

# **2016 39<sup>th</sup> International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)**

## **Microelectronics, Electronics and Electronic Technology**

<b>(Si)GeSn Nanostructures for Optoelectronic Device Applications – <i>Invited Paper</i></b> I.A. Fischer, F. Oliveira, A. Benedetti, S. Chiussi, J. Schulze	1
<b>Thermoelectric Properties of Polycrystalline WS<sub>2</sub> and Solid Solutions of WS<sub>2-y</sub>Se<sub>y</sub> Types</b> G.E. Yakovleva, A.I. Romanenko, A.S. Berdinsky, A.Yu. Ledneva, V.A. Kuznetsov, M.K. Han, S.J. Kim, V.E. Fedorov	5
<b>Piezoresistive Effect in Polycrystalline Bulk and Film Layered Sulphide W<sub>0.95</sub>Re<sub>0.05</sub>S<sub>2</sub></b> V.A. Kuznetsov, A.I. Romanenko, A.S. Berdinsky, A.Yu. Ledneva, S.B. Artemkina, V.E. Fedorov	10
<b>Luminescent Diagnostics in the NIR-region on a Base of Yb-porphyrin Complexes</b> V.D. Rumyantseva, I.P. Shilov, Yu.V. Alekseev, A.S. Gorshkova	14
<b>Simulation Study of the Composite Silicon Solar Cell Efficiency Sensitivity to the Absorption Coefficients and the Thickness of intrinsic Absorber Layer</b> V. Tadic, N. Posavec	18
<b>The Investigation of Influence of Localized States on a-Si:H p-i-n Photodiode Transient Response to Blue Light Impulse with Blue Light Optical Bias</b> M. Covic, V. Gradisnik, Z. Jericevic	24
<b>Analysis of Electrical and Optical Characteristics of InP/InGaAs Avalanche Photodiodes in Linear Regime by a New Simulation Environment</b> T. Knezevic, T. Suligoj	28
<b>Design of Passive-Quenching Active-Reset Circuit with Adjustable Hold-Off Time for Single-Photon Avalanche Diodes</b> I. Berdalovic, Z. Osrecki, F. Segmanovic, D. Grubisic, T. Knezevic, T. Suligoj	34
<b>Impact of the Emitter Polysilicon Thickness on the Performance of High-Linearity Mixers with Horizontal Current Bipolar Transistors</b> J. Zilak, M. Koricic, H. Mochizuki, S. Morita, T. Suligoj	40
<b>Fully-integrated Voltage Controlled Oscillator in Low-cost HCBT Technology</b> M. Koricic, J. Zilak, H. Mochizuki, S. Morita, T. Suligoj	45

<b>Variable-Gain Amplifier for Ultra-Low Voltage Applications in 130nm CMOS Technology</b>	51
D. Arbet, M. Kovác, L. Nagy, V. Stopjaková, M. Sovcík	
<b>Relaxation Oscillator Calibration Technique with Comparator Delay Regulation</b>	57
J. Mikulic, G. Schatzberger, A. Baric	
<b>A Bootstrap Circuit for DC–DC Converters with a Wide Input Voltage Range in HV-CMOS</b>	62
N. Mitrovic, R. Enne, H. Zimmermann	
<b>A Fractional-N Subsampling PLL based on a Digital-to-Time Converter</b>	66
N. Markulic, K. Raczkowski, P. Wambacq, J. Craninckx	
<b>Infrared Protection System for High-Voltage Testing of SiC and GaN FETs used in DC-DC Converters</b>	72
F. Hormot, J. Bacmaga, A. Baric	
<b>Optimal Conduction Angle of an E-PHEMT Harmonic Frequency Multiplier</b>	76
K. Martincic	
<b>Ultra-Wideband Transmitter Based on Integral Pulse Frequency Modulator</b>	80
T. Matic, M. Herceg, J. Job, L. Sneler	
<b>Design of a Transmitter for High-Speed Serial Interfaces in Automotive Micro-Controller</b>	84
A. Bandiziol, W. Grollitsch, F. Brandonisio, R. Nonis, P. Palestri	
<b>Application of the Calculation-Experimental Method in the Design of Microwave Filters</b>	89
A.S. Geraskin, A.N. Savin, I.A. Nakrap, V.P. Meshchanov	
<b>Minimax Design of Multiplierless Sharpened CIC Filters Based on Interval Analysis</b>	94
G. Molnar, A. Dudarin, M. Vucic	
<b>Minimization of Maximum Electric Field in High-Voltage Parallel-Plate Capacitor</b>	99
R. Blečić, Q. Diduck, A. Baric	
<b>Modelling SMD Capacitors by Measurements</b>	104
R. Mislov, M. Magerl, S. Fratte-Sumper, B. Weiss, C. Stockreiter, A. Baric	
<b>Impact of Capacitor Dielectric Type on the Performance of Wireless Power Transfer System</b>	110
D. Vinko, P. Orsolic	

