Lecture Notes in Computer Science

11268

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, Lancaster, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Zurich, Switzerland

John C. Mitchell

Stanford University, Stanford, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

C. Pandu Rangan

Indian Institute of Technology Madras, Chennai, India

Bernhard Steffen

TU Dortmund University, Dortmund, Germany

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbrücken, Germany

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

Leong Hou U · Haoran Xie (Eds.)

Web and Big Data

APWeb-WAIM 2018 International Workshops: MWDA, BAH, KGMA, DMMOOC, DS Macau, China, July 23–25, 2018 Revised Selected Papers



Editors Leong Hou U University of Macau Macao, China

Haoran Xie Education University of Hong Kong Hong Kong, China

ISSN 0302-9743 ISSN 1611-3349 (electronic) Lecture Notes in Computer Science ISBN 978-3-030-01297-7 ISBN 978-3-030-01298-4 (eBook) https://doi.org/10.1007/978-3-030-01298-4

Library of Congress Control Number: 2018948814

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

© Springer Nature Switzerland AG 2018

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, express 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

The Asia Pacific Web (APWeb) and Web-Age Information Management (WAIM) Joint Conference on Web and Big Data is a leading international conference for researchers, practitioners, developers, and users to share and exchange their cutting-edge ideas, results, experiences, techniques, and tools in connection with all aspects of Web data management. As the first joint event, APWeb-WAIM 2018 was held in Macau SAR, China, during July 23–25, 2018, and it attracted participants from all over the world.

Along with the main conference, APWeb-WAIM workshops intend to provide an international forum for researchers to discuss and share research results. After reviewing the workshop proposals, we were able to accept five workshops, which covered topics in Web data, health-care data, massive open online course data, knowledge graph data, data mining, and data science. The diversity of topics in these workshops contributed to the main themes of the APWeb-WAIM conference. For these workshops, we accepted 31 full papers that were carefully reviewed from 44 submissions. The five workshops were as follows:

- Mobile Web Data Analytics 2018 (MWDA 2018)
- Big Data Analytics for Health Care 2018 (BAH 2018)
- The First International Workshop on Knowledge Graph Management and Analysis (KGMA 2018)
- Data Management and Mining on MOOCs 2018 (DMMOOC 2018)
- APWeb-WAIM Data Science Workshop 2018 (DS 2018)

August 2018 Leong Hou U Haoran Xie

Organization

Workshop Co-chairs

Leong Hou U University of Macau, SAR China

Haoran Xie Education University of Hong Kong, SAR China

Mobile Web Data Analytics 2018 (MWDA 2018)

General Co-chairs

Li Li Southwest University, China Li Liu Chongqing University, China

Xiangliang Zhang King Abdullah University of Science and Technology,

Saudi Arabia

Program Committee

Shiping Chen CSIRO, Australia

Jiong Jin Swinburne University of Technology, Australia

Ming Liu Southwest University, China

Guoxin Su National University of Singapore, Singapore

Min Gao Chongqing University, China

Basma Alharbi King Abdullah University of Science and Technology,

Saudi Arabia

Zehui Qu Southwest University, China Yonggang Lu Lanzhou University, China

Zhen Dong National University of Singapore, Singapore Ye Liu National University of Singapore, Singapore

Jun Zeng Chongqing University, China

Aiguo Wang Hefei University of Technology, China

Xuejun Li
Chenren Xu
Peking University, China
Peking University, China
Chongqing University, China
Kunxia Wang
Texas A&M University, USA

Big Data Analytics for Health Care 2018 (BAH 2018)

General Co-chairs

Genlang Chen Ningbo Institute of Technology, Zhejiang University Shiting Wen Ningbo Institute of Technology, Zhejiang University

Program Committee

An Liu Soochow University, China Chaoyang Zhu Zhejiang University, China

Lihua Yue University of Science and Technology of China, China

Chaoyi Pang CSIRO, Australia

Yang Yang Jiangsu University, China Detian Zhang Jiangnan University, China

Peiguan Jin University of Science and Technology of China, China

Jingiu Yang NIT, Zhejiang University, China

The First International Workshop on Knowledge Graph Management and Analysis (KGMA 2018)

Honorary Co-chairs

Junhu Wang Griffith University, Australia Xiaojie Yuan Nankai University, China

General Co-chairs

Xin Wang Tianjin University, China

Jianxin Li University of Western Australia, Australia

Program Committee

Gao Cong Nanyang Technological University, Singapore

Huajun Chen Zhejiang University, China

Tim French University of Western Australia, Australia

Jun GaoPeking University, ChinaMd Saiful IslamGriffith University, Australia

Ronghua Li Beijing Institute of Technology, China

Yuanfang Li
Jiaheng Lu
University, Australia
University of Helsinki, Finland
Jeff Z. Pan
The University of Aberdeen, UK
Chuitian Rong
Jijun Tang
University of South Carolina, USA

