhang	517
Privacy-Preserving Learning via Data and Knowledge Distillation Fahim Faisal, Carson K. Leung, Noman Mohammed and Yang Wang	527
Session 2: Private, Secure, and Trust Data Analytics II	
Privacy-aware Adaptive Collaborative Learning Approach for Distributed Edge Networks Saeed Alqubaisi, Deepak Puthal, Joy Dutta and Ernesto Damiani	537
Multi-Granularity Entity Recognition Based Sentence Ranking for Multi-Document Summarization Guowei Zhang, Xuyun Zhang, Zhiyong Wang and Amin Beheshti	547
Temporal Differential Privacy for Human Activity Recognition Debaditya Roy and Sarunas Girdzijauskas	557
Graph Disentangled Collaborative Filtering Based on Multi-order Similarity Constraint  Yaoze Liu, Junwei Du, Haojie Li and Guanfeng Liu	567
Session 3: Private, Secure, and Trust Data Analytics III	
Defending the Graph Reconstruction Attacks for Simplicial Neural Networks Huixin Zhan, Liyuan Gao, Kun Zhang, Zhong Chen and Victor Sheng	577
Underwater Localization Based on Robust Privacy-preserving and Intelligent Correction of Sound Velocity  Jingxiang Xu, Ying Guo, Ziqi Wang, Fei Li and Ke Geng	586
A Multimodal Adversarial Database: Towards a Comprehensive Assessment of Adversarial Attacks and Defenses on Medical Images  Junyao Hu, Yimin He, Weiyu Zhang, Shuchao Pang, Ruhao Ma and Anan Du	596
Enhancing Federated Learning by One-Shot Transferring of Intermediate Features from Clients  Deng Youxingzhu, Zhou Yipeng, Liu Gang, Hui Wang and Shui Yu	606

#### Session 4: AI and Data Science for Cybersecurity

CRIMEO: Criminal Behavioral Patterns Mining and Extraction from Video Contents Raed Abdallah, Hassan Harb, Yehia Taher, Salima Benbernou and Rafiqul Haque	617
Cross-layer Federated Heterogeneous Ensemble Learning for Lightweight IoT Intrusion Detection System Suzan Hajj, Joseph Azar, Jacques Bou Abdo, Jacques Demerjian, Abdallah Makhoul and Dominique Ginhac	625
A Data-driven Approach for Risk Exposure Analysis in Enterprise Security Albert Calvo, Santiago Escuder, Josep Escrig, Marta Arias, Nil Ortiz and Jordi Guijarro	635
Understanding the Country-Level Security of Free Content Websites and their Hosting Infrastructure  Mohammed Alqadhi, Ali Alkinoon, Saeed Salem and David Mohaisen	644
ECC: Enhancing Smart Grid Communication with Ethereum Blockchain, Asymmetric Cryptography, and Cloud Services Raphaelle Akhras, Wassim El-Hajj, Hazem Hajj, Khaled Shaban and Rabih Jabr	654
Session 5: Practical Applications of Explainable Artificial Intelligence	Methods I
Towards Explaining Satellite Based Poverty Predictions with Convolutional Neural Networks  Hamid Sarmadi, Thorsteinn Rögnvaldsson, Mattias Ohlsson, Nils Roger Carlsson, Ibrahim Wahab and Ola Hall	664
Text Classification is Keyphrase Explainable! Exploring Local interpretability of Transformer Models with Keyphrase Extraction Dimitrios Akrivousis, Nikolaos Mylonas, Ioannis Mollas and Grigorios Tsoumakas	674
Interpreting Black-box Machine Learning Models for High Dimensional Datasets Md. Rezaul Karim, Md. Shajalal, Alex Graß, Till Döhmen, Sisay Adugna Chala, Christian Beecks and Stefan Decker	683
Enhanced Explanations for Knowledge-Augmented Clustering Using Subgroup Discovery  Maciej Szelążek, Daniel Hudson, Szymon Bobek, Grzegorz J. Nalepa and  Martin Atzmueller	693
Session 6: Practical Applications of Explainable Artificial Intelligence	Methods II
Towards Quality Measures for xAI algorithms: Explanation Stability Marek Pawlicki	704
ORANGE: Opposite label soRting for tANGent Explanations in heterogeneous spaces Alejandro Kuratomi, Zed Lee, Ioanna Miliou, Tony Lindgren and Panagiotis Papapetrou	714
Instils Trust in Random Forest Predictions  Gopal Jamnal	724

