

2017 IEEE International Congress on Big Data (BigData Congress 2017)

Honolulu, Hawaii, USA

25-30 June 2017



IEEE Catalog Number: CFP17SEV-POD
ISBN: 978-1-5386-1997-1

**Copyright © 2017 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:	CFP17SEV-POD
ISBN (Print-On-Demand):	978-1-5386-1997-1
ISBN (Online):	978-1-5386-1996-4
ISSN:	2379-7703

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

CURRAN ASSOCIATES INC.
proceedings
.com

2017 IEEE 6th International Congress on Big Data

BigDataCongress 2017

Table of Contents

Message from the General Chairs	xiii
Message from the Program Chairs.....	xv
Organizing Committee.....	xvi
Technical Program Committee.....	xviii
IEEE Computer Society Technical Committee on Services Computing Services Society.....	xxii

BigData Congress Research Track

Research Session 1: Machine Learning for Big Data

Comprehensive Predictions of Tourists' Next Visit Location Based on Call Detail Records Using Machine Learning and Deep Learning Methods	1
<i>Nai Chun Chen, Wanqin Xie, Roy E. Welsch, Kent Larson, and Jenny Xie</i>	
Bayesian Networks with Structural Restrictions: Parallelization, Performance, and Efficient Cross-Validation	7
<i>Hao Peng, Zhe Jin, and John A. Miller</i>	
Building an SVM Classifier for Automated Selection of Big Data	15
<i>Junhua Ding, Jiabin Wang, Xiaojun Kang, and Xin-Hua Hu</i>	

Research Session 2: Big Data Analytics Framework

Adaptive Concurrent Query Execution Framework for an Analytical In-Memory Database System	23
<i>Harshad Deshmukh, Hakan Memisoglu, and Jignesh M. Patel</i>	
Toward Scalable Indexing and Search on Distributed and Unstructured Data	31
<i>Alexandru Iulian Orhean, Itua Ijagbone, Ioan Raicu, Kyle Chard, and Dongfang Zhao</i>	
Scalable, Efficient Anonymization with INCOGNITO - Framework & Algorithm	39
<i>Antorweep Chakravorty, Chunming Rong, K.R. Jayaram, and Shu Tao</i>	

Research Session 3: Big Data Privacy and Protection

Differentially Private Trajectory Analysis for Points-of-Interest	
Recommendation	49
<i>Chao Li, Balaji Palanisamy, and James Joshi</i>	
Privacy-Preserving Inductive Learning with Decision Trees	57
<i>Stacey Truex, Ling Liu, Mehmet Emre Gursoy, and Lei Yu</i>	
SafeNVM: A Non-Volatile Memory Store with Thread-Level Page Protection	65
<i>Pradeep Kumar and H. Howie Huang</i>	

Research Session 4: Social Big Data

Maximizing the Effectiveness of Advertising Campaigns on Twitter	73
<i>Yan Mei, Weiliang Zhao, and Jian Yang</i>	
Big Social Data Analytics in Football: Predicting Spectators and TV Ratings from Facebook Data	81
<i>Nicolai H. Egebjerg, Niklas Hedegaard, Gerda Kuum, Raghava Rao Mukkamala, and Ravi Vatrapu</i>	
Big Social Data Analytics for Public Health: Predicting Facebook Post Performance Using Artificial Neural Networks and Deep Learning	89
<i>Nadiya Straton, Raghava Rao Mukkamala, and Ravi Vatrapu</i>	

Research Session 5: Big Data Systems

An Integrated Software System for Supporting Real-Time Near-Infrared Spectral Big Data Analysis and Management	97
<i>Liping Zhao, Shupeng Hu, Xiaojun Zeng, Yuejin Wu, Yanqing Lin, Jing Liu, and Shuang Fan</i>	
A Model-Driven Methodology for Big Data Analytics-as-a-Service	105
<i>Claudio A. Ardagna, Valerio Bellandi, Paolo Ceravolo, Ernesto Damiani, Michele Bezzi, and Cedric Hebert</i>	
Bleach: A Distributed Stream Data Cleaning System	113
<i>Yongchao Tian, Pietro Michiardi, and Marko Vukolić</i>	

Research Session 6: Big Data Performance

Zero-Day Attack Identification in Streaming Data Using Semantics and Spark	121
<i>Sai C. Pallaprolu, Rishi Sankineni, Muthukumar Thevar, George Karabatis, and Jianwu Wang</i>	

