

2017 IEEE 14th International Scientific Conference on Informatics

**Poprad, Slovakia
14 – 16 November 2017**



**IEEE Catalog Number: CFP17E80-POD
ISBN: 978-1-5386-0890-6**

**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:	CFP17E80-POD
ISBN (Print-On-Demand):	978-1-5386-0890-6
ISBN (Online):	978-1-5386-0889-0

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

TABLE OF CONTENTS

Invited Papers

<i>Andrzej Z. Grzybowski:</i>	
On some recent advancements within the pairwise comparison methodology	1

<i>Sonja Ristić:</i>	
How to Apply Model-Driven Paradigm in Information System (Re)Engineering	6

<i>Imre J. Rudas:</i>	
Augmented Virtuality for the Next Generation Production Intelligence	12

Regular Papers

<i>Marko Arsenovic, Srdjan Sladojevic, Andras Anderla, Darko Stefanovic, Bojan Lalic:</i>	
Deep learning powered automated tool for generating image based datasets	13

<i>Gabriel Baban, Alexandru Iovanovici, Cristian Cosariu, Lucian Prodan:</i>	
Determination of the critical congestion point in urban traffic networks: a case study	18

<i>Michaela Bačíková, Lukáš Galko, Eva Hvízdová:</i>	
Manual Techniques for Evaluating Domain Usability	24

<i>Renata-Graziela Boar, Alexandru Iovanovici, Horia Ciocarlie:</i>	
Complex networks analysis of international import-export trade	31

<i>Ján Boháčik, Michal Zábovský:</i>	
Naive Bayes for Statlog Heart Database with Consideration of Data Specifics	35

<i>Ján Boháčik, Michal Zábovský:</i>	
Nearest Neighbor Method Using Non-nested Generalized Exemplars in Breast Cancer Diagnosis	40

<i>Emir Buza, Amila Akagic, Samir Omanovic, Haris Hasic:</i>	
Unsupervised Method for Detection of High Severity Distresses on Asphalt Pavements	45

<i>Grigoreta Sofia Cojocar, Adriana-Mihaela Guran:</i>	
On A Top Down Aspect Mining Approach for Monitoring Crosscutting Concerns Identification	51

<i>Uroš Čibej, Jurij Mihelič:</i>	
Heuristic sampling for the subgraph isomorphism problem	57

<i>Zuzana Dankovičová, Peter Drotár, Juraj Gazda, Liberios Vokorokos:</i>	
Overview of the Handwriting Processing for Clinical Decision Support System	63

<i>Tomasz Derda, Zbigniew Domański:</i>	
Simulation Study of Critically Loaded Arrays of Pillars	68

<i>Tomaž Dobravec:</i>	
Estimating the time complexity of the algorithms by counting the Java bytecode instructions	74

<i>Paweł Drąg, Krystyn Styczeń:</i>	
The variability constraints in simulation of index-2 differential-algebraic processes	80