<b>Switching Speed and Stress Analysis for Fixed-fixed Beam Based Shunt Capacitive RF MEMS Switches</b>	114
A. Kumar A, R. R	
<b>Performance Analysis of Micromirrors - Lift-off and von Mises Stress</b>	120
S. Finny, R. R	
<b>Material and Orientation Optimization for Quality Factor Enhancement of BAW Resonators</b>	124
R. Raj R.S., R. R	
<b>Impact of Propagation Medium on Link Quality for Underwater and Underground Sensors</b>	129
G. Horvat, D. Vinko, J. Vlaovic	
<b>Electrical Field Intensity Model on the Surface of Human Body for Localization of Wireless Endoscopy Pill</b>	135
B. Lukovac, A. Koren, A. Marincic, D. Simunic	
<b>Wide Band Current Transducers in Power Measurment Methods - an Overview</b>	140
R. Malaric, Z. Martinovic, M. Dadic, P. Mostarac, Z. Martinovic	
<b>Laboratory Model for Design and Verification of Synchronous Generator Excitation Control Algorithms</b>	146
S. Tusun, I. Erceg, I. Sirotic	
<b>The European Project SolarDesign Illustrating the Role of Standardization in the Innovation System</b>	152
W. Brenner, N. Adamovic	
<b>Open Public Design Methodology and Design Process</b>	158
D. Rembold, S. Jovalekic	
 <b>Distributed Computing, Visualization and Biomedical Engineering</b>	
<b>Views on the Role and Importance of Dew Computing in the Service and Control Technology – <i>Invited Paper</i></b>	164
Z. Sojat, K. Skala	
<b>Parameters That Affect the Parallel Execution Speed of Programs in Multi-Core Processor Computers</b>	169
V. Xhafa, F. Dika	
<b>Federated Computing on the Web: the UNICORE Portal</b>	174
M. Petrova-El Sayed, K. Benedyczak, A. Rutkowski, B. Schuller	

<b>Problem-Oriented Scheduling of Cloud Applications: PO-HEFT Algorithm Case Study</b>	180
E.A. Nepovinnykh, G.I. Radchenko	
<b>Towards a Novel Infrastructure for Conducting High Productive Cloud-Based Scientific Analytics</b>	186
P. Brezany, T. Ludescher, T. Feilhauer	
<b>An OpenMP Runtime Profiler/Configuration Tool for Dynamic Optimization of the Number of Threads</b>	192
T. Dancheva, M. Gusev, V. Zdravevski, S. Ristov	
<b>An Effective Task Scheduling Strategy in Multiple Data Centers in Cloud Scientific Workflow</b>	198
E.I. Djebbar, G. Belalem	
<b>Visualisation in the ECG QRS Detection Algorithms</b>	202
A. Ristovski, A. Guseva, M. Gusev, S. Ristov	
<b>Analysis and Comparison of Algorithms in Advanced Web Clusters Solutions</b>	208
D. Alagic, K. Arbanas	
<b>Metamodeling as an Approach for Better Computer Resources Allocation in Web Clusters</b>	214
D. Alagic, D. Macek	
<b>Showers Prediction by WRF Model above Complex Terrain</b>	220
T. Davitashvili, N. Kutaladze, R. Kvataladze, G. Mikuchadze, Z. Modebadze, I. Samkharadze	
<b>Methods and Tools to Increase Fault Tolerance of High-Performance Computing Systems</b>	226
I.A. Sidorov	
<b>Logical-Probabilistic Analysis of Distributed Computing Reliability</b>	231
A.G. Feoktistov, I.A. Sidorov	
<b>Distributed Graph Reduction Algorithm with Parallel Rigidity Maintenance</b>	237
D. Susanj, D. Arbula	
<b>Architecture of Virtualized Computational Resource Allocation on SDN-enhanced Job Management System Framework</b>	241
Y. Watashiba, S. Date, H. Abe, K. Ichikawa, Y. Kido, H. Yamanaka, E. Kawai, S. Shimojo	
<b>Near Real-time Detection of Crisis Situations</b>	247
S. Girtelschmid, A. Salfinger, B. Pröll, W. Retschitzegger, W. Schwinger	

