Lecture Notes in Computer Science

12343

Founding Editors

Gerhard Goos

Karlsruhe Institute of Technology, Karlsruhe, Germany

Juris Hartmanis

Cornell University, Ithaca, NY, USA

Editorial Board Members

Elisa Bertino

Purdue University, West Lafayette, IN, USA

Wen Gao

Peking University, Beijing, China

Bernhard Steffen

TU Dortmund University, Dortmund, Germany

Gerhard Woeginger

RWTH Aachen, Aachen, Germany

Moti Yung

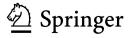
Columbia University, New York, NY, USA

More information about this series at http://www.springer.com/series/7409

Zhisheng Huang · Wouter Beek · Hua Wang · Rui Zhou · Yanchun Zhang (Eds.)

Web Information Systems Engineering – WISE 2020

21st International Conference Amsterdam, The Netherlands, October 20–24, 2020 Proceedings, Part II



Editors
Zhisheng Huang
VU Amsterdam
Amsterdam, The Netherlands

Hua Wang (D)
Victoria University
Melbourne, VIC, Australia

Yanchun Zhang (D)
Victoria University
Melbourne, VIC, Australia

Wouter Beek D
VU Amsterdam
Amsterdam, The Netherlands

Rui Zhou
Swinburne University of Technology Hawthorn, VIC, Australia

ISSN 0302-9743 ISSN 1611-3349 (electronic) Lecture Notes in Computer Science ISBN 978-3-030-62007-3 ISBN 978-3-030-62008-0 (eBook) https://doi.org/10.1007/978-3-030-62008-0

LNCS Sublibrary: SL3 - Information Systems and Applications, incl. Internet/Web, and HCI

© Springer Nature Switzerland AG 2020, corrected publication 2020

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

Welcome to the proceedings of the 21st International Conference on Web Information Systems Engineering (WISE 2020), held in Amsterdam and Leiden, The Netherlands, during October 20–24, 2020. The series of WISE conferences aims to provide an international forum for researchers, professionals, and industrial practitioners to share their knowledge in the rapidly growing area of web technologies, methodologies, and applications. The first WISE event took place in Hong Kong, China (2000). Then the trip continued to Kyoto, Japan (2001); Singapore (2002); Rome, Italy (2003); Brisbane, Australia (2004); New York, USA (2005); Wuhan, China (2006); Nancy, France (2007); Auckland, New Zealand (2008); Poznan, Poland (2009); Hong Kong, China (2010); Sydney, Australia (2011); Paphos, Cyprus (2012); Nanjing, China (2013); Thessaloniki, Greece (2014); Miami, USA (2015); Shanghai, China (2016); Pushchino, Russia (2017); Dubai, UAE (2018); Hong Kong, China (2019); and this year, WISE 2020 was held in Amsterdam and Leiden, The Netherlands, supported by Vrije Universiteit Amsterdam.

A total of 190 research papers were submitted to the conference for consideration, and each paper was reviewed by at least three reviewers. Finally, 37 submissions were selected as regular papers (with an acceptance rate of 20% approximately), plus 44 as short papers. The research papers cover the areas of network embedding, graph neural network, social network, graph query, knowledge graph and entity linkage, spatial temporal data analysis, service computing, cloud computing, information extraction, text mining, security and privacy, recommender systems, database system, workflow, and data mining and applications.

In addition, special thanks are due to the members of the International Program Committee and the external reviewers for a rigorous and robust reviewing process. We are also grateful to Vrije Universiteit Amsterdam, Springer Nature, Atlantis Press, Ztone, Triply, and the International WISE Society for supporting this conference. The WISE Organizing Committee is also grateful to the workshop organizers for their great efforts to help promote web information system research to broader domains.

We expect that the ideas that have emerged in WISE 2020 will result in the development of further innovations for the benefit of scientific, industrial, and social communities.

