

# **Lecture Notes on Data Engineering and Communications Technologies**

Volume 118

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The aim of the book series is to present cutting edge engineering approaches to data technologies and communications. It will publish latest advances on the engineering task of building and deploying distributed, scalable and reliable data infrastructures and communication systems.

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Leonard Barolli · Elis Kulla · Makoto Ikeda  
Editors

# Advances in Internet, Data & Web Technologies

The 10th International Conference  
on Emerging Internet, Data and Web  
Technologies (EIDWT-2022)

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# **Welcome Message of EIDWT-2022 International Conference Organizers**

Welcome to the 10th International Conference on Emerging Internet, Data and Web Technologies (EIDWT-2022), which will be held from March 2 to March 4, 2022, at Okayama University of Science, Okayama, Japan.

The EIDWT is dedicated to the dissemination of original contributions that are related to the theories, practices and concepts of emerging Internet and data technologies yet most importantly of their applicability in business and academia toward a collective intelligence approach.

In EIDWT-2022 will be discussed topics related to Information Networking, Data Centers, Data Grids, Clouds, Crowds, Mashups, Social Networks, Security Issues and other Web 2.0 implementations toward a collaborative and collective intelligence approach leading to advancements of virtual organizations and their user communities. This is because, current and future Web and Web 2.0 implementations will store and continuously produce a vast amount of data, which if combined and analyzed through a collective intelligence manner will make a difference in the organizational settings and their user communities. Thus, the scope of EIDWT-2022 includes methods and practices which bring various emerging Internet and data technologies together to capture, integrate, analyze, mine, annotate and visualize data in a meaningful and collaborative manner. Finally, EIDWT-2022 aims to provide a forum for original discussion and prompt future directions in the area.

An international conference requires the support and help of many people. A lot of people have helped and worked hard for a successful EIDWT-2022 technical program and conference proceedings. First, we would like to thank all authors for submitting their papers. We are indebted to program area chairs, program committee members and reviewers who carried out the most difficult work of carefully evaluating the submitted papers. We would like to give our special thanks to Honorary Chair of EIDWT-2022 Prof. Makoto Takizawa, Hosei University,

Japan, for his guidance and support. We would like to express our appreciation to our keynote speakers for accepting our invitation and delivering very interesting keynotes at the conference.

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# **EIDWT-2022 Keynote Talks**

# Mining of Cohesive Groups in Massive Social and Web Graphs

Alex Thomo

University of Victoria, British Columbia, Canada

**Abstract.** Mining dense subgraphs and discovering hierarchical relations between them is a fundamental problem in graph analysis tasks. For instance, it can be used in visualizing complex networks, finding correlated genes and motifs in biological networks, detecting communities in social and Web graphs, summarizing text and revealing new research subjects in citation networks. Core, truss and nucleus decompositions are popular tools for finding dense subgraphs. A  $k$ -core is a maximal subgraph in which each vertex has at least  $k$ -neighbors, and a  $k$ -truss is a maximal subgraph whose edges are contained in at least  $k$ -triangles. Core and truss decompositions have been extensively studied in both deterministic as well as probabilistic graphs. A more recent notion of dense subgraphs is nucleus decomposition which is a generalization of core and truss decompositions that uses higher-order structures to detect dense regions in the graph. In this talk, I will first motivate and illustrate core, truss, and nucleus decompositions for mining dense hierarchical regions in large graphs. Next, I will describe algorithms for computing these decompositions and outline avenues for further research.

# Human Centered Approaches in Transformative Computing Applications

Lidia Dominika Ogiela

AGH University of Science and Technology, Krakow, Poland

**Abstract.** Human centered systems are now recognized as one of the most important solutions in artificial intelligence. They have advantage over other systems from the fact that they still adapt their operation to the changing and unpredictable tasks and functions. The variability of the human analysis process, which is the basis for the operation of such systems, means that the developed IT solutions are constantly evolving, and their development is a determinant of various external factors independent of humans and those that depend on them. Human centered systems allow for the implementation of deep tasks, meaningful analysis and interpretation of various data sets. Their special advantage is the possibility of incorporating characteristic of the human perception processes of automatic data prediction. In human centered systems, transformative computing processes are also carried out, giving the possibility of implementing analysis steps at various levels of inference. The differentiation of the levels at which the interpretation and inference processes are carried out is a characteristic of complex data management structure.