#### **Session 7: Emerging Problems in Disinformation**

Machine Learning-Based Android Malware Detection  Carson Leung	733
Model Stitching Algorithm for Fake News Detection Problem Rafał Kozik, Aleksandra Pawlicka, Marek Pawlicki and Michal Choras	743
Towards Handling Bias in Intelligence Analysis with Twitter Alexandros Karakikes, Panagiotis Alexiadis, Theocharis Theocharopoulos, Nikolaos Skoulidas, Dimitris Spiliotopoulos and Konstantinos Kotis	750
A Continual Learning System with Self Domain Shift Adaptation for Fake News Detection Sebastián Basterrech, Andrzej Kasprzak, Jan Platos and Michal Wozniak	760
Combating Disinformation with Holistic Architecture, Neuro-symbolic AI and NLU Models Rafal Kozik, Wojciech Mazurczyk, Krzysztof Cabaj, Aleksandra Pawlicka, Marek Pawlicki and Michal Choras	770
Session 8: Computational Imaging, Vision, Linguistics and Language I	
Adaptive Compressed Sensing for Real-Time Video Compression, Transmission, and Reconstruction  Yaping Zhao, Qunsong Zeng and Edmund Lam	779
A CNN-Transformer Hybrid Network for Multi-scale object detection Jianhong Wu and Yingdong Ma	789
Searching Images in a Web Archive  André Mourão and Daniel Gomes	796
ScaleFace: Uncertainty-aware Deep Metric Learning Roman Kail, Kirill Fedyanin, Nikita Muravev, Alexey Zaytsev and Maxim Panov	806
Session 9: Computational Imaging, Vision, Linguistics and Language II	
YOLO-based Object Detection in Panoramic Images of Smart Buildings Sebastian Pokuciński and Dariusz Mrozek	816
Solving Inverse Problems in Compressive Imaging with Score-Based Generative Models	825
Zhen Yuen Chong, Yaping Zhao, Zhongrui Wang and Edmund Lam	
All Translation Tools Are Not Equal: Investigating the Quality of Language Translation for Forced Migration  Ameeta Agrawal, Lisa Singh, Elizabeth Jacobs, Yaguang Liu, Gwyneth Dunlevy, Rhitabrat Pokharel and Varun Uppala	835
Session 10: Smart City Data Analytics I	
Empowering Urban Connectivity in Smart Cities using Federated Intrusion Detection  Youcef Djenouri and Ahmed Nabil Belbachir	845
Recycling of Generic ImageNet-trained Models for Smart-city Applications Katarzyna Filus and Joanna Domanska	854

Incremental Targeted Mining in Sequences Kaixia Hu, Wensheng Gan, Gengsen Huang, Guoting Chen and Jerry Chun-Wei Lin	864
Price Prediction of Digital Currencies Using Machine Learning  Ashutosh Dhar Dwivedi, Subhrangshu Adhikary, Subhayu Dutta and Jens Myrup  Pedersen	874
ZigBee Network for AGV Communication in Industrial Environments Jarosław Flak, Tomasz Skowron, Rafał Cupek, Marcin Fojcik, Dariusz Caban and Adam Domański	883
Session 11: Smart City Data Analytics II	
Automated Detection of Trajectory Groups Based on SNN-Clustering and Relevant Frequent Itemsets  Friedemann Schwenkreis	892
Object-aware Multi-criteria Decision-Making Approach Using Heuristic data- driven Theory for Intelligent Transportation Systems M S Mekala, Elyad Eyad and Gm Srivastava	902
Predicting Conflict Zones on Terrestrial Routes of Automated Guided Vehicles with Fuzzy Querying on Apache Kafka  Bozena Malysiak-Mrozek, Stanisław Kozielski and Dariusz Mrozek	910
Low-Cost Gunshot Detection System with Localization for Community Based Violence Interruption  Isaac Manring, James Hill, Paul Brantingham, George Mohler, Thomas Williams and Bruce White	918
Session 12: Graph Data Science and Applications I	
JAMES: Normalizing Job Titles with Multi-Aspect Graph Embeddings and Reasoning  Michiharu Yamashita, Jia Tracy Shen, Hamoon Ekhtiari, Thanh Tran and Dongwon Lee	925
Unfolding Temporal Networks through Statistically Significant Graph Evolution Rules	935
Alessia Galdeman, Tommaso Locatelli, Matteo Zignani and Sabrina Gaito  Prediction of Future Nation-initiated Cyber Attacks from News-based Political  Event Graph  Bishal Lakha, Jason Duran, Edoardo Serra and Francesca Spezzano	945
Session 13: Graph Data Science and Applications II	
Leveraging patient similarities via graph neural networks to predict phenotypes from temporal data  Dimitrios Proios, Anthony Yazdani, Alban Bornet, Julien Ehrsam, Islem Rekik and Douglas Teodoro	953
Enhancing Recommendation Systems with Hybrid Manifold Regularized Knowledge Graph Giang Ngo and Nhi Vo	963
EvoAlign: A Continual Learning Framework for Aligning Evolving Networks Shruti Saxena and Joydeep Chandra	971