<b>Automatic Protocol Based Intervention Plan Analysis in Healthcare</b>	253
M. Kozlovszky, L. Kovács, K. Batbayar, Z. Garaguly	
<b>Using Fourier and Hartley Transform for Fast, Approximate Solution of Dense Linear Systems</b>	258
Z. Jericevic, I. Kozar	
<b>Procedural Generation of Mediterranean Environments</b>	261
N. Mikulicic, Z. Mihajlovic	
<b>Energy-Aware Power Management of Virtualized Multi-core Servers through DVFS and CPU Consolidation</b>	267
H. Rostamzadeh Hajilari, M.M. Talebi, M. Sharifi	
<b>Human Posture Detection Based on Human Body Communication with Muti-carriers Modulation</b>	273
W. Ni, Y. Gao, Z. Lucev Vasic, S.H. Pun, M. Cifrek, M.I. Vai, M. Du	
<b>SAT-Based Search for Systems of Diagonal Latin Squares in Volunteer Computing Project SAT@home</b>	277
O. Zaikin, S. Kochemazov, A. Semenov	
<b>Architectural Models for Deploying and Running Virtual Laboratories in the Cloud</b>	282
E. Afgan, A. Lonie, J. Taylor, K. Skala, N. Goonasekera	
<b>A CAD Service for Fusion Physics Codes</b>	287
M. Telenta, L. Kos	
<b>Correlation between Attenuation of 20 GHz Satellite Communication Link and Liquid Water Content in the Atmosphere</b>	292
M. Kolman, G. Kosec	
<b>Practical Implementation of Private Cloud with Traffic Optimization</b>	298
D.G. Grozev, M.P. Shopov, N.R. Kakanakov	
<b>Improving Data Locality for NUMA-Agnostic Numerical Libraries</b>	304
P. Zinterhof	
<b>Use Case Diagram Based Scenarios Design for a Biomedical Time-Series Analysis Web Platform</b>	310
A. Jovic, D. Kukolja, K. Jozic, M. Cifrek	
<b>Augmented Reality for Substation Automation by Utilizing IEC 61850 Communication</b>	316
M. Antonijevic, S. Sucic, H. Keserica	
<b>Innovation of the Campbell Vision Stimulator with the Use of Tablets</b>	321
J. Brozek, M. Jakes, V. Svoboda	

<b>Classification of Scientific Workflows Based on Reproducibility Analysis</b>	327
A. Bánáti, P. Kacsuk, M. Kozlovszky	
<b>Dynamic Execution of Scientific Workflows in Cloud</b>	332
E. Kail, J. Kovács, M. Kozlovszky, P. Kacsuk	
<b>FPGA Kernels for Classification Rule Induction</b>	337
P. Skoda, B. Medved Rogina	
<b>Prototyping of Visualization Designs of 3D Vector Fields Using POVRay Rendering Engine</b>	343
J. Opiła	
<b>New Cybercrime Taxonomy of Visualization of Data Mining Process</b>	349
M. Babic, B. Jerman-Blazic	
<b>Visual Representation of Predictions in Software Development Based on Software Metrics History Data</b>	352
B. Popovic, A. Balota, Dz. Strujic	
<b>Interaction with Virtual Objects in a Natural Way</b>	358
I. Prazina, K. Balic, K. Prses, S. Rizvic, V. Okanovic	
<b>Bone Shape Characterization Using the Fourier Transform and Edge Detection in Digital X-Ray Images</b>	362
D. Susanj, G. Gulani, I. Kozar, Z. Jericevic	
<b>GIS in the e-Government Platform to Enable State Financial Subsidies Data Transparency</b>	365
M. Kranjac, U. Sikimic, I. Simic, M. Paroski, S. Tomic	
<b>Evaluation of Caching Techniques for Video on Demand in Named Data Networks</b>	370
K. Jakimoski, S. Arsenovski, L. Gorachinova, S. Chungurski, O. Iliev, L. Djinevski, E. Kamcheva	
<b>Diagnostic of Asthma Using Fuzzy Rules Implemented in Accordance with International Guidelines and Physicians Experience</b>	375
A. Badnjevic, L. Gurbeta, M. Cifrek, D. Marjanovic	
<b>Robust Beat Detection on Noisy Differential ECG</b>	381
P. Lavric, M. Depolli	
<b>Classification of Asthma Using Artificial Neural Network</b>	387
A. Badnjevic, L. Gurbeta, M. Cifrek, D. Marjanovic	
<b>Brain-Computer Interface Based on Steady-State Visual Evoked Potentials</b>	391
K. Friganovic, M. Medved, M. Cifrek	