# Contents

<b>Data Service Platform for Social and Community to Drive the Royal Project Foundation . . . . .</b>	<b>1</b>
Suphatchaya Autarrom, Kittayaporn Chantaranimi, Anchan Chompupoung, Pichan Jinapook, Waranya Mahanan, Pathathai Na Lumpoon, Juggapong Natwichai, Prompong Sugunsil, Sumalee Sangamuang, Titipat Sukhvibul, and Pree Thiengburanathum	
<b>Implementation of a Local-Community Issues Visualization System Using Open Data and Future Population Projection . . . . .</b>	<b>11</b>
Tomoyuki Ishida and Mutsuki Kojima	
<b>SAE+Bi-GRU Based Security Situation Prediction for Smart Grid . . . .</b>	<b>21</b>
Lei Chen, Mengyao Zheng, Zhaohua Liu, Fadong Chen, Kui Zhou, and Bin Liu	
<b>Design of Identity Authentication Scheme for Dynamic Service Command System Based on SM2 Algorithm and Blockchain Technology . . . . .</b>	<b>31</b>
Jie Deng, Lili Jiao, Lili Zhang, Yongjin Ren, and Wengang Yin	
<b>Visual Authentication Codes Generated Using Predictive Intelligence. . . . .</b>	<b>38</b>
Urszula Ogiela, Makoto Takizawa, and Marek R. Ogiela	
<b>Reliable Network Design Problem by Improving Node Reliability . . . .</b>	<b>42</b>
Hiroki Yano, Sumihiro Yoneyama, and Hiroyoshi Miwa	
<b>Toward Secure K-means Clustering Based on Homomorphic Encryption in Cloud. . . . .</b>	<b>52</b>
Zheng Tu, Xu An Wang, Yunxuan Su, Ying Li, and Jiasen Liu	
<b>On the Insecurity of a Certificateless Public Verification Protocol for the Outsourced Data Integrity in Cloud Storage . . . . .</b>	<b>63</b>
Xu An Wang, Xiaozhong Pan, Lixian Wei, and Yize Zhao	

<b>An Improved Density Peaks-Based Graph Clustering Algorithm . . . . .</b>	<b>68</b>
Lei Chen, Heding Zheng, Zhaohua Liu, Qing Li, Lian Guo, and Guangsheng Liang	
<b>Community Division Algorithm Based on Node Similarity and Multi-attribute Fusion . . . . .</b>	<b>81</b>
Du Tiansi, Deng Na, and Chen Weijie	
<b>Research on TCM Patent Annotation to Support Medicine R&amp;D and Patent Acquisition Decision-Making . . . . .</b>	<b>91</b>
Du Tiansi, Deng Na, and Chen Weijie	
<b>An Algorithm for GPS Trajectory Compression Preserving Stay Points . . . . .</b>	<b>102</b>
Shota Iiyama, Tetsuya Oda, and Masaharu Hirota	
<b>Blockchain for Islamic HRM: Potentials and Challenges on Psychological Work Contract . . . . .</b>	<b>114</b>
Olivia Fachrunnisa and Fannisa Assyilah	
<b>Human-Value Orientation as Center for Business Transformation Model in Digital Era . . . . .</b>	<b>123</b>
Ardian Adhiatma and Nurhidayati	
<b>An Energy-Efficient Algorithm to Make Virtual Machines Migrate in a Server Cluster . . . . .</b>	<b>130</b>
Dilawaer Duolikun, Tomoya Enokido, Leonard Barolli, and Makoto Takizawa	
<b>Energy Consumption Model of a Device Supporting Information Flow Control in the IoT . . . . .</b>	<b>142</b>
Shigenari Nakamura, Tomoya Enokido, and Makoto Takizawa	
<b>A Fuzzy-Based System for Assessment of QoS of V2V Communication Links in SDN-VANETs . . . . .</b>	<b>153</b>
Ermioni Qafzezi, Kevin Bylykbashi, Phudit Ampirit, Makoto Ikeda, Keita Matsuo, and Leonard Barolli	
<b>Reliable and Low-Cost Digital Transformation Technology Using Progressive Web Apps in Fog Computing Architecture for Small and Medium Industries in Indonesia . . . . .</b>	<b>163</b>
Zulkifli Tahir, Amil Ahmad Ilham, Ais Prayogi Alimuddin, Muhammad Zulfadly A. Suyuti, and Charina	
<b>A Low-Cost Solution for Smart-City Based on Public Bus Transportation System Using Opportunistic IoT . . . . .</b>	<b>175</b>
Evjola Spaho and Andrea Koroveshi	

