

# **2016 3rd Asia-Pacific World Congress on Computer Science and Engineering (APWC on CSE 2016)**

**Nadi, Fiji  
5-6 December 2016**



**IEEE Catalog Number: CFP1661Z-POD  
ISBN: 978-1-5090-5754-2**

**Copyright © 2016 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:	CFP1661Z-POD
ISBN (Print-On-Demand):	978-1-5090-5754-2
ISBN (Online):	978-1-5090-5753-5

**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

# 2016 3rd Asia-Pacific World Congress on Computer Science and Engineering

## APWC on CSE 2016

### Table of Contents

Preface and Purpose and Goals.....	ix
Message from the General Chairs.....	x
APWC on CSE 2016 Steering Committee.....	xii
APWC on CSE 2016 Program Committee.....	xiii
APWCE 2016 Steering Committee.....	xv
APWCE 2016 Program Committee.....	xvi

---

### Technical Papers

Private Equality Test Using Ring-LWE Somewhat Homomorphic Encryption .....	1
<i>Tushar Kanti Saha and Takeshi Koshiha</i>	
Constant-Time Algorithms for Complex Networks .....	10
<i>Hiro Ito</i>	
Prediction of Consumer Purchasing in a Grocery Store Using Machine Learning Techniques .....	18
<i>Yi Zuo, Katsutoshi Yada, and A.B.M. Shawkat Ali</i>	
Autonomous Elevator Inspection with Unmanned Aerial Vehicle .....	26
<i>Hui Tsun Kit and Huiying Chen</i>	
A Deep Learning Approach for Motor Imagery EEG Signal Classification .....	34
<i>Shiu Kumar, Alok Sharma, Kabir Mamun, and Tatsuhiko Tsunoda</i>	
Design of a Low Temperature Differential (LTD) Stirling Engine for Water Transportation .....	40
<i>M. Navunawa, F.H. Kado, D. Aitchison, F.R. Islam, and K.A. Mamun</i>	
Study on the Quantitative Effects of New Bridge Construction on Traffic Conditions .....	47
<i>Seongmin Kim, Kitae Jang, and In Gwun Jang</i>	
A Geometric Approach to Motion Control of a Standard Tractor-Trailer Robot .....	53
<i>Avinesh Prasad, Bibhya Sharma, and Jito Vanualailai</i>	

An Autonomous Steering System for Wireless Charging Electric Vehicles to Minimize Power Degradation .....	60
<i>K. Hwang, J. Cho, J. Park, D. Kim, J.H. Kwon, S.I. Kwak, H.H. Park, and S. Ahn</i>	
New Calibration Estimators in Stratified Sampling .....	66
<i>D.K. Rao, T. Tekabu, and M.G.M. Khan</i>	
Wave Energy Converter: A Review of Wave Energy Conversion Technology .....	71
<i>S.S. Prakash, K.A. Mamun, F.R. Islam, R. Mudliar, C. Pau'u, M. Kolivuso, and S. Cadralala</i>	
Electrochemical Study of SiO Initial Efficiency for Lithium Ion Batteries .....	78
<i>Il Won Seong, Jee Ho Yom, Sung Man Cho, and Woo Young Yoon</i>	
Drone-Assisted Disaster Management: Finding Victims via Infrared Camera and Lidar Sensor Fusion .....	84
<i>Seoungjun Lee, Dongsoo Har, and Dongsuk Kum</i>	
Model Checking a Client-Side Micro Payment Protocol .....	90
<i>Kaylash Chaudhary and Ansgar Fehnker</i>	
The Need for Quantum-Resistant Cryptography in Classical Computers .....	98
<i>Mohammed Farik and Shawkat Ali</i>	
Backchanneling Quantum Bit (Qubit) 'Shuffling': Quantum Bit (Qubit) 'Shuffling' as Added Security by Slipstreaming Q-Morse .....	106
<i>John Ronczka</i>	
Comparative Accuracy of Different Classification Algorithms for Forest Cover Type Prediction .....	116
<i>Rahul R. Kishore, Shalvin S. Narayan, Sunil Lal, and Mahmood A. Rashid</i>	
Review of Power System Distribution Network Architecture .....	124
<i>K. Prakash, A. Lallu, F.R. Islam, and K.A. Mamun</i>	
Memoryless AM/AM Behavioral Model for RF Power Amplifiers .....	131
<i>Paul O. Fisher and Said F. Al-Sarawi</i>	
i-SHOP: A Model for Smart Shopping .....	139
<i>Anal Kumar and A.B.M. Shawkat</i>	
Measuring Temporal and Contextual Proximity: Big Text-Data Analytics in Concept Maps .....	144
<i>Elan Sasson, Gilad Ravid, and Nava Pliskin</i>	
Charging Wireless Rechargeable Sensor Networks Deployed in a Rectangular Street Grid .....	153
<i>Sunghee Myung, Sangkeum Lee, Celso Moraes, and Dongsoo Har</i>	
Development of a Rumor and Spam Reporting and Removal Tool for Social Media .....	157
<i>Shakil Ahmed, Rifat Monzur, and Rajesh Palit</i>	

