16th International Conference on Mobile Systems and Pervasive Computing (MobiSPC 2019), 14th International Conference on Future Networks and Communications (FNC 2019), 9th International Conference on Sustainable Energy Information Technology (SEIT 2019)

Procedia Computer Science Volume 155

Halifax, Canada 19 – 21 August 2019

Editors:

Elhadi Shakshuki Ansar Yasar Haroon Malik

ISBN: 978-1-7138-0653-0

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2019) The Authors. Published by Elsevier Ltd. Creative Commons Attribution 4.0 International License. License details: http://creativecommons.org/licenses/by/4.0/.

No changes have been made to the content of these proceedings. There may be changes to pagination, and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact the publisher:

Elsevier B.V. Radarweg 29 Amsterdam 1043 NX The Netherlands

Phone: +31 20 485 3911 Fax: +31 20 485 2457

http://www.elsevierpublishingsolutions.com/contact.asp

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400

Phone: 845-758-0400 Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com

Available online at www.sciencedirect.com

ScienceDirect





Table of Contents

Preface Elhadi Shakshuki, and Ansar-Ul-Haque Yasar	1
Preface Haroon Malik, and Ansar-Ul-Haque Yasar	4
Preface Ansar-Ul-Haque Yasar, and Jesús Fraile Ardanuy	6
Keynote I Jason Gu	8
Proceeding	10
An Approach towards Missing Data Recovery within IoT Smart System Ivan Izonin, Natalia Kryvinska, Roman Tkachenko, and Khrystyna Zub	11
A Novel Time Series based Seq2Seq Model for Temperature Prediction in Firing Furnace Process Soonsung Hwang, Gunwoo Jeon, Jongpil Jeong, and JunYoul Lee	19
Challenges and requirements for communication technologies in connected zones Zayan El Khaled, and Hamid Mcheick	27
Development of a «smart» home system based on the modular structure and architectural data flow pattern Redux Artem Kazarian, Vasyl Teslyuk, Ivan Tsmots, and Ján Greguš	35
Development of Mobile System for Medical Recommendations Nataliya Shakhovska, Solomiia Fedushko, Michal Greguš ml, Iryna Shvorob, and Yuriy Syerov	43
Connection-less BLE Performance Evaluation on Smartphones Joshua Siva, Jian Yang, and Christian Poellabauer	51
Towards an Actor-based Approach to Design Verified ROS-based Robotic Programs using Rebeca Saeid Dehnavi, Ali Sedaghatbaf, Bahar Salmani, Marjan Sirjani, Mehdi Kargahi, and Ehsan Khamespanah	59
The Choice Of The Optimal Energy-Saving Technology Redundant Power Steam Turbines During The Passage Of The Daily Schedules Of Power Consumption Gaps E.K. Arakelyan, A.V. Andryushin, G.A. Pikina, S.V. Mezin, and A.A. Kosoy	69
Structure model and means of a smart public transport system Oleh Boreiko, Vasyl Teslyuk, Natalia Kryvinska, and Mykola Logoyda	75
Simulation, Validation and FPGA Implementation of a Ring Oscillator Sensor for Thermal Management and Monitoring	
Aziz Oukaira, Ouafaa Ettahri, Mohamed Tabaa, Shamsodin Taheri, and Ahmed Lakhssassi	83
Software-defined security controller-based end-to-end packet key security management Younghan Jung, Marnel Peradilla, and Ronnel Agulto	89