<i>Darko Galinec, William Steingartner:</i> Combining Cybersecurity and Cyber Defence to achieve Cyber Resilience	87
<i>Kornél Gyöngyösi, Péter János Varga, Zsolt Illési:</i> WLAN heat mapping in hybrid network	94
<i>Peter Halaš, Marek Lóderer, Viera Rozinajová:</i> Prediction of Electricity Consumption using Biologically Inspired Algorithms	98
<i>Median Hilal, Christoph G. Schütz, Michael Schrefl:</i> Superimposed Multidimensional Schemas for RDF Data Analysis	104
<i>Dana Horváthová, Vladimír Siladi:</i> Creation of interactive panoramic video for phobia treatment	111
<i>Marián Hudák, Štefan Korečko, Branislav Sobota:</i> Peripheral Devices Support for LIRKIS CAVE	117
<i>Sergej Chodarev, Michaela Bačíková:</i> Development of Oberon-0 using YAJCo	122
<i>Judith Jakob, Kordula Kugele, József Tick:</i> Defining Camera-Based Traffic Scenarios and Use Cases for the Visually Impaired by means of Expert Interviews	128
<i>Milan Jančár, Jaroslav Porubän:</i> Examining Truthfulness of Informal Diagrams More Than a Year After Their Creation	134
<i>Tomáš Jarábek, Peter Laurinec, Mária Lucká:</i> Energy Load Forecast Using S2S Deep Neural Networks with k-Shape Clustering	140
<i>Milan Jičínský, Jaroslav Marek:</i> Clustering analysis of phonetic and text feature vectors	146
<i>Ján Juhár, Liberios Vokorokos:</i> Towards a Uniform Code Annotation Approach with Configurable Annotation Granularity	152
<i>Ondrej Kainz, Frantisek Jakab, Miroslav Michalko:</i> Proposal of Human Body Description Format XML Schema and Validation of Anthropometric Parameters ..	158
<i>Maksat N. Kalimoldayev, Vladimir Siladi, Maxat N. Satymbekov, Lyazat Naizabayeva:</i> Solving Mean-Shift Clustering Using MapReduce Hadoop	164
<i>Ammar Ahmed Khan, Mika Ahistus, Tero Liukko, Joni Lumela, Otto Sassi, Seppo J. Ovaska:</i> aaltOS for Energy Harvesting Applications: Effects of Clock Frequency and System Tick on Power and Energy Consumption	168
<i>Pawel Kossecki, Łukasz Korc, Stefan Kossecki:</i> Valuation of Intellectual Property – Income Approach and Scenario Analysis. Software on Early Stage of Implementation	173
<i>Rafał Kozik, Michał Choraś, Damian Puchalski, Rafał Renk:</i> Data Analysis Tool Supporting Software Development Process	179

<i>Peter Krammer, Marcel Kvassay, Ladislav Hluchý:</i> Cluster Identification in Time Dependent Multidimensional Data	185
<i>Konstantin S. Kurachka, Ihar M. Tsalka:</i> Vertebrae Detection in X-Ray Images Based on Deep Convolutional Neural Networks	194
<i>Michal Kvet, Karol Matiaško:</i> Temporal data retrieval effectivity	197
<i>István Lakatos, Tamás Péter, Ádám Titrik:</i> Logistic conception for real-time based info-communication system applied in selective waste gathering	203
<i>Peter Laurinec, Mária Lucká:</i> New Clustering-based Forecasting Method for Disaggregated End-consumer Electricity Load Using Smart Grid Data	210
<i>Kornélia Lazányi, Beáta Hajdu:</i> Trust in human-robot interactions	216
<i>Andrzej Z. Grzybowski, Piotr Puchała:</i> Monte Carlo Simulation in the Evaluation of the Young Functional Values	221
<i>Andrzej Z. Grzybowski, Tomasz Starczewski:</i> Remarks about Inconsistency Analysis in the Pairwise Comparison Technique	227
<i>Matej Madeja, Jaroslav Porubän:</i> Automatic assessment of assignments for Android application programming courses	232
<i>Branislav Madoš, Ján Hurtuk, Eva Chovancová, Peter Fecil'ák, Dávid Bajkó:</i> Downsizing of Web Server Design Using Raspberry PI 3 Single Board Computer Platform	238
<i>Gábor Márton, Imre Szekeres, Zoltán Porkoláb:</i> High level C++ Implementation of the Read-Copy-Update Pattern	243
<i>Michal Márton, Luboš Ovseník, Michal Špes:</i> Measurement Effect of Visibility in Experimental FSO system	249
<i>Karol Matiaško, Michal Kvet:</i> Medical data management	253
<i>Juraj Mihal'ov, Michal Hulič:</i> NFC/RFID technology using Raspberry Pi as platform used in Smart Home project	259
<i>Jurij Mihelič, Uroš Čibej:</i> Dataflow Processing of Matrices and Vectors: Experimental Analysis	265
<i>Gabriela Nečasová, Petr Veigend, Václav Šátek, Jiří Kunovský:</i> Model of the Telegraph Line	271
<i>Marie Nedvědová, Jaroslav Marek:</i> The simulation of paintings with different aesthetic variables Temperature and Harmony	276
<i>Jakub Oravec, Ján Turán:</i> Substitution Steganography with Security Improved by Chaotic Image Encryption	284