Gamifying Foundational STEM Skills .....	164
<i>Jim Morey, John Gammack, and Erik Thornquist</i>	
Vehicle Ownership and Economic Development .....	171
<i>Zhen Li, Ken Ishibashi, Yuta Kaneko, Kei Miyazaki, Hiromi Shioji, and Katsutoshi Yada</i>	
Conceptual Framework for Startup Enterprise Evaluation: Value of the Trust and Soft Information .....	181
<i>Hyuk Ho, Seong Bin Jeong, and Bong Gyou Lee</i>	
Proposal for WPT Drone Spectrum Allocation Policy .....	187
<i>Yong Hee Cho, Chul Hyung Lee, and Bong Gyou Lee</i>	
Proactive Detection of Crash Hotspots Using In-Vehicle Driving Recorder .....	193
<i>Jooyoung Lee and Kitae Jang</i>	
Comparative Analysis of Software Architecture Documentation and Architecture Languages .....	199
<i>Mateen Ahmed Abbasi, Dur-E-Benish Batool, Rahil Butt, and Tanveer Mehmood Anjum</i>	
Hunting the Popular Construction Apps .....	205
<i>Tong Liu, Anuradha Mathrani, and Jasper Mbachu</i>	
Development of Domain Ontology for Enhancing Design Understand-Ability for Developers and End-Users .....	212
<i>Ahmad Z.H. Samsudin, Mohd Sazili Shahibi, Shah Jahan Miah, and Hafizul Islam</i>	
Architecture for Complex Event Processing Using Open Source Technologies .....	218
<i>Sanjay Jha, Meena Jha, Liam O'Brien, and Pramod Kumar Singh</i>	
Study of Electrochemical Performance of Li-Ion Batteries Based on Simultaneous Measurement of a Three-Electrode System .....	226
<i>Kam-Chuen Yung, Qin Yang, Jiajie Fan, and Michael Pecht</i>	
CFD Modelling and Optimisation of a Waste Water Treatment Plant Bioreactor - A Case Study .....	232
<i>Andrew Elshaw, N.M.S. Hassan, and M.M.K. Khan</i>	
Exploring Protein Flexibility and Allosteric Signalling Mechanism with Rigidity Theory .....	240
<i>Adnan Sljoka and Nobuyuki Tsuchimura</i>	
Potentials of Data Mining and Cloud Computing in the Fish Poisoning and Relevant Economic Contexts: A Conceptual Review .....	250
<i>Jesmin Nahar, Kunal Kumar, Alvin Prasad, Neeraj Sharma, Almaz Khan, Swetha Singh, Shinal Shania, Ashrita Kumar, Jenny Singh, and Tasadduq Imam</i>	

Student Readiness and Perception to the Use of Smart Phones for Higher Education in the Pacific .....	258
<i>Emmenual Reddy, Pritika Reddy, Bibhya Sharma, Karuna Reddy, and M.G.M. Khan</i>	
Electricity Tariffs Evaluation Using Smart Load Monitoring Devices for Residential Consumer .....	265
<i>Md. Moktadir Rahman, Cindy Van Heerden, and G.M. Shafiullah</i>	
A Perfect Mathematical Formulation of Fuzzy Transportation Problem Provides an Optimal Solution Speedily .....	271
<i>K. Ramanuja Rao, Rajnesh K. Mudaliar, M.K. Hasan, and M.K. Alam</i>	
<b>Author Index .....</b>	<b>279</b>