

# **2019 IEEE International Conference on Big Knowledge (ICBK 2019)**

**Beijing, China  
10 – 11 November 2019**



**IEEE Catalog Number: CFP19M78-POD  
ISBN: 978-1-7281-4608-9**

**Copyright © 2019 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:	CFP19M78-POD
ISBN (Print-On-Demand):	978-1-7281-4608-9
ISBN (Online):	978-1-7281-4607-2

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2019 IEEE International Conference on Big Knowledge (ICBK) ICBK 2019

## Table of Contents

Welcome Message from Conference Organizers	x
Organizing Committee	xii
Program Committee	xiii
ICDM/ICBK 2019 Panel: Marketing Intelligence – Let Marketing Drive Efficiency and Innovation	xv

## Regular Papers

Highly Parallel Seedless Random Number Generation from Arbitrary Thread Schedule Reconstruction	1
<i>Eryn Aguilar (UNITE/University of Nevada), Jevis Dancel (UNITE/University of Nevada), Deysaree Mamaud (UNITE/University of Nevada), Dorothy Pirosh (UNITE/University of Nevada), Farin Tavacoli (UNITE/University of Nevada), Felix Zhan (UNITE/University of Nevada), Robbie Pearce (RET/University of Nevada), Margaret Novack (RET/University of Nevada), Hokunani Keehu (RET/University of Nevada), Benjamin Lowe (University of Arkansas), Justin Zhan (University of Arkansas), Laxmi Gewali (UNITE/University of Nevada), and Paul Oh (RET/University of Nevada)</i>	
Modeling Multi-label Recurrence in Data Streams	9
<i>Zahra Ahmadi (Johannes Gutenberg University) and Stefan Kramer (Johannes Gutenberg University)</i>	
Tensor-Train Parameterization for Ultra Dimensionality Reduction	17
<i>Mingyuan Bai (University of Sydney), S.T. Boris Choy (University of Sydney), Xin Song (China University of Geosciences; University of Sydney), and Junbin Gao (University of Sydney)</i>	
Knowledge-Guided Biclustering via Sparse Variational EM Algorithm	25
<i>Changgee Chang (University of Pennsylvania), Eun Jeong Min (University of Pennsylvania), Jihwan Oh (University of Pennsylvania), and Qi Long (University of Pennsylvania)</i>	
Recurrent Neural Networks for Autoregressive Moving Average Model Selection	33
<i>Bei Chen (IBM Research Ireland), Beat Buesser (IBM research Ireland), and Kelsey DiPietro (University of Notre Dame)</i>	
Continuous Path-Based Range Keyword Queries on Road Networks	42
<i>Fangshu Chen (Shanghai Polytechnic University), Pengfei Zhang (Zhejiang University), Huaizhong Lin (Zhejiang University), and Shan Tang (Shanghai Zhi Pan Intelligent Technology Co.Ltd, Shanghai Polytechnic University)</i>	

Complicacy-Guided Parameter Space Sampling for Knowledge Discovery with Limited Simulation Budgets .50	
<i>Xilun Chen (Arizona State University), Logan Mathesen (Arizona State University), Giulia Pedrielli (Arizona State University), and K. Selcuk Candan (Arizona State University)</i>	
Co-training Based on Semi-Supervised Ensemble Classification Approach for Multi-label Data Stream .58.....	
<i>Zhe Chu (Hefei University of Technology), Peipei Li (Hefei University of Technology), and Xuegang Hu (Hefei University of Technology)</i>	
Nonlinear Cross-Domain Feature Representation Learning Method Based on Dual Constraints .66.....	
<i>Han Ding (Hefei University of Technology), Yuhong Zhang (Hefei University of Technology), Shuai Yang (Hefei University of Technology), and Yaojin Lin (Fujian Province University)</i>	
Which Patient to Treat Next? Probabilistic Stream-Based Reasoning for Decision Support and Monitoring .73.....	
<i>Marcel Gehrke (University of Luebeck, Germany), Simon Schiff (University of Luebeck, Germany), Tanya Braun (University of Luebeck, Germany), and Ralf Möller (University of Luebeck, Germany)</i>	
Approximate Query Answering in Complex Gaussian Mixture Models .81.....	
<i>Mattis Hartwig (University of Lübeck, Germany), Marcel Gehrke (University of Lübeck, Germany), and Ralf Möller (University of Lübeck)</i>	
Adaptive Structural Co-regularization for Unsupervised Multi-view Feature Selection .87.....	
<i>Tsung-Yu Hsieh (The Pennsylvania State University), Yiwei Sun (The Pennsylvania State University), Suhang Wang (The Pennsylvania State University), and Vasant Honavar (The Pennsylvania State University)</i>	
Machine Learning Models for Paraphrase Identification and its Applications on Plagiarism Detection .97.....	
<i>Ethan Hunt (UNITE/University of Nevada), Ritvik Janamsetty (UNITE/University of Nevada), Chanana Kinares (UNITE/University of Nevada), Chanel Koh (UNITE/University of Nevada), Alexis Sanchez (UNITE/University of Nevada), Felix Zhan (UNITE/University of Nevada), Murat Ozdemir (RET/University of Nevada), Shabnam Waseem (RET/University of Nevada), Osman Yolcu (RET/University of Nevada), Binay Dahal (UNITE/University of Nevada; RET/University of Nevada), Justin Zhan (University of Arkansas), Laxmi Gewali (UNITE/University of Nevada), and Paul Oh (RET/University of Nevada)</i>	
Sparse Tensor Decomposition for Multi-task Interaction Selection .105.....	
<i>Jun-Yong Jeong (POSTECH) and Chi-Hyuck Jun (POSTECH)</i>	
A Hybrid Machine Learning Method for the De-identification of Un-Structured Narrative Clinical Text in Multi-center Chinese Electronic Medical Records Data .115.....	
<i>Meng Jin (Peking University Medical Informatics Center, National Medical Service Data Center), Kai Zhang (Peking University Health Science Center), Yunhaonan Yang (Peking University School of Public Health), Shuanglian Xie (Peking University Fifth Clinical Medical College), Kai Song (China-Japan Friendship Hospital), Yonghua Hu (Peking University Medical Informatics Center, Peking University School of Public Health), and Xiaoyuan Bao (Peking University Medical Informatics Center, National Medical Service Data Center)</i>	