Haofen Wang Shenzhen Gowild Robotics Co. Ltd., China

Hongzhi Wang Harbin University of Industry, China

Kewen Wang Griffith University, Australia

Guohui Xiao Free University of Bozen-Bolzano, Italy

Yajun Yang Tianjin University, China Haiwei Zhang Nankai University, China

Qingpeng Zhang City University of Hong Kong, SAR China

Wei Zhang Alibaba, China

Xiaowang Zhang Tianjin University, China

Xuyun Zhang The University of Auckland, New Zealand

W. Jim Zheng The University of Texas, Health Science Center

at Houston, USA

Yuanyuan Zhu Wuhan University, China

Data Management and Mining on MOOCs 2018 (DMMOOC 2018)

Workshop Organizers

Wenjun Wu Beihang University, China Yan Zhang Peking University, China Yongxin Tong Beihang University, China

Program Committee

Dawei Gao Beihang University, China

Hailong Liu Northwestern Polytechnical University, China

Jun Liu Xian Jiaotong University, China

Xinjun Mao National University of Defense Technology, China

Longfei Shangguan Princeton University, USA Tianshu Song Beihang University, China

Zhiyang Su Microsoft, China

Jie Tang Tsinghua University, China Qian Tao Beihang University, China Libin Wang Beihang University, China Qiong Wang Peking University, China

Ting Wang National University of Defense Technology, China

Jia Xu Guangxi University, China Wei Xu Tsinghua University, China

Gang Yin National University of Defense Technology, China Yuxiang Zeng Hong Kong University of Science and Technology,

SAR China

Zimu Zhou ETH Zurich, Switzerland

APWeb-WAIM Data Science Workshop 2018 (DS 2018)

Honorary Chair

Zhiguo Gong University of Macau, SAR China

Workshop Co-chairs

Leong Hou U University of Macau, SAR China

Man Lung YIU Hong Kong Polytechnic University, SAR China

X Organization

Program Committee Members

Gao Cong
Nanyang Technological University, Singapore
Haibo Hu
Hong Kong Polytechnic University, SAR China
Reynold Cheng
The University of Hong Kong, SAR China

Fai Wong University of Macau, SAR China

Contents

Mobile Web Data Analytics	
Hybrid Decision Based Chinese News Headline Classification Yukun Cao, Xiaofei Xu, Ye Du, Jun He, and Li Li	3
A Self-representation Model for Robust Clustering of Categorical Sequences	13
Diversified Spatial Keyword Query on Topic Coverage	24
Sequence-As-Feature Representation for Subspace Classification of Multivariate Time Series	35
Discovering Congestion Propagation Patterns by Co-location Pattern Mining	46
Spectroscopy-Based Food Internal Quality Evaluation with XGBoost Algorithm	56
Large Scale UAVs Collaborative Formation Simulation Based on Starlings' Flight Mechanism	65
Measuring the Spatio-Temporal Similarity Between Users	79
Gesture Recognition Based on Accelerometer and Gyroscope and Its Application in Medical and Smart Homes	90
Smartphone-Based Human Activity Recognition Using CNN in Frequency Domain	101
Text Classification Methods Based on SVD and FCM	111

Ning Yang, Shuaibing Li, Rong Sun, and Yi Yang

Bigdata Analytics for Healthcare

An Image Processing Method via OpenCL for Identification of Pulmonary Nodules	123
Genlang Chen, Jiajian Zhang, Yuning Pan, and Chaoyi Pang	
Pulmonary Nodule Segmentation Method of CT Images Based on 3D-FCN	134
Yan Nie, Deyun Zhuo, Guanghui Song, and Shiting Wen	10.
The 1st International Workshop on Knowledge Graph Management and Analysis	
Research on Video Recommendation Algorithm Based on Knowledge Reasoning of Knowledge Graph	145
A Hybrid Framework for Query Processing and Data Analytics on Spark Haokun Chen, Xiaowang Zhang, Jiahui Zhang, and Zhiyong Feng	159
Improving Network-Based Top-N Recommendation with Background Knowledge from Linked Open Data	174
A Web-Based Theme-Related Word Set Construction Algorithm Yingkai Wu, Yukun Li, and Gang Hao	188
Classifying Personal Photo Collections: An Event-Based Approach Ming Geng, Yukun Li, and Fenglian Liu	201
Data Management and Mining on MOOCs	
A Learning Analytic Model for Smart Classroom	219
Understanding User Interests Acquisition in Personalized Online Course Recommendation	230
A Learning Analytics System for Cognition Analysis in Online Learning Community	243
A Semantic Role Mining and Learning Performance Prediction Method in MOOCs	259

Contents	XIII
MOOC Guider: An End-to-End Dialogue System for MOOC Users Yuntao Li and Yan Zhang	270
AUnet: An Unsupervised Method for Answer Reliability Evaluation in Community QA Systems	281
Model and Practice of Crowd-Based Education	293
Exploring Business Models and Dynamic Pricing Frameworks for SPOC Services	306
APWeb-WAIM Data Science Workshop	
Speed-Up Algorithms for Happiness-Maximizing Representative Databases	321
Multi-location Influence Maximization in Location-Based Social Networks	336
Emotion Analysis for the Upcoming Response in Open-Domain Human-Computer Conversation	352
A Recurrent Neural Network Language Model Based on Word Embedding	368
Inferring Social Ties from Multi-view Spatiotemporal Co-occurrence Caixu Xu and Ruirui Bai	378
Author Index	393