<b>A ML-Based System for Predicting Flight Coordinates Considering ADS-B GPS Data: Problems and System Improvement . . . . .</b>	<b>183</b>
Kazuma Matsuo, Makoto Ikeda, and Leonard Barolli	
<b>Fault Detection from Bend Test Images of Welding Using Faster R-CNN . . . . .</b>	<b>190</b>
Shigeru Kato, Takanori Hino, Hironori Kumeno, Shunsaku Kume, Tomomichi Kagawa, and Hajime Nobuhara	
<b>An Efficient Local Search for the Maximum Clique Problem on Massive Graphs . . . . .</b>	<b>201</b>
Kazuho Kanahara, Tetsuya Oda, Elis Kulla, Akira Uejima, and Kengo Katayama	
<b>A Method for Reducing Number of Parameters of Octave Convolution in Convolutional Neural Networks . . . . .</b>	<b>212</b>
Yusuke Gotoh and Yu Inoue	
<b>A Comparison Study of RIWM with RDVM and CM Router Replacement Methods for WMNs Considering Boulevard Distribution of Mesh Clients . . . . .</b>	<b>223</b>
Admir Barolli, Phudit Ampirit, Shinji Sakamoto, Elis Kulla, and Leonard Barolli	
<b>A Fuzzy-Based System for Safe Driving in VANETs Considering Impact of Driver Impatience on Stress Feeling Level . . . . .</b>	<b>236</b>
Kevin Bylykbashi, Ermioni Qafzezi, Phudit Ampirit, Makoto Ikeda, Keita Matsuo, and Leonard Barolli	
<b>Mobility-Aware Narrow Routing Protocol for Underwater Wireless Sensor Networks . . . . .</b>	<b>245</b>
Elis Kulla, Kuya Shintani, and Keita Matsuo	
<b>Design and Implementation of a Testbed for Delay Tolerant Networks: Work in Progress . . . . .</b>	<b>254</b>
Kuya Shintani, Elis Kulla, Makoto Ikeda, Leonard Barolli, and Evjola Spaho	
<b>Evaluation of Focused Beam Routing Protocol on Delay Tolerant Network for Underwater Optical Wireless Communication . . . . .</b>	<b>263</b>
Keita Matsuo, Elis Kulla, and Leonard Barolli	
<b>A Fuzzy-Based System for Slice Service Level Agreement in 5G Wireless Networks: Effect of Traffic Load Parameter . . . . .</b>	<b>272</b>
Phudit Ampirit, Ermioni Qafzezi, Kevin Bylykbashi, Makoto Ikeda, Keita Matsuo, and Leonard Barolli	

**A River Monitoring and Predicting System Considering a Wireless Sensor Fusion Network and LSTM . . . . . 283**  
Yuki Nagai, Tetsuya Oda, Tomoya Yasunaga, Chihiro Yukawa,  
Aoto Hirata, Nobuki Saito, and Leonard Barolli