iv *Contents*

Design and Implementation of CPPS and Edge Computing Architecture based on OPC UA Server Guejong Jo, Su-Hwan Jang, and Jongpil Jeong	97
The recommendation system for cyclists LvivBicycleMap Vasyl Teslyuk, Vitalij Shevchyk, Michal Greguš ml, Taras Teslyuk, and Oleksandra Mishchuk	105
A Novel CPPS Architecture Integrated with Centralized OPC UA server for 5G-based Smart Manufacturing Jeehyeong Kim, Guejong Jo, and Jongpil Jeong	113
Efficient Mobile Clouds: Forecasting the Future Connectivity of Mobile and IoT Devices to Save Energy and Bandwidth Gabriel Orsini, Wolf Posdorfer, and Winfried Lamersdorf	121
A new Deep learning model for Sequential Pattern Mining using Ensemble learning and Models selection Taking Mobile Activity Recognition as a case Choukri Djellali, and Mehdi adda	129
Trusted relational databases with blockchain: design and optimization Amin Beirami, Ying Zhu, and Ken Pu	137
Performance Analysis of SDN-based Global Mobility Support Scheme in Smart Factory Networks Jaehyeong Lee, Changyong Um, Guejong Jo, Dogun Park, and Jongpil Jeong	145
Real time visualization of asymmetrical sitting posture Arif Reza Anwary, Hamid Bouchachia, and Michael Vassallo	153
IoT Based Real-time River Water Quality Monitoring System Mohammad Salah Uddin Chowdury, Talha Bin Emran, Subhasish Ghosh, Abhijit Pathak, Mohd. Manjur Alam, Nurul Absar, Karl Andersson, and Mohammad Shahadat Hossain	161
On Intelligent Hierarchical F-PMIPv6 based Mobility Support for Industrial Mobile Networks Seung-Hoon La, Jongpil Jeong, Jahwan Koo, and Ung-Mo Kim	169
Towards Continuous Authentication on Mobile Phones using Deep Learning Models Hasan Can Volaka, Gulfem Alptekin, Okan Engin Basar, Mustafa Isbilen, and Ozlem Durmaz Incel	177
Resource Usage Analysis of a Mobile Banking Application using Sensor-and-Touchscreen-Based Continuous Authentication Okan Engin Basar, Gulfem Alptekin, Hasan Can Volaka, Mustafa Isbilen, and Ozlem Durmaz Incel	185
The AREA Algorithm Framework Enabling Location-based Mobile Augmented Reality Applications Marc Schickler, Manfred Reichert, Philip Geiger, Micha Weilbach, and Rüdiger Pryss	193
Layered Architectural Model for Collaborative Computing in Peripheral Autonomous Networks of Mobile Devices Ghassan Fadlallah, Hamid Mcheick, and Djamal Rebaine	201
Wireless Indoor Localization Using Passive RFID Tags Alseny Diallo, Zaixin Lu, and Xinghui Zhao	210
Design, Implementation and Testing of a New Mobile Multi-Function Sensing Device for Identifying High-Risk Areas for Bicyclists in Highly Congested Urban Streets Suzana Duran Bernardes, Abdullah Kurkcu, and Kaan Ozbay	218
A Generic and Flexible Geospatial Data Warehousing and Analysis Framework for Transportation Performance Measurement in Smart Connected Cities Patricio Vicuna, Sandeep Mudigonda, Camille Kamga, Kyriacos Mouskos, and Charles Ukegbu	226
Container Based Resource Management for Data Processing on IoT Gateways Bali Ahmed, Billel Seghir, Mahmud Al-Osta, and Gherbi Abdelouahed	234

Contents

Xiaoli Liu, Satu Tamminen, Topi Korhonen, and Juha Röning	24
A Quantum-Annealing-Based Approach to Optimize the Deployment Cost of a Multi-Sink Multi-Controller WSN Reihaneh Nikouei, Nayereh Rasouli, Shirin Tahmasebi, Somayeh Zolfi, Hamid Faragardi, and Hossein Fotouhi	25
Considerations for system design in IoT-based autonomous ecological sensing Nwamaka U. Okafor, and Declan Delaney	25
A Framework to Determine Applications' Authenticity Rida Zojaj Naeem, Haider Abbas, Narmeen Shafqat, Kashif Saleem, and Waseem Iqbal	26
At the Edge of Industry 4.0 Anderson Carvalho, Niall O' Mahony, Lenka Krpalkova, Sean Campbell, Joseph Walsh, and Pat Doody	27
Continuous Region Query Processing in Clustered Point Sets Wendy Osborn, and Farzin Keykavoos	28
Progressive Web Application Assessment Using AHP Asharul Islam Khan, Ali Al-Badi, and Mahmood Al-Kindi	28
The 14th International Conference on Future Networks and Communications (FNC 2019)	29
Flexibility Enhancements in Digital Manufacturing by means of Ontological Data Modeling Richard Otrebski, Dominik Pospisil, Corinna Engelhardt-Nowitzki, Natalia Kryvinska, and Mohamed Aburaia	29
HoBAC: toward a Higher-order Attribute-Based Access Control Model Linda Aliane, and Mehdi Adda	30
Anomaly Detection Method for Online Discussion Peter Krammer, Ondrej Habala, Ján Mojžiš, Ladislav Hluchý, and Marek Jurkovič	31
A Non-Iterative Neural-Like Framework for Missing Data Imputation Roman Tkachenko, Oleksandra Mishchuk, Ivan Izonin, Natalia Kryvinska, and Roksoliana Stoliarchuk	31
A Framework for a Decentralized and Self-Organized Mail Service Network Shushan Zhao, and Ken Wang	32
Distributed Environmental Event Monitoring using Mobile Wireless Sensor Network Amany Abu Safia, Zaher Al Aghbari, and Ibrahim Kamel	33
Comparative Study of LPWAN Technologies on Unlicensed Bands for M2M Communication in the IoT: beyond LoRa and LoRaWAN J. Penã Queralta, T.N. Gia, Z. Zou, H. Tenhunen, and T. Westerlund	34
An Analysis of the Directional Preference ETX Measure for the Collection Tree Protocol in Mobile Sensor Networks David Krynicki, and Ramiro Liscano	35
Multi-objective Optimization for Multi-task Allocation in Mobile Crowd Sensing Mingchu Li, Yuan Gao, Mingliang Wang, Cheng Guo, and Xing Tan	36
Cloud Acknowledgment Scheme for a Node Network Siddardha Kaja, Elhadi Shakshuki, and Ansar Yasar	36
How much training data is enough to move a ML-based classifier to a different network? Ali Safari Khatouni, and Nur Zincir Heywood	37