<b>Comparison of Wireless Electrocardiographic Monitoring and Standard ECG in Dogs</b>	396
A. Krvavica, S. Likar, M. Brloznik, A. Domanjko-Petric, V. Avbelj	
<b>A Medical Cloud</b>	400
J. Tasic, M. Gusev, S. Ristov	
<b>A Hospital Cloud-Based Open Archival Information System for the Efficient Management of HL7 Big Data</b>	406
A. Celesti, M. Fazio, A. Romano, M. Villari	
<b>Recognition and Adjustment for Strip Background Baseline in Fluorescence Immuno-chromatographic Detection System</b>	412
Y. Gao, C. Lin, S.H. Pun, M.I. Vai, M. Du	
<b>Agile Development of a Hospital Information System</b>	416
S.L.R. Vrhovec	
<b>SOA Based Interoperability Component for Healthcare Information System</b>	422
D. Kucak, G. Djambic, V. Kokanovic	
<b>Wireless Intrabody Communication Sensor Node Realized Using PSoC Microcontroller</b>	426
F. Grilec, Z. Lucev Vasic, W. Ni, Y. Gao, M. Du, M. Cifrek	
<b>Detection of Heart Rate Variability from a Wearable Differential ECG Device</b>	430
J. Slak, G. Kosec	
<b>Penetration of the ICT Technology to the Health Care Primary Sector – Ljubljana PILOT</b>	436
T. Poplas Susic, U. Stanic	
<b>Image-Based Metal Artifact Reduction in CT Images</b>	442
A. Serifovic-Trbalic, A. Trbalic	
<b>New Algorithm for Automatic Determination of Systolic and Diastolic Blood Pressures in Oscillometric Measurements</b>	447
V. Jazbinsek	
<b>TGTP-DB – a Database for Extracting Genome, Transcriptome and Proteome Data Using Taxonomy</b>	452
K. Krizanovic, M. Marinovic, A. Bulovic, R. Vaser, M. Sikic	
<b>Development and Perspectives of Biomedical Engineering in South East European Countries</b>	457
A. Badnjevic, L. Gurbeta	
<b>Clustering of Heartbeats from ECG Recordings Obtained with Wireless Body Sensors</b>	461
A. Rashkovska, D. Kocev, R. Trobec	

<b>Heart Rate Analysis with NevroEkg</b>	467
M. Mohorcic, M. Depolli	

## Telecommunications & Information

<b>Time Series Analysis and Possible Applications – <i>Invited Paper</i></b>	473
M. Ivanovic, V. Kurbalija	
<b>Wireless Resonant Power Transfer – An Overview</b>	480
Z. Martinovic, M. Dadic, R. Malaric, Z. Martinovic	
<b>Investigation of a Small Handheld PCB Nesting Two Antennas NFC 13.56 MHz and to RF 868 MHz</b>	487
L.A. Iliev, I.S. Stoyanov, T.B. Iliev, E.P. Ivanova, Gr.Y. Mihaylov	
<b>The Coverage Belt for Low Earth Orbiting Satellites</b>	491
S. Cakaj	
<b>The Investigation of the Effect of the Carrier Frequency Offset (CFO) in SC-FDMA System</b>	495
N. Taşpinar, M. Balki	
<b>Performance Analysis of Low Density Parity Check Codes Implemented in Second Generations of Digital Video Broadcasting Standards</b>	499
Gr.Y. Mihaylov, T.B. Iliev, E.P. Ivanova, I.S. Stoyanov, L.A. Iliev	
<b>Iterative Denoising of Sparse Images</b>	503
I