Ensemble Classification Method Based on Truth Discovery .122.....	
<i>Yuxin Jin (Hefei University of Technology), Ze Yang (Hefei University of Technology), Ying He (Hefei University of Technology), Xianyu Bao (Shenzhen Academy of Inspection and Quarantine), and Gongqing Wu (Hefei University of Technology)</i>	
Mining Spatial Co-location Patterns by the Fuzzy Technology .129.....	
<i>Le Lei (Yunnan University), Lizhen Wang (Yunnan University), and Xiaoxuan Wang (Yunnan University)</i>	
Discovering High Influence Co-location Patterns from Spatial Data Sets .137.....	
<i>Lili Lei (Yunnan University), Lizhen Wang (Yunnan University), Yuming Zeng (Yunnan University), and Lanqing Zeng (Yunnan University)</i>	
A Multi-granularity Genetic Algorithm .145.....	
<i>Caoxiao Li (Chongqing University of Posts and Telecommunications), Shuyin Xia (Chongqing University of Posts and Telecommunications), Zizhong Chen (Chongqing University of Posts and Telecommunications), and Guoyin Wang (Chongqing University of Posts and Telecommunications)</i>	
Consensus with Voting Theory in Blockchain Environments .152.....	
<i>Lei Li (Hefei University of Technology), Yongkang Jiang (Hefei University of Technology), and Guanfeng Liu (Macquarie University)</i>	
Unsupervised Cross-Lingual Word Embeddings Learning with Adversarial Training .160.....	
<i>Yuling Li (Hefei University of Technology), Yuhong Zhang (Hefei University of Technology), Peipei Li (Hefei University of Technology), and Xuegang Hu (Hefei University of Technology)</i>	
Nonparametric Functional Approximation with Delaunay Triangulation Learner .167.....	
<i>Yehong Liu (The University of Hong Kong) and Guosheng Yin (The University of Hong Kong)</i>	
Matrix Profile XX: Finding and Visualizing Time Series Motifs of All Lengths using the Matrix Profile .175.....	
<i>Frank Madrid (University of California, Riverside), Shima Imani (University of California, Riverside), Ryan Mercer (University of California, Riverside), Zachary Zimmerman (University of California, Riverside), Nader Shakibay (University of California, Riverside), and Eamonn Keogh (University of California, Riverside)</i>	
AD-Link: An Adaptive Approach for User Identity Linkage .183.....	
<i>Xin Mu (Nanjing University), Wei Xie (Singapore Management University), Roy Ka-Wei Lee (University of Saskatchewan), Feida Zhu (Singapore Management University), and Ee-Peng Lim (Singapore Management University)</i>	
A Performance Comparison of Cloud-Based Container Orchestration Tools .191.....	
<i>Yao Pan (The University of Melbourne), Ian Chen (The University of Melbourne), Francisco Brasileiro (Federal University of Campina Grande), Glenn Jayaputera (The University of Melbourne), and Richard Sinnott (The University of Melbourne)</i>	
AQUA+: Query Optimization for Hybrid Database-MapReduce System .199.....	
<i>Zhifei Pang (Zhejiang University), Sai Wu (Zhejiang University), Haichao Huang (State Grid Zhejiang Electric Power Company, China), Zhouzhenyan Hong (Zhejiang University), and Yuqing Xie (State Grid Zhejiang Electric Power Company, China)</i>	