vi Contents

Towards an E-Lab Solution for Network Assisted Learning Fatima Ezzahraa Louhab, Azeddine Khiat, Ayoub Bahnasse, Faycal Bensalah, Yousaf Khiat, and Mohamed Talea	3
Multi Features and Multi-time steps LSTM Based Methodology for Bike Sharing Availability Prediction Xu Liu, Abdelouahed Gherbi, Wubin Li, and Mohamed Cheriet	3
Efficient Management of Security for Supporting Intrusion Detection in Ubiquitous and Pervasive Environments Lynda Sellami, Khaled Sellami, and Pierre F Tiako	4
A Blockchain-based Architecture for Stable and Trustworthy Smart Grid Yuhong Li, Rahim Rahmani, Nicolas Fouassier, Peik Stenlund, and Kun Ouyang	4
Smart-AC: A New Framework Concept for Modeling Access Control Policy Nadine Kashmar, Mehdi Adda, Mirna Atieh, and Hussein Ibrahim	4
Performance Evaluation of CP-ABE Schemes under Constrained Devices Mohammad Bany Taha, Chamseddine Talhi, and Hakima Ould-Slimane	4
IoT Avatars: Mixed Reality Hybrid Objects for CoRe Ambient Intelligent Environments Yiyi Shao, Nadine Lessio, and Alexis Morris	4
A Cluster of CP-ABE Microservices for VANET Mohammad Bany Taha, Chamseddine Talhi, and Hakima Ould-Slimanec	4
Computer interconnection networks with virtual cut-through routing Lev B. Levitin, and Yelena Rykalova	4
Automation of network simulation: concepts related to IPv4 and IPv6 convergence Ayoub Bahnasse, Faycal Bensalah, Fatima Ezzahraa Louhab, Azeddine Khiat, Yousaf Khiat, and Mohamed Talea	۷
The 9th International Conference on Sustainable Energy Information Technology (SEIT 2019)	4
Using Linear Regression and Back Propagation Neural Networks to Predict Performance of Soiled PV Modules	
Salsabeel Shapsough, Rached Dhaouadi, and Imran Zualkernan	2
Optimal Design of Shafting System for Wind Turbine in Multi-cases Wang Delun, Yuan Hailiang, Qiu Jun, and Wang Zhi	۷
Detection of wood damages using infrared thermography Rui Pitarma, João Crisóstomo, and Lívia Pereira	۷
Non-contact Infrared Temperature Acquisition System based on Internet of Things for Laboratory Activities Monitoring Gonçalo Marques, and Rui Pitarma	2
Real-Time Occupancy Estimation Using WiFi Network to Optimize HVAC Operation Krishna Chaitanya Jagadeesh Simma, Andrea Mammoli, and Susan M Bogus	۷
Return on investment for energy efficient chillers D.C. Zietlow	4
Forecasting Temperature in a Smart Home with Segmented Linear Regression Bruce Spencer, Omar Alfandi, and Feras Al-Obeidat	4
Evaluating the effectiveness of electric vehicle subsidies in Canada Zachary Thorne, and Larry Hughes	4
Simulating the charging of electric vehicles by laser	4