Big Data Processing: Scalability with Extreme Single-Node Performance	129
<i>Venkatraman Govindaraju, Sam Idicula, Sandeep Agrawal, Venkatanathan Vardarajan, Arun Raghavan, Jarod Wen, Cagri Balkesen, Georgios Giannikis, Nipun Agarwal, and Eric Sedlar</i>	
Parallel Compression and Indexing of Large-Scale Geospatial Raster Data with GPGPUs	137
<i>Nathalie Kaligirwa, Eleazar Leal, Le Gruenwald, Jianting Zhang, and Simin You</i>	

Research Session 7: Resource Management in Big Data

Scheduling Recurring Distributed Dataflow Jobs Based on Resource Utilization and Interference	145
<i>Lauritz Thamsen, Benjamin Rabier, Florian Schmidt, Thomas Renner, and Odej Kao</i>	
Resource Allocation in Cloud-Based Distributed Cameras	153
<i>Bikash Agrawal, Jayachander Surbiryala, and Chunming Rong</i>	
Resource Management for Parallel Processing Frameworks with Load Awareness at Worker Side	161
<i>Son-Hai Ha, Patrick Brown, and Pietro Michiardi</i>	

Research Session 8: Big Data Processing

CEPaaS: Complex Event Processing as a Service	169
<i>Wilson A. Higashino, Miriam A.M. Capretz, and Luiz F. Bittencourt</i>	
Towards Elucidating the Structural Principles of Host-Pathogen Protein-Protein Interaction Networks: A Bioinformatics Survey	177
<i>Huaming Chen, Jiangning Song, Geng Sun, Jun Shen, and Lei Wang</i>	
OB-Tree: Accelerating Data Cleaning in Out-of-Core Column-Store Databases	185
<i>Feng Yu, Brandon J. Latronics, Tyler Matacic, and Eric S. Jones</i>	

Research Session 9: Big Data Learning

A Deep-Learning Based Precipitation Forecasting Approach Using Multiple Environmental Factors	193
<i>Pengcheng Zhang, Lei Zhang, Hareton Leung, and Jimin Wang</i>	
What Are My Users Looking for When Preparing a Big Data Campaign	201
<i>Claudio Ardagna, Paolo Ceravolo, Guido Lena Cota, Muhammad Muneeb Kiani, and Ernesto Damiani</i>	
Content Embedding Regularized Matrix Factorization for Recommender Systems	209
<i>Hao Wu, Zhengxin Zhang, Kun Yue, Binbin Zhang, and Ruichao Zhu</i>	

Research Session 10: Big Data Case Study

A Spatio-Temporal Mining Approach for Enhancing Satellite Data Availability: A Case Study on Blue Green Algae	216
<i>Vinay Boddula, Lakshmis Ramaswamy, and Deepak Mishra</i>	
Real-Time Anomaly Detection of Short-Time-Scale GWAC Survey Light Curves	224
<i>Tianzhi Feng, Zhihui Du, Yankui Sun, Jianyan Wei, Jing Bi, and Jason Liu</i>	

BigData Congress Visionary Track

Parallel Processing over Spatial-Temporal Datasets from Geo, Bio, Climate and Social Science Communities: A Research Roadmap	232
<i>Sushil K. Prasad, Danial Aghajarian, Michael McDermott, Dhara Shah, Mohamed Mokbel, Satish Puri, Sergio J. Rey, Shashi Shekhar, Yiqun Xe, Ranga Raju Vatsavai, Fusheng Wang, Yanhui Liang, Hoang Vo, and Shaowen Wang</i>	
Adding Support for Theory in Open Science Big Data	251
<i>John A. Miller, Hao Peng, and Michael E. Cotterell</i>	
Towards a Framework for Developing Cyber Privacy Metrics: A Vision Paper	256
<i>Bhavani Thuraisingham, Murat Kantarcioğlu, Elisa Bertino, and Chris Clifton</i>	

BigData Congress Application Track

Session 1: Big Data QoS

De-Centralized Reputation-Based Trust Model to Discriminate between Cloud Providers Capable of Processing Big Data	266
<i>Hadeel T. El Kassabi and Mohamed Adel Serhani</i>	
A Multivariate Clustering Approach for Infrastructure Failure Predictions	274
<i>Simon Luo, Victor W. Chu, Jianlong Zhou, Fang Chen, Raymond K. Wong, and Weidong Huang</i>	
Microblog Sentiment Classification Using Parallel SVM in Apache Spark	282
<i>Bo Yan, Zijiang Yang, Yitian Ren, Xing Tan, and Eric Liu</i>	