<i>Luboš Ovseník, Ján Turán, Tomáš Ivaniga, Petr Ivaniga:</i> Deployment of the PON with an Optical Fibre G-652.B	289
<i>Ján Perháč, Daniel Mihályi, Lukáš Maťaš:</i> Resource Oriented BDI Architecture for IDS	293
<i>Ivan Plander, Michal Štepanovský:</i> MEMS technology in optical switching	299
<i>Gábor Sági, Ramón Horváth:</i> Non-Computable Models of Certain First Order Theories	306
<i>Serkan Savaş, Nurettin Topaloğlu:</i> Crime Intelligence from Social Media: A Case Study	313
<i>Alena Novák Sedláčková, Pavol Kurdel, Boris Mrekaj:</i> Synthesis Criterion of Ergatic Base Complex with Focus on its Reliability	318
<i>Michal Sičák, Ján Kollár:</i> Supercombinator Driven Grammar Reconstruction	322
<i>Vladimir Siladi, Michal Povinský, Ludovít Trajtel', Maxat N. Satymbekov:</i> Adapted parallel Quine-McCluskey algorithm using GPGPU	327
<i>František Silváši, Martin Tomášek:</i> Fully Automatic Modular Theorem Prover with Code Generation Support	332
<i>Jindřich Skupa, Jiří Šafařík:</i> Survey of traffic prediction methods for dynamic routing in overlay networks	339
<i>Branislav Sobota, Milan Guzan:</i> Calculation of Cross-Sections of Boundary Surface Using Parallelization	344
<i>Dávid Solus, Luboš Ovseník, Ján Turán:</i> Usage of Optical Correlator in Video Surveillance System for Abandoned Luggage	349
<i>Milan Spišiak, Ján Kollár:</i> Quantum programming: a review	353
<i>William Steingartner, Mohamed Ali M. Eldojali, Davorka Radaković, Jiří Dostál:</i> Software support for course in Semantics of programming languages	359
<i>Zoltán Subecz:</i> Event Detection in Hungarian Texts with Dependency and Constituency Parsing and WordNet	365
<i>Matúš Sulír, Jaroslav Porubán, Ondrej Zoričák:</i> IDE-Independent Program Comprehension Tools via Source File Overwriting	372
<i>Urszula Świerczyńska-Kaczor, Małgorzata Kotlińska:</i> Could the Movie Be Cute? Understanding the User-Generated Word-of-Mouth by Implementing Text Mining Analysis on the Movie Market	377
<i>Péter Szikora, Nikolett Madarász:</i> Self-driving cars – the human side	383

<i>Sabina Szymoniak, Olga Siedlecka-Lamch, Miroslaw Kurkowski:</i> SAT-based Verification of NSPK Protocol Including Delays in the Network	388
<i>Petr Šaloun, Martin Malčík, David Andrešič, David Nespěšný:</i> Using Eyetracking to Analyse How Flowcharts Are Understood	394
<i>Jarmila Škrinárová, Adam Dudas, Eduard Vesel:</i> Model of education and training strategy for the management of HPC systems	400
<i>Jana Št'astná, Martin Tomášek:</i> Assembling Behavioural Characteristics of Malicious Software	406
<i>Katarína Teplická, Soňa Hurná:</i> Using software support to implement enterprise controlling	412
<i>Michal Vagac, Michal Povinský, Miroslav Melicherčík:</i> Detection of shoe sole features using DNN	416
<i>Liberios Vokorokos, Zuzana Bilanová, Daniel Mihályi:</i> Linear Logic Operators in Transparent Intensional Logic	420
<i>Michal Vrábel, Ján Genčí, Pavol Bobik:</i> Low-level computer vision techniques for processing of extensive air shower track images	425
<i>Lukáš Čegan, Petr Filip:</i> Advanced web analytics tool for mouse tracking and real-time data processing	431
Author Index	436