Luis Lopez, Luis Afanador, Liz Martinez, Elvin Jiménez, Ingrid Oliveros, Rafael Castillo, Jose Soto, Maria Calle, and Lacides Ripoll	535
Thermodynamic analysis of the performance of sub-critical organic Rankine cycle with borehole thermal energy storage Wey H. Leong, and Roshaan Mudasar	543
Regional-scale Spatio-Temporal Analysis of Impacts of Weather on Traffic Speed in Chicago using Probe Data Kuldeep Kurte, Srinath Ravulaparthy, Anne Berres, Melissa Allen, and Jibonananda Sanyal	55 1
Real Time Simulation of Observer Based State Feedback Load Frequency Regulator for Optimally Reduced Power System Model Arkan Ahmed Hussein, Naimul Hasan, and Shuaib Farooq	559
Affiliated Workshops	568
Integration of Data Technology for Analyzing University Dropout Amelec Viloria, Jholman Garcia Padilla, Carlos Vargas-Mercado, Hugo Hernández-Palma, Nataly Orellano Llinas, and Monica Arrozola David	569
Integration of Data Mining Techniques to PostgreSQL Database Manager System Amelec Viloria, Genesis Camargo Acuña, Daniel Jesús Alcázar Franco, Hugo Hernández-Palma, Jorge Pacheco Fuentes, and Etelberto Pallares Rambal	575
Data Mining Techniques and Multivariate Analysis to Discover Patterns in University Final Researches Amelec Viloria, Jorge Rodríguez López, Diana Margarita García Leyva, Carlos Vargas-Mercado, Hugo Hernández-Palma, Nataly Orellano Llinas, Mónica Arrozola David, and Javier Velasquez Rodriguez	58 1
Determinating Student Interactions in a Virtual Learning Environment Using Data Mining Amelec Viloria, Jorge Rodríguez López, Karen Payares, Carlos Vargas-Mercado, Sonia Ethel Duran, Hugo Hernández-Palma, and Mónica Arrozola David	587
Non-academic factors impacting analysis of the student's the qualifying test results Ivanna Dronyuk, Volodymyr Verhun, and Eleonora Benova	593
Big Data Approach and its applications in Various Fields: Review Loubna Rabhi, Noureddine Falih, Abdlekbir Afraites, and Belaid Bouikhalene	599
A Solution to the Security Authentication Problem in Smart Houses Based on Speech Awais Mahmood	606
Securing SCADA-based Critical Infrastructures: Challenges and Open Issues Noshina Tariq, Muhammad Asim, and Farrukh Aslam Khan	612
Arabic Text Lossless Compression by Characters Encoding Tariq Abu Hilal, and Hasan Abu Hilal	618
Using Big Data for Formalization the Patient's Personalized Data Nataliia Melnykova, Natalia Shakhovska, Michal Greguš ml, and Volodymyr Melnykov	624
An Approach towards an Efficient Encryption-Decryption of Grayscale and Color Images Anatoliy Kovalchuk, Nataliia Lotoshynska, Michal Greguš ml., Ivan Izonin, and Leonid Berezko	630
A comparative Survey Study on LPWA IoT Technologies: Design, considerations, challenges and solutions	
Franck Muteba, Karim Djouani, and Thomas Olwal	636
A Novel SDN-based Cross Handoff Scheme in Industrial Mobile Networks Do Gun Park, Jachyeong Lee, Jin Woo Oh, and Jongpil Jeong	643