October 2020

Zhisheng Huang Wouter Beek Hua Wang Rui Zhou Yanchun Zhang

Organization

General Co-chairs

Yanchun Zhang Victoria University, Australia

Frank van Harmelen Vrije Universiteit Amsterdam, The Netherlands Marek Rusinkiewicz New Jersey Institute of Technology, USA

Program Co-chairs

Zhisheng Huang Vrije Universiteit Amsterdam, The Netherlands

Wouter Beek Triply, The Netherlands Hua Wang Victoria University, Australia

Workshop Co-chairs

Rui Zhou Swinburne University of Technology, Australia

Haiyuan Wang Ztone Beijing, China

Tutorial and Panel Co-chairs

Kamal Karlapalem International Institute of Information Technology, India

Yunjun Gao Zhejiang University, China

Industry Chair

Wouter Beek Triply, The Netherlands

Demo Chair

Yi Cai South China University of Technology, China

Sponsor Chair

Ran Dang Atlantis Press, France

Finance Chair

Qing Hu Ztone International BV, The Netherlands

Local Arrangement Co-chairs

Ting Liu Vrije Universiteit Amsterdam, The Netherlands Xu Wang Vrije Universiteit Amsterdam, The Netherlands

Wei Wei Holiday Inn Leiden, The Netherlands

Publication Chair

Rui Zhou Swinburne University of Technology, Australia

Publicity Co-chairs

Panagiotis Bouros Johannes Gutenberg University of Mainz, Germany

An Liu Soochow University, China

Wen Hua The University of Queensland, Australia

Website Co-chairs

Haiyuan Wang Ztone Beijing, China Di Wang Ztone Beijing, China

WISE Steering Committee Representative

Oing Li

The Hong Kong Polytechnic University, Hong Kong

Program Committee

Karl Aberer EPFL, Switzerland

Marco Aiello University of Stuttgart, Germany
Bernd Amann LIP6, Sorbonne Université, France
Chutiporn Anutariya Asian Institute of Technology, Thailand

Nikolaos Armenatzoglou Amazon, USA

Wouter Beek Vrije Universiteit Amsterdam, The Netherlands

Devis Bianchini University of Brescia, Italy

Xin Cao University of New South Wales, Australia

Jinli Cao La Trobe University, Australia

Tsz Nam Chan The Hong Kong Polytechnic University, Hong Kong Jiefeng Cheng The Chinese University of Hong Kong, Hong Kong

Dickson K. W. Chiu

The University of Hong Kong, Hong Kong

LAMSADE, Université Paris-Dauphine, France

Alexandra Cristea Durham University, UK Valeria De Antonellis University of Brescia, Italy

Anton Dignös Free University of Bozen-Bolzano, Italy

Lei Duan Sichuan University, China

Yixiang Fang University of New South Wales, Australia

Yunjun Gao Zhejiang University, China

Daniela Grigori LAMSADE, Université Paris-Dauphine, France

Tobias Grubenmann University of Bonn, Germany Hakim Hacid Zayed University, UAE

Jiafeng Hu Google, USA

Haibo Hu

The Hong Kong Polytechnic University, Hong Kong
Zhisheng Huang
Vrije Universiteit Amsterdam, The Netherlands
Xin Huang
Hong Kong Baptist University, Hong Kong
Jyun-Yu Jiang
University of California, Los Angeles, USA

Panos Kalnis King Abdullah University of Science and Technology,

Saudi Arabia

Verena Kantere University of Ottawa, Canada Georgia Kapitsaki University of Cyprus, Cyprus Panagiotis Karras Aarhus University, Denmark

Kyoung-Sook Kim National Institute of Advanced Industrial Science

and Technology (AIST), Japan

Hong Va Leong The Hong Kong Polytechnic University, Hong Kong

Jianxin Li Deakin University, Australia Hui Li Xiamen University, China

Kewen Liao Australian Catholic University, Australia

An Liu Soochow University, China
Guanfeng Liu Macquarie University, Australia
Siqiang Luo Harvard University, USA
Fenglong Ma Penn State University, USA

Hui Ma Victoria University of Wellington, New Zealand

Jiangang Ma Federation University, Australia

Yun Ma City University of Hong Kong, Hong Kong Abyayananda Maiti Indian Institute of Technology Patna, India

Silviu Maniu Université Paris-Sud, France Yannis Manolopoulos Open University of Cyprus, Cyprus

George Papastefanatos Information Management Systems Institute,

Athena Research Center, Greece

Kostas Patroumpas Information Management Systems Institute,

Athena Research Center, Greece

Dimitris Plexousakis Institute of Computer Science, FORTH, Greece

Nicoleta Preda Université Paris-Saclay, France

Dimitris Sacharidis Vienna University of Technology, Austria

Heiko Schuldt University of Basel, Switzerland

Caihua Shan The University of Hong Kong, Hong Kong Jieming Shi National University of Singapore, Singapore