Research on Incentive Algorithm of Participatory Sensing System Based on Location .207.....	Ziyi Qi (Yanshan University, China), Mingxin Liu (Yanshan University, China), Yanjun Liang (Yanshan University, China), and Jing Chen (Yanshan University, China)
U-Net Based Defects Inspection in Photovoltaic Electroluminescence Images .215.....	Muhammad Rameez Ur Rahman (Hebei University of Technology), Haiyong Chen (Hebei University of Technology), and Wen Xi (Hebei University of Technology)
CEPV: A Tree Structure Information Extraction and Visualization Tool for Big Knowledge Graph .221.....	Shaojing Sheng (Heifei University of Technology), Peng Zhou (Anhui University), and Xindong Wu (Mininglamp Academy of Sciences, Mininglamp Technology, China; Heifei University of Technology)
An Abnormal Login Detection Method Based on Multi-source Log Fusion Analysis .229.....	Jing Tao (Xi'an Jiaotong University), Waner Wang (Xi'an Jiaotong University), Ning Zheng (Xi'an Jiaotong University), Ting Han (Xi'an Jiaotong University), Yue Chang (Xi'an Jiaotong University), and Xuna Zhan (Xi'an Jiaotong University)
A Behavior Sequence Clustering-Based Enterprise Network Anomaly Host Recognition Method .236.....	Jing Tao (Xi'an Jiaotong University), Ning Zheng (Xi'an Jiaotong University), Waner Wang (Xi'an Jiaotong University), Ting Han (Xi'an Jiaotong University), Xuna Zhan (Xi'an Jiaotong University), and Qingxin Luan (Xi'an Jiaotong University)
A Spatial Co-location Pattern Mining Algorithm Without Distance Thresholds .242.....	Vanha Tran (Yunnan University), Lizhen Wang (Yunnan University), and Hongmei Chen (Yunnan University)
A Fast Relative Density Method Based on Space Partitioning .250.....	Binggui Wang (Chongqing University of Telecommunications and Posts), Shuyin Xia (Chongqing University of Telecommunications and Posts), Hong Yu (Chongqing University of Telecommunications and Posts), and Guoyin Wang (Chongqing University of Telecommunications and Posts)
Inductive Multi-view Semi-Supervised Anomaly Detection via Probabilistic Modeling .257.....	Zhen Wang (University of Wyoming), Maohong Fan (University of Wyoming), Suresh Muknahallipatna (University of Wyoming), and Chao Lan (University of Wyoming)
Adversarial Graph Attention Network for Multi-modal Cross-Modal Retrieval .265.....	Hongchang Wu (Xidian University), Ziyu Guan (Xidan University), Tao Zhi (Xidan University), Wei Zhao (Xidian University), Cai Xu (Xidian University), Hong Han (Xidian University), and Yaming Yang (Xidian University)
FASE: Feature-Based Similarity Search on ECG Data .273.....	Meng Wu (Peking University), Lei Li (Sensetime), and Hongyan Li (Peking University)
Vector-Degree: A General Similarity Measure for Co-location Patterns .281.....	Pingping Wu (Yunnan University), Lizhen Wang (Yunnan University), and Muquan Zou (Yunnan University)

An Optimization-Based Truth Discovery Method with Claim Relation .289.....	
<i>Jiazhu Xia (Hefei University of Technology), Ying He (Hefei University of Technology), Yuxin Jin (Hefei University of Technology), Xianyu Bao (Shenzhen Academy of Inspection and Quarantine), and Gongqing Wu (Hefei University of Technology)</i>	
A Two-Stage Clustering Algorithm Based on Improved K-Means and Density Peak Clustering .296.....	
<i>Na Xiao (Hunan University), Xu Zhou (Hunan University), Xin Huang (Big-Data Center of State Grid Hunan Electric Power Company Limited), and Zhibang Yang (Changsha University)</i>	
Unsupervised Keyword Extraction Method Based on Chinese Patent Clustering .302.....	
<i>Yuxin Xie (Hefei University of Technology), Xuegang Hu (Hefei University of Technology), Yuhong Zhang (Hefei University of Technology), and Shi Li (JAC Technical Center, China)</i>	
Micro-Level Incident Analysis using Spatial Association Rule Mining .310.....	
<i>Jin Soung Yoo (Purdue University Fort Wayne), Sang Jun Park (Columbia University), and Aneesh Raman (Purdue University Fort Wayne)</i>	
Edge Sign Prediction Based on Orthogonal Graph Regularized Nonnegative Matrix Factorization for Transfer Learning .318.....	
<i>Junwu Yu (Chongqing University of Posts and Telecommunications), Shuyin Xia (Chongqing University of Posts and Telecommunications), and Guoyin Wang (Chongqing University of Posts and Telecommunications)</i>	
Open-Domain Document-Based Automatic QA Models Based on CNN and Attention Mechanism .326.....	
<i>Guangjie Zhang (Zhejiang University), Xumin Fan (Zhejiang University), Canghong Jin (Zhejiang University City College), and Minghui Wu (Zhejiang University City College)</i>	
A Three-Dimensional Convolutional-Recurrent Network for Convective Storm Nowcasting .333.....	
<i>Wei Zhang (Ocean University of China), Wei Li (Ocean University of China), and Lei Han (Ocean University of China)</i>	
An Efficient Application Traffic Signature Generation System .341.....	
<i>Yuanming Zhang (Xi'an Jiaotong University), Ting Han (Xi'an Jiaotong University), Zelin Hao (Xi'an Jiaotong University), Yu Cao (Xi'an Jiaotong University), and Jing Tao (Xi'an Jiaotong University)</i>	
<b>Author Index 349.</b> .....	