#### Session 14: Data Science for Social and Behavioral Analytics

Enhanced Mining of High Utility Patterns from Streams of Dynamic Profit Carson Leung	981
Towards Contiguous Sequences in Uncertain Data Zefeng Chen, Wensheng Gan, Gengsen Huang, Yanxin Zheng and Philip S. Yu	991
Emotion-based Dynamic Difficulty Adjustment in Video Games Krzysztof Kutt, Łukasz Ściga and Grzegorz J. Nalepa	1001
Session 15: Learning from Temporal Data	
1NN-DTW ARIMA LSTM: A New Ensemble for Forecasting Multi-domain/Multi-context Time Series Hadi Fanaee-T	1006
Online Explainable Model Selection for Time Series Forecasting Amal Saadallah	1016
LITE: Light Inception with boosTing tEchniques for Time Series Classification Ali Ismail-Fawaz, Maxime Devanne, Stefano Berretti, Jonathan Weber and Germain Forestier	1026
Journal Track	
Journal 1	
TOCOL: Improving Contextual Representation of Pre-trained Language Models via Token-Level Contrastive Learning Keheng Wang, Chuantao Yin, Rumei Li, Sirui Wang, Yunsen Xian, Wenge Rong and Zhang Xiong	1036
GS2P: A Generative Pre-trained Learning to Rank Model with Over- parameterization for Web-Scale Search Yuchen Li, Haoyi Xiong, Linghe Kong, Jiang Bian, Shuaiqiang Wang, Guihai Chen and Dawei Yin	1039
PANACEA: A Neural Model Ensemble for Cyber-Threat Detection Malik Al-Essa, Giuseppina Andresini, Annalisa Appice and Donato Malerba	1041
Journal 2	
Hyperparameter Analysis of Wide-Kernel CNN Architectures in Industrial Fault Detection – An Exploratory Study  Jurgen van den Hoogen, Dan Hudson, Stefan Bloemheuvel and Martin Atzmueller	1043
Hybrid Approaches to Optimization and Machine Learning Methods Beatriz Flamia Azevedo, Ana Maria A. C. Rocha and Ana I. Pereira	1045
Sparse Self-Attention Guided Generative Adversarial Networks for Time-Series Generation  Nourhan Ahmed and Lars Schmidt-Thieme	1047

#### Journal 3

DynamiSE: Dynamic Signed Network Embedding for Link Prediction

Haiting Sun, Peng Tian, Yun Xiong, Yao Zhang, Yali Xiang, Xing Jia and Haofen Wang	1049
PAF-Tracker: A Novel Pre-Frame Auxiliary and Fusion Visual Tracker Wei Liang, Derui Ding and Hui Yu	1051
Entity Recognition Based on Heterogeneous Graph Reasoning of Visual Region and Text Candidate  Xinzhi Wang, Nengjun Zhu, Jiahao Li, Yudong Chang and Zhennan Li	1053
Industrial Track	
Prioritization of Identified Data Science Use Cases in Industrial Manufacturing via C-EDIF Scoring Raphael Fischer, Andreas Pauly, Rahel Wilking, Anoop Kini and David Graurock	1055
Opportunistic Air Quality Monitoring and Forecasting with Expandable Graph Neural Networks  Jingwei Zuo, Wenbin Li, Michele Baldo and Hakim Hacid	1059
Short-term Forecast and Long-term Simulation for Accurate Energy Consumption Prediction  Daniele Giampaoli, Francesca Cipollini, Denise Maffione and Luca Oneto	1063
Practical Insights on Incremental Learning of New Human Physical Activity on the Edge  Georgios Arvanitakis, Jingwei Zuo, Mthandazo Ndhlovu and Hakim Hacid	1067
<b>Student Competition</b>	
MAT: Effective Link Prediction via Mutual Attention Transformer Van Quan Nguyen, Quang Huy Pham, Quang Dan Tran, Kien Bao Thang Nguyen and Hieu Nghia Nguyen	1071
Enhanced Edge Prediction, A Case Study: Predicting Links in Wikipedia Sites Apostolos Giannoulidis and Ioannis Mavroudopoulos	1075
Link Prediction for Wikipedia Articles as a Natural Language Inference Task Chau Thang Phan, Quoc-Nam Nguyen and Kiet Nguyen	1079
A Text-based Approach For Link Prediction on Wikipedia Articles Anh Tran, Tam Nguyen and Son Luu	1083
Link Prediction on Graphs Using NLP Embedding João Victor Galvão da Mata and Martin Skovgaard Andersen	1087
Predict Link Between Nodes Using An Ensemble Modelling Combining Depth Search Algorithm And Textual Similarity Score Aditya Kansal and Rishabh Mehta	1090
Achieving High Performance in Link Prediction for Wikipedia Articles Using Ensemble Approach Weiwu Yang	1092
Tutorial	
Interpretability Methods for Graph Neural Networks	1096