Kostas Stefanidis University of Tampere, Finland

Stefan Tai TU Berlin, Germany

Bo Tang Southern University of Science and Technology, China Chaogang Tang China University of Mining and Technology, China Xiaohui Tao University of Southern Queensland, Australia

Dimitri Theodoratos New Jersey Institute of Technology, USA

Hua Wang Victoria University, Australia

Organization

Х

Jin Wang University of California, Los Angeles, USA

Lizhen Wang Yunnan University, China

Beijing University of Technology, China Haiyuan Wang Harbin Institute of Technology, China Hongzhi Wang

Xin Wang Tianjin University, China Shiting Wen Zhejiang University, China

Mingjun Xiao University of Science and Technology of China, China University of Illinois at Urbana-Champaign, USA Carl Yang Zhenguo Yang City University of Hong Kong, Hong Kong

Hongzhi Yin University of Queensland, Australia

Auckland University of Technology, New Zealand Sira Yongchareon

Demetrios University of Cyprus, Cyprus

Zeinalipour-Yazti

Yanchun Zhang Victoria University, Australia Detian Zhang Jiangnan University, China Jinan University, China Jilian Zhang

Yudian Zheng Twitter, USA

Rui Zhou Swinburne University of Technology, Australia

Lihua Zhou Yunnan University, China

Singapore Management University, Singapore Feida Zhu Zhejiang Gongshang University, China Yi Zhuang

Additional Reviewers

Eugene Fu

Olayinka Adeleye Haridimos Kondylakis Ebaa Alnazer Kyriakos Kritikos Yixin Bao Christos Laoudias Dong Chen Rémi Lebret

Hongxu Chen Bing Li Tong Chen Veronica Liesaputra

Xuefeng Chen Ting Liu Constantinos Costa Tong Liu Alexia Dini Kounoudes Xin Liu

Thang Duong Steven Lynden Vasilis Efthymiou Stavros Maroulis Negar Foroutan Grace Ngai Rebekah Overdorf

Ilche Georgievski Xueli Pan Jérémie Rappaz Yu Hao Mohammadhadi Rouhani Wenjie Hu

Xiaojiao Hu Brian Setz

Firas Kassawat Panayiotis Smeros Wenya Sun Xiangguo Sun Pei-Wei Tsai Fucheng Wang Jun Wang Qinyong Wang Xu Wang Xin Xia Yuxin Xiao

Xiangchen Song

Costas Zarifis Chrysostomos Zeginis

Shijie Zhang Zichen Zhu

Yanchao Tan

Nikolaos Zygouras

Contents - Part II

÷				4.	T 4	4.0
ı	m	tn	rm	atioi	1 Extr	action

TaskGenie: Crowd-Powered Task Generation for Struggling Search Luyan Xu, Xuan Zhou, and Ujwal Gadiraju	3
Search Engine Similarity Analysis: A Combined Content and Rankings	
Approach	21
Evaluating Similarity Measures for Dataset Search	38
Towards Efficient Retrieval of Top-k Entities in Systems of Engagement Anirban Mondal, Nilesh Padhariya, and Mukesh Mohania	52
A Compare-Aggregate Model with External Knowledge	
for Query-Focused Summarization	68
An Active Learning Based Hybrid Neural Network for Joint	
Information Extraction	84
ABLA: An Algorithm for Repairing Structure-Based Locators Through	
Attribute Annotations	101
Text Mining	
Automatic Action Extraction for Short Text Conversation Using	
Unsupervised Learning	117
Senthil Ganesan Yuvaraj, Shayan Zamanirad, Boualem Benatallah, and Carlos Rodriguez	
Topic Analysis by Exploring Headline Information	129
A Text Mining Approach to Extract and Rank Innovation Insights from Research Projects	143
Francesca Maridina Malloci, Laura Portell Penadés, Ludovico Boratto, and Gianni Fenu	- 10