Session 2: Machine Learning in Big Data

Drowsy Driving Warning System Based on GS1 Standards with Machine Learning	289
<i>Seongjoo Moon, Moran Min, Jangwoo Nam, Jaeyou Park, Doheon Lee, and Daeyoung Kim</i>	

An Effective Distributed GHSOM Algorithm for Unsupervised Clustering on Big Data	297
--	-----

Chui-Hui Chiu, Jin-Jie Chen, and Fang Yu

Integrating Extractive and Abstractive Models for Long Text Summarization	305
---	-----

Shuai Wang, Xiang Zhao, Bo Li, Bin Ge, and Daquan Tang

Session 3: Big Data Processing

SCMAT: A Mechanism Presuming SCMs to Efficiently Enable Both OLAP and OLTP	313
--	-----

Takamitsu Shioi, Kenji Hatano, and Haruo Yokota

A Real-Time Scheduling Strategy Based on Processing Framework of Hadoop	321
---	-----

Fangbing Chen, Ji Liu, and Yuesheng Zhu

Developing a Real-Time Data Analytics Framework for Twitter Streaming Data	329
--	-----

Babak Yadranjiaghdam, Seyedfaraz Yasrobi, and Nasseh Tabrizi

Session 4: Big Data Mining

Locating Sources in Online Social Networks via Random Walk	337
--	-----

Zhijian Zhang, Kun Yue, Zhengbao Sun, Ling Liu, and Weiyi Liu

Big Data and Analysis of Data Transfers for International Research Networks

Using NetSage	344
---------------------	-----

Alberto Gonzalez, Jason Leigh, Sean Peisert, Brian Tierney, Edward Balas, Predrag Radulovic, and Jennifer M. Schopf

PAS4SCF - A Publication Analytics System for Services Conference
--

Federation (SCF 2004-2016)	352
----------------------------------	-----

Liang-Jie Zhang and Huan Chen

Session 5: Big Data Algorithms

I-Sampling: A New Block-Based Sampling Method for Large-Scale Dataset	360
---	-----

Yulin He, Joshua Zhexue Huang, Hao Long, Qiang Wang, and Chenghao Wei

Leveraging Stacked Denoising Autoencoder in Prediction of Pathogen-Host

Protein-Protein Interactions	368
------------------------------------	-----

Huaming Chen, Jun Shen, Lei Wang, and Jiangning Song

Experiences with the Twitter Health Surveillance (THS) System	376
---	-----

Manuel Rodríguez-Martínez

Session 6: Big Data Case Studies

Data Governance Framework for Big Data Implementation with a Case of Korea	384
<i>Hee Young Kim and June-Suh Cho</i>	
Educational and Scientific Applications of Climate Model Diagnostic Analyzer	392
<i>Seungwon Lee, Chengxing Zhai, Terence Kubar, Benyang Tang, Lei Pan, Juilin Li, Jia Zhang, and Qihao Bao</i>	
Implementation of Disaster Prevention-Oriented Information Service Platform of XRAIN on DIAS	398
<i>Hitomi Sano, Eiji Ikoma, Masaru Kitsuregawa, and Masato Oguchi</i>	

Session 7: Big Data Models

New E-Commerce User Interest Patterns	406
<i>Matthias Volk, Abed Elrahman Shareef, Naoum Jamous, and Klaus Turowski</i>	
Big Data Analysis and Visualization for the Smart Grid	414
<i>Alejandro Sanchez and Wilson Rivera</i>	

Session 8: Big Data Analysis

Compliance Analysis of Configurable Business Process Model Based on Extend CTL	419
<i>Huang Yiwang, Feng Zaiwen, He Keqing, and Xu Songjin</i>	
Any-Time Methods for Time-Series Prediction with Missing Observations	427
<i>Yanjie Wei, Hongzhi Wang, Shengfei Shi, Hong Gao, and Jianzhong Li</i>	

BigData Congress Theme Track

Session 1: Big Data Management

TeenRead: An Adolescents Reading Recommendation System Towards Online Bibliotherapy	431
<i>Yunxing Xin, Yongqiang Chen, Li Jin, Yici Cai, and Ling Feng</i>	
A Resilient Index Graph for Querying Large Biological Scientific Data	435
<i>Liang Li, Zhihong Shen, Jianhui Li, Dongjiang Liu, Huajin Wang, Lipeng Wang, and Qinglan Sun</i>	
SPARQL Query Parallel Processing: A Survey	444
<i>Jiaying Feng, Chenhong Meng, Jiaming Song, Xiaowang Zhang, Zhiyong Feng, and Lei Zou</i>	