**Social Experiment of Realtime Road State Sensing and Analysis for Autonomous EV Driving in Snow Country . . . . . 291**  
Yositaka Shibata, Akira Sakuraba, Yoshikazu Arai, Yoshiya Saito,  
and Noriki Uchida

**A Soldering Motion Analysis System for Danger Detection Considering Object Detection and Attitude Estimation . . . . . 301**  
Tomoya Yasunaga, Tetsuya Oda, Nobuki Saito, Aoto Hirata,  
Chihiro Yukawa, Yuki Nagai, and Masaharu Hirota

**Performance Evaluation of a Soldering Training System Based on Haptics . . . . . 308**  
Kyohei Toyoshima, Tetsuya Oda, Chihiro Yukawa, Tomoya Yasunaga,  
Aoto Hirata, Nobuki Saito, and Leonard Barolli

**Performance Evaluation of WMNs by WMN-PSOHC Hybrid Simulation System Considering Two Instances and Normal Distribution of Mesh Clients . . . . . 316**  
Shinji Sakamoto and Leonard Barolli

**The Principal Dimensions Optimization of Large Ships Based on Improved Firefly Algorithm . . . . . 324**  
Jianghao Yin and Na Deng

**Improved Butterfly Optimization Algorithm Fused with Beetle Antennae Search . . . . . 335**  
Jianghao Yin and Na Deng

**A Delaunay Edge and CCM-Based SA Approach for Mesh Router Placement Optimization in WMN: A Case Study for Evacuation Area in Okayama City . . . . . 346**  
Aoto Hirata, Tetsuya Oda, Nobuki Saito, Tomoya Yasunaga,  
Kengo Katayama, and Leonard Barolli

**FPGA Implementation of a Interval Type-2 Fuzzy Inference for Quadrotor Attitude Control . . . . . 357**  
Tomoaki Matusi, Tetsuya Oda, Chihiro Yukawa, Tomoya Yasunaga,  
Nobuki Saito, Aoto Hirata, and Leonard Barolli

**Design of a Robot Vision System for Microconvex Recognition . . . . . 366**  
Chihiro Yukawa, Tetsuya Oda, Nobuki Saito, Aoto Hirata,  
Tomoya Yasunaga, Kyohei Toyoshima, and Kengo Katayama

**Path Control Algorithm for Weeding AI Robot . . . . . 375**  
Misato Shiba and Hiroyoshi Miwa

**Performance Analysis of RIWM and RDVM Router Replacement  
Methods for WMNs by WMN-PSOSA-DGA Hybrid Simulation  
System Considering Stadium Distribution of Mesh Clients . . . . . 386**  
Admir Barolli, Shinji Sakamoto, and Leonard Barolli

**An Energy-Efficient Process Replication to Reduce the Execution  
of Meaningless Replicas . . . . . 395**  
Tomoya Enokido, Dilawaer Duolikun, and Makoto Takizawa

**A Byzantine Fault Tolerant Protocol for Realizing the Blockchain . . . . 406**  
Akihito Asakura, Shigenari Nakamura, Dilawaer Duolikun,  
Tomoya Enokido, Kuninao Nashimoto, and Makoto Takizawa

**Performance Evaluation of a DQN-Based Autonomous Aerial Vehicle  
Mobility Control Method in an Indoor Single-Path Environment with  
a Staircase . . . . . 417**  
Nobuki Saito, Tetsuya Oda, Aoto Hirata, Chihiro Yukawa,  
Masaharu Hirota, and Leonard Barolli

**Practical Survey on MapReduce Subgraph  
Enumeration Algorithms . . . . . 430**  
Xiaozhou Liu, Yudi Santoso, Venkatesh Srinivasan, and Alex Thomo

**Identifying Vehicle Exterior Color by Image Processing  
and Deep Learning. . . . . 445**  
Somayeh Abniki, Kin Fun Li, and Tom Avant

**Author Index. . . . . 459**