Automatic Complex Word Identification Using Implicit Feedback from User Copy Operations	155
A Densely Connected Encoder Stack Approach for Multi-type Legal Machine Reading Comprehension	167
Security and Privacy	
Privacy-Preserving Data Generation and Sharing Using Identification Sanitizer	185
Robust Blockchain-Based Cross-Platform Audio Copyright Protection System Using Content-Based Fingerprint	201
Distributed Differential Evolution for Anonymity-Driven Vertical Fragmentation in Outsourced Data Storage Yong-Feng Ge, Jinli Cao, Hua Wang, Yanchun Zhang, and Zhenxiang Chen	213
A Graph Data Privacy-Preserving Method Based on Generative Adversarial Networks	227
Channel Correlation Based Robust Audio Watermarking Mechanism for Stereo Signals	240
Adaptive Online Learning for Vulnerability Exploitation Time Prediction Jiao Yin, MingJian Tang, Jinli Cao, Hua Wang, Mingshan You, and Yongzheng Lin	252
Recommender Systems	
Double-Wing Mixture of Experts for Streaming Recommendations Yan Zhao, Shoujin Wang, Yan Wang, Hongwei Liu, and Weizhe Zhang	269
Modelling Local and Global Dependencies for Next-Item Recommendations	285

Contents – Part II	xiii
Why-Not Questions & Explanations for Collaborative Filtering	301
Learning from Multiple Graphs of Student and Book Interactions for Campus Book Recommendation	316
A Clustering-Based Collaborative Filtering Recommendation Algorithm via Deep Learning User Side Information	331
Path-Based Academic Paper Recommendation	343
Database System and Workflow	
A Slice-Based Method to Speed Up Join View Maintenance for Transactions	359
A Chunk-Based Hash Table Caching Method for In-Memory Hash Joins Xing Wei, Huiqi Hu, Xuan Zhou, and Aoying Zhou	376
An Asynchronous View Maintenance Approach Based on IO Sharing Huichao Duan, Huiqi Hu, Weining Qian, and Aoying Zhou	390
AQapprox: Aggregation Queries Approximation with Distribution-Aware Online Sampling	404
LogRank ⁺ : A Novel Approach to Support Business Process Event Log Sampling	417
ProvONE+: A Provenance Model for Scientific Workflows	431
Data Mining and Applications	
Fair Outlier Detection	447
A New Effective and Efficient Measure for Outlying Aspect Mining Durgesh Samariya, Sunil Aryal, Kai Ming Ting, and Jiangang Ma	463
Time Series Data Cleaning Based on Dynamic Speed Constraints	475

Predicting MOOCs Dropout with a Deep Model	488
RFRSF: Employee Turnover Prediction Based on Random Forests and Survival Analysis	503
A Deep Sequence-to-Sequence Method for Aircraft Landing Speed Prediction Based on QAR Data	516
Fine-grained Multi-label Sexism Classification Using Semi-supervised Learning	531
aDFR: An Attention-Based Deep Learning Model for Flight Ranking Yuan Yi, Jian Cao, YuDong Tan, QiangQiang Nie, and XiaoXi Lu	548
Dealing with Ratio Metrics in A/B Testing at the Presence of Intra-user Correlation and Segments	563
Risk Monitoring Services of Discharged SARS-CoV-2 Patients	578
UAVFog-Assisted Data-Driven Disaster Response: Architecture, Use Case, and Challenges	591
Correction to: Fair Outlier Detection	C1
Author Index	607

Contents – Part I

Network E	mbedding
-----------	----------

Higher-Order Graph Convolutional Embedding for Temporal Networks Xian Mo, Jun Pang, and Zhiming Liu	3
RolNE: Improving the Quality of Network Embedding with Structural Role Proximity	16
Qi Liang, Dan Luo, Lu Ma, Peng Zhang, MeiLin Zhou, YongQuan He, and Bin Wang	
Weighted Meta-Path Embedding Learning for Heterogeneous Information Networks	29
Yongjun Zhang, Xiaoping Yang, and Liang Wang	
A Graph Embedding Based Real-Time Social Event Matching Model	
for EBSNs Recommendation	41
Competitor Mining from Web Encyclopedia: A Graph Embedding	
Approach	56
Graph Neural Network	
Fine-Grained Semantics-Aware Heterogeneous Graph Neural Networks Yubin Wang, Zhenyu Zhang, Tingwen Liu, Hongbo Xu, Jingjing Wang, and Li Guo	71
DynGCN: A Dynamic Graph Convolutional Network Based	
on Spatial-Temporal Modeling	83
NeuLP: An End-to-End Deep-Learning Model for Link Prediction Zhiqiang Zhong, Yang Zhang, and Jun Pang	96
PLSGAN: A Power-Law-modified Sequential Generative Adversarial Network for Graph Generation	109
Qijie Bai, Yanting Yin, Yining Lian, Haiwei Zhang, and Xiaojie Yuan	