Session 2: Big Data Management

Burst-Based Event Classification on Weakly Labeled Time Series Data of Sensors	452
<i>Hanbo Zhang, Yawen Wang, Peng Wang, and Wei Wang</i>	
Bootstrapping a Blockchain Based Ecosystem for Big Data Exchange	460
<i>Jinchuan Chen and Yunzhi Xue</i>	
The Performance of SQL-on-Hadoop Systems - An Experimental Study	464
<i>Xiongpai Qin, Yueguo Chen, Jun Chen, Shuai Li, Jiesi Liu, and Huijie Zhang</i>	

Session 3: Real-Time Big Data Case Analytics

Real Time Social Attitude Expression Prediction	472
<i>Jiawei Zhang, Philip S. Yu, Charu C. Aggarwal, and Limeng Cui</i>	
A Hybrid Learning Framework for Imbalanced Stream Classification	480
<i>Wenbin Zhang and Jianwu Wang</i>	
Personalized Recommendation Algorithm Based on LFM with QoS Constraint	488
<i>Ying Jin and Yi-wen Zhang</i>	

BigData Congress Short Paper Track

Session 1: Big Data Processing

Clustering Data Streams with Adaptive Forgetting	494
<i>Gopi Chand Nutakki and Olfa Nasraoui</i>	
Big Data Pre-Processing: Closing the Data Quality Enforcement Loop	498
<i>Ikbal Taleb and Mohamed Adel Serhani</i>	
Cloud-Based and Big Data-Enabled Brokerage System for Smart Grids	502
<i>Howard Martinez Meza and Manuel Rodriguez-Martinez</i>	
Graph Computation and Its Applications in Smart Grid	507
<i>Guangyi Liu, Kewen Liu, Di Shi, Wendong Zhu, Zhiwei Wang, and Xi Chen</i>	

Session 2: QoS of Big Data

Open Medical Big Data and Open Consent and Their Impact on Privacy	511
<i>Jingquan Li</i>	
Enhancing Energy, Health and Security Policy by Extracting, Enriching and Interfacing Next Generation Data in the Transport Domain (A Study on the Use of Big Data in Cross-Sectoral Policy Development)	515
<i>Susan Grant-Muller, Frances Hodgson, Nick Malleson, and Robert Snowball</i>	
Managing Emerging Risks and Liabilities in Data-Enabled Solutions	519
<i>Olaitan Olaleye, Talmai Oliveira, and Alexandru Darie</i>	

Ecosystem Design of Big Data through Previous Study Analysis in the World: Policy Design for Big Data as Public Goods	525
<i>HyeJung Moon, KwanWoo Kim, SungKyung Kim, and JangHo Park</i>	
Challenges of Software Testing for Astronomical Big Data	529
<i>Lixiao Zhou and Maohai Huang</i>	

Session 3: Big Data Applications

A Distributed System for Finding High Profit Areas over Big Taxi Trip Data with MognoDB and Spark	533
<i>Fadhilah Kurnia Putri and Joonho Kwon</i>	
Comparison of Gambling Industry through Study Analysis in the World	537
<i>HyeJung Moon, Thomas Yang, SungKyung Kim, and JangHo Park</i>	
Big Data Analysis on Gambling Related News in South Korea	541
<i>HyeJung Moon, SungKyung Kim, Thomas Yang, and KwanWoo Kim</i>	
Semantic Analysis of Transportation Related Researches	545
<i>SiYeun Lee and HyeJung Moon</i>	

Session 4: Satellite Session

Business Graphing for Internet-Enabled Enterprises	549
<i>Bo Hu, Jian Wang, Yutao Ma, and Liang-Jie Zhang</i>	
An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends	557
<i>Zibin Zheng, Shaoan Xie, Hongning Dai, Xiangping Chen, and Huaimin Wang</i>	
A New Sleep Mechanism Based on SDN Framework	565
<i>Yu Peizhao, Xu Lei, Gu Jinguang, and He Heng</i>	
CloudSec: A Novel Approach to Verifying Security Conformance at the Bottom of the Cloud	569
<i>Xiaochen Liu, Chunhe Xia, Tianbo Wang, and Li Zhong</i>	
Cutting Parameters Optimization Based on ITLBO Algorithm with Big Data Driven	577
<i>Chen Wang, Yi Wang, KeSheng Wang, Yao Dong, Xueliang Zhou, and Shenghuai Wang</i>	
Author Index	582