viii Contents

IoT based Smart System to Support Agricultural Parameters: A Case Study Abhijit Pathak, Mohammad AmazUddin, Md. Jainal Abedin, Karl Andersson, Rashed Mustafa, and Mohammad Shahadat Hossain	18
OMNET++ and Maple software environments for IT Bachelor studies Ivanna Dronyuk, Olga Fedevych, Roksolyana Stolyarchuk, and Winfried Auzinger	54
Smart Device for Multi-band Industrial IoT Communications Oussama Rholam, Mohamed Tabaa, and Fabrice Monteiro et Abbas Dandache	50
Combined Reed-Solomon and Convolutional codes for IWSN based on IDWPT/DWPT Architecture Aamre Khalil, Safa Saadoui, Mohamed Tabaa, Mouhamad Chehaitly, Fabrice Monteiro, Aziz Oukaira, and Abbas Dandache	56
Internet of Things based Durability Monitoring and Assessment of Reinforced Concrete Structures Woubishet Zewdu Taffese, Ethiopia Nigussie, and Jouni Isoaho	12
A Comparative study of applications of Game Theory in Cyber Security and Cloud Computing. Vishruti Kakkad, Hitarth Shah, Reema Patel, and Nishant Doshi	30
A survey on game theoretic approaches for privacy preservation in data mining and network security Hitarth Shah, Vishruti Kakkad, Reema Patel, and Nishant Doshi	36
Social implications of smart cities Yash Patel, and Nishant Doshi)2
Human Activity Recognition: A Survey Charmi Jobanputra, Jatna Bavishi, and Nishant Doshi	98
Blockchain - based IoT: A Survey Riya Thakore, Rajkumar Vaghashiya, Chintan Patel, and Nishant Doshi)4
Survey- Pollution Monitoring using IoT Jhanvi Arora, Utkarsh Pandya, Saloni Shah, and Nishant Doshi	0
A Novel Rule-based MPS model for SME Manufacturing Factory in Korea Byungjun Park, and Jongpil Jeong. 71	6
On Reflecting Optimal Inventory of Profit and Loss Perspective for Production Planning Jeong Seog Kho, and Jongpil Jeong. 72	22
A Novel Architecture of Air Pollution Measurement Platform Using 5G and Blockchain for Industrial IoT Applications	
Yohan Han, Byungjun Park, and Jongpil Jeong	28
Design and implementation of street light control system based on power line carrier communication Xiaoqiang Xu, Ao Zhan, and Xiaohan Li	34
Research and Design of Power Frequency Electric Field Measurement System Wenqiang Zhu, Jiang Guo, Guangzhou Zhang, Degui Yao, Songyang Zhang, and Shilin Qian	10
Research and Application of Mobile Online Microcomputer Anti-misoperation Locking System Based on ASP.NET Web API Framework Mengqiang An, Xianglian Xu, Lukai Mao, Chenhu Luo, and Wei Zhou	1 6
Research and Application of Vibration Energy Harvester Using Macro-Fiber Composite Lixiang Wang, Wei Lin, Qiang Wen, Lixing Xie, and Yan Xie	52
Power Communication Network Design Considering Global Information Fusion Part One Overall Architecture Zhenfeng Xiao, Xiaoping Wu, Peizhe Li, Zhigang Liu, Zhou Zhou, Kai Deng, Hongyue Yang, Hui Hou, Lei Liu, and Wenqi Mao	58

Contents ix

Research on Power Wireless Private Network Planning Technology Considering Propagation Model Correction Part Two Applications and Explorations Hongyue Yang, Zhenfeng Xiao, Hui Hou, Feng Fan, Peizhe Li, Wei Wen, Kai Deng, Dawei Li, Jingjing Liu, and Lei Liu	763
Power Communication Network Design Considering Global Information Fusion Part Two Applications and Explorations Zhenfeng Xiao, Xiaoping Wu, Peizhe Li, Zhigang Liu, Hongyue Yang, Zhou Zhou, Kai Deng, Hui Hou, and Lin Zhang	768
Research on Power Wireless Private Network Planning Technology Considering Propagation Model Correction Part One Theory Fundament Zhenfeng Xiao, Feng Fan, Xiaoyou Zhang, Sijing Han, Wei Liao, Heng Jia, Guozhu Chen, Yuxu Wu, Hongyue Yang, and Hui Hou	774
Review on the Research Status of Power System Risk Identification under Typhoon Disaster Xi Chen, Zhong Lianhong, Min Li, Yong Huang, Hui Hou, Shiwen Yu, and Xixiu Wu	780
The Research on Communication Technology Matching of Power Terminal Communication Access Network Peizhe Li, Zhenfeng Xiao, Zhongwei Chen, Yichao Wang, Xiaoping Wu, Dawei Li, Ming Wen, and Wenqi Mao	785
Shuncheng Liu, Jian Chen, Kai Deng, HaoTian Liu, Jiajia Xiang, Lin Du, Zhiqiang Xu, Lin Zhang, Wenqi Mao, and Peizhe Li	791
Enhancement of Proportional Scheduling in LTE Using Resource Allocation Based Proposed Technique Manpreet Kaur, Navdeep Singh Randhawa, and Rohit Bansal	797
Minimization of Energy Consumption in WSN using Hybrid WECRA Approach Anurag Saini, Avnish Kansal, and Navdeep Singh Randhawa	803
Research on the Improving Lighting Protection Level for Strong Lightning Activity Area and Easily Suffering Lighting Strike Distribution Line Xiaoliang Tang, Fang Yang, Zhongyu Zheng, Yunfeng Hu, Xixiu Wu, and Hui Hou	809
Research on the Monitoring System Design for the Line Loss of the Distribution Line Based on Dynamic Three-phase Unbalance Degree Wei Meifang, Long Min, Li Junyi, Pang Wenlong, and Wu Xixiu	815
Damage Analysis of Distribution Network in Super Typhoon Mangkhut Lianhong Zhong, Yong Huang, Hongyue Yang, Hui Hou, and Xixiu Wu	822