Social Network

User Profile Linkage Across Multiple Social Platforms	125
Budgeted Influence Maximization with Tags in Social Networks	141
Modeling Implicit Communities from Geo-Tagged Event Traces Using Spatio-Temporal Point Processes. Ankita Likhyani, Vinayak Gupta, P. K. Srijith, P. Deepak, and Srikanta Bedathur	153
Detecting Social Spammers in Sina Weibo Using Extreme Deep Factorization Machine	170
Clustering Hashtags Using Temporal Patterns Borui Cai, Guangyan Huang, Shuiqiao Yang, Yong Xiang, and Chi-Hung Chi	183
Nonnegative Residual Matrix Factorization for Community Detection Yulong Pei, Cong Liu, Chuanyang Zheng, and Long Cheng	196
Graph Query	
Fast Algorithm for Distance Dynamics-Based Community Detection	213
A Hybrid Index for Distance Queries	227
DySky: Dynamic Skyline Queries on Uncertain Graphs	242
Leveraging Double Simulation to Efficiently Evaluate Hybrid Patterns	
on Data Graphs	255
Knowledge Graph and Entity Linkage	
Knowledge-Infused Pre-trained Models for KG Completion	273

Contents – Part I	xvii
TransMVG: Knowledge Graph Embedding Based on Multiple-Valued Gates	286
ADKT: Adaptive Deep Knowledge Tracing	302
MULCE: Multi-level Canonicalization with Embeddings of Open Knowledge Bases	315
Encoding Knowledge Graph Entity Aliases in Attentive Neural Network for Wikidata Entity Linking	328
Improving Entity Linking with Graph Networks	343
Spatial Temporal Data Analysis	
Accurate Indoor Positioning Prediction Using the LSTM and Grey Model Xuqi Fang, Fengyuan Lu, Xuxin Chen, and Xinli Huang	357
Bus Travel-Time Prediction Based on Deep Spatio-Temporal Model Kaixin Zhang, Yongxuan Lai, Liying Jiang, and Fan Yang	369
TraSP: A General Framework for Online Trajectory Similarity Processing Zhicheng Pan, Pingfu Chao, Junhua Fang, Wei Chen, Zhixu Li, and An Liu	384
Indicators for Measuring Tourist Mobility	398
Modeling Local and Global Flow Aggregation for Traffic Flow Forecasting	414
NSA-Net: A NetFlow Sequence Attention Network for Virtual Private Network Traffic Detection	430
Spatial and Temporal Pricing Approach for Tasks in Spatial Crowdsourcing	445

Service Computing and Cloud Computing

Attention-Based High-Order Feature Interactions to Enhance the Recommender System for Web-Based Knowledge-Sharing Service	461
Jiayin Lin, Geng Sun, Jun Shen, Tingru Cui, David Pritchard, Dongming Xu, Li Li, Wei Wei, Ghassan Beydoun, and Shiping Chen	.01
Designing Context-Based Services for Resilient Cyber Physical Production Systems	474
Ada Bagozi, Devis Bianchini, and Valeria De Antonellis	
A Novel Repair-Based Multi-objective Algorithm for QoS-Constrained Distributed Data-Intensive Web Service Composition	489
Heuristics Based Mosaic of Social-Sensor Services for Scene Reconstruction	503
Fast Build Top-k Lightweight Service-Based Systems	516
Comparison of Text-Based and Feature-Based Semantic Similarity Between Android Apps	530
Md Kafil Uddin, Qiang He, Jun Han, and Caslon Chua	
Subjective Metrics-Based Cloud Market Performance Prediction	546
Towards Web-Scale and Energy-Efficient Hybrid SDNs: Deployment Optimization and Fine-Grained Link State Management Yufei Liu, Shang Cheng, and Xinli Huang	559
Author Index	575