## 2022 IEEE International Conference on Knowledge Graph (ICKG 2022)

Virtual Conference 30 November - 1 December 2022



IEEE Catalog Number: CFP22M78-POD ISBN: 978-1-6654-5102-4

## Copyright © 2022 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:
 CFP22M78-POD

 ISBN (Print-On-Demand):
 978-1-6654-5102-4

 ISBN (Online):
 978-1-6654-5101-7

#### 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



# 2022 IEEE International Conference on Knowledge Graph (ICKG) ICKG 2022

### **Table of Contents**

Welcome from IEEE ICKG 2022 Chairs	xi
IEEE ICKG 2022 Organization	xiii
Keynotes	xiv
13th IEEE International Conference on Knowledge Graph	
Graph Reachability Pruning: Adaptive Data Reduction for Inexact Subgraph Matching Franklin Abodo (STR, USA), Phillip Marvin (STR, USA), and Joanna Brown (STR, USA)	1
PropInit: Scalable Inductive Initialization for Heterogeneous Graph Neural Networks Soji Adeshina (AWS AI), Jian Zhang (AWS AI), Muhyun Kim (AWS ML Solutions Lab), Min Chen (Grab), Rizal Fathony (Rizal Fathony), Advitiya Vashisht (Grab), Jia Chen (Grab), and George Karypis (AWS AI)	6
Certified Data Removal in Sum-Product Network  Alexander Becker (TU Dortmund University, Germany) and Thomas Liebig  (TU Dortmund University, Germany)	14
An Optimization Approach to Automatic Construction of Browsable Concept Index for Organizing Online Educational Content	22
SUMSHINE: Scalable Unsupervised Multi-source Heterogeneous Information Network 132  Tsai Hor Chan (The University of Hong Kong, China), Chi Ho Wong (The Hong Kong University of Science and Technology, China), Jiajun Shen (TCL Corporate Research (Hong Kong), China), and Guosheng Yin (The University of Hong Kong, China)	Embeddings
Matrix Profile XXVII: A Novel Distance Measure for Comparing Long Time Series  Audrey Der (University of California, Riverside; Visa Research), Chin-Chia Michael Yeh (Visa Research), Renjie Wu (University of California, Riverside), Junpeng Wang (Visa Research), Yan Zheng (Visa Research), Zhongfang Zhuang (Visa Research), Liang Wang (Visa Research), Wei Zhang (Visa Research), and Eamonn Keogh (University of California, Riverside)	40

Multihop: Leveraging Complex Models to Learn Accurate Simple Models	3
Distilling Business Value from COVID-19 Public Media Dataset with Machine Learning and Natural Language Processing	6
Enhancing Graph Variational Autoencoder for Short Text Topic Modeling with Mutual Information Maximization	4
An Architecture and a Methodology Enabling Interoperability within and Across Universities 71 Fausto Giunchiglia (University of Trento, Italy), Vincenzo Maltese (University of Trento, Italy), Amarsanaa Ganbold (National University of Mongolia, Mongolia), and Alessio Zamboni (University of Trento, Italy)	1
Mining Literature-Based Knowledge Graph for Predicting Combination Therapeutics: A COVID-19 Use Case	9
Clustering by Peak Merging	7
A Spectral Measure for Network Robustness: Assessment, Design, and Evolution	7
Sequence-Structure Embeddings via Protein Language Models Improve on Prediction Tasks 105 Anowarul Kabir (George Mason University, USA) and Amarda Shehu (George Mason University, USA)	5
Deep Associative Classifier	3
An Efficient Storage Scheme for Sustainable Development Goals Data over Distributed  Knowledge Graph Stores	3

Two is Better Than One: Dual Embeddings for Complementary Product Recommendations
Language Style Matters: Personality Prediction from Textual Styles Learning
AOP-Miner: Approximate Order-Preserving Pattern Mining for Time Series
A Generative Adversarial Net Assisted Method for User Intention Recognition on Imbalanced
Dataset
BlabKG: a Knowledge Graph for the Blue Amazon
BSG-Net: A Blind Super-resolution Guided Network for Improving Ultrasound Image Segmentation
HMM-Boost: Improved Time Series State Prediction Via Supervised Hidden Markov Models: Case Studies in Epileptic Seizure and Complex Care Management

Progressive Feature Upgrade in Semi-supervised Learning on Tabular Domain	. 188
Unsupervised DeepView: Global Explainability of Uncertainties for High Dimensional Data	196
Graph Modeling in Computer Assisted Automotive Development	203
Self-Knowledge Distillation from Target-Embedding AutoEncoder for Multi-label Classification	. 210
An Asynchronously Alternative Stochastic Gradient Descent Algorithm for Efficiently Parallel Latent Feature Analysis on Shared-Memory  Wen Qin (Chongqing University of Posts and Telecommunications, China, Chinese Academy of Sciences, University of Chinese Academy of Sciences, China) and Xin Luo (Southwest University, China)	. 217
Scalable Multi-instance Multi-shape Support Vector Machine for Whole Slide Breast Histopathology Hoon Seo (Colorado School of Mines, USA), Lodewijk Brand (Colorado School of Mines, USA), Lucia Saldana Barco (Colorado School of Mines, USA), and Hua Wang (Colorado School of Mines, USA)	. <b>22</b> 5
HTransE: Hybrid Translation-based Embedding for Knowledge Graphs	. 233
Deep Semantic-Enhanced Event Detection via Symmetric Graph Convolutional Network	. 241
Multi-sentence Matching via Exploiting List-level Semantics Expansion  Ruijun Sun (University of Science and Technology of China, China;  State Key Laboratory of Cognitive Intelligence, China), Zhi Li (Tsinghua University, China), Qi Liu (University of Science and Technology of China, China; State Key Laboratory of Cognitive Intelligence, China), Zhefeng Wang (Huawei Cloud), Xinyu Duan (Huawei Cloud), Baoxing Huai (Huawei Cloud), and Nicholas Jing Yuan (Huawei Cloud)	. 249

Learning from Crowds with Mutual Correction-Based Co-Training  Nianshang Tian (Nanjing University of Science and Technology, China),  Ming Wu (Nanjing University of Science and Technology, China), Jiqiong  Jiang (Zhejiang Lab, China), and Jing Zhang (Nanjing University of  Science and Technology, China)	257
A Method for Discovering Novel Classes in Tabular Data	265
Transfer Naïve Bayes Learning using Augmentation and Stacking for SMS Spam Detection  Cihan Ulus (Florida Atlantic University, USA), Zhiqiang Wang (Florida  Atlantic University, USA), Sheikh M.A. Iqbal (Florida Atlantic  University, USA), K.Md.Salman Khan (Florida Atlantic University, USA),  and Xingquan Zhu (Florida Atlantic University, USA)	275
Multi-Kernel-FM: A Multi-embedding & Kernelization Factorization Machine Framework for CT	ΓR
Prediction	283
A Robust Semantic Frame Parsing Pipeline on a New Complex Twitter Dataset	289
A New Design of VQA System based on Weighted Contextual Features  Yu Wang (Samsung Research America, USA), Vijay Srinivasan (Samsung Research America, USA), and Hongxia Jin (Samsung Research America, USA)	297
Label Enhanced Event Detection with Collective Knowledge and Heterogeneous Graph	305
Multiple Anomaly Alignments on Network Traffics	313
FADMAN: Federated Anomaly Detection across Multiple Attributed Networks	N/A

HUSS: A Heuristic Method for Understanding the Semantic Structure of Spreadsheets
VREN: Volleyball Rally Dataset with Expression Notation Language
Inference Calibration of Neural Network Models
QUBO Decision Tree: Annealing Machine Extends Decision Tree Splitting
Multi-time Predictions of Wildfire Grid Map using Remote Sensing Local Data
Hierarchy-Aware Temporal Knowledge Graph Embedding
Weighted Transformer for Dialect Speech Recognition 381  Minghan Zhang (Anhui Jianzhu University, China), Fei Xie (Heifei  Normal University, China), and Fuliang Weng (Heifei Normal University,  China)
Foreign Accent Conversion using Concentrated Attention
Time Series Anomaly Detection for Smart Grids via Multiple Self-Supervised Tasks Learning 392  Zhenyu Zhang (Jiangsu Electric Power Information Technology Company, China), Lin Zhao (Jiangsu Electric Power Information Technology Company, China), Dongyang Cai (State Grid Jiangsu Electric Power Company, China), Shuming Feng (Jiangsu Electric Power Information Technology Company, China), Jiawei Miao (Nanjing University of Finance & Economic, China), Yirun Guan (Nanjing University of Finance & Economic, China), Haicheng Tao (Nanjing University of Finance & Economic, China), and Jie Cao (Hefei University of Technology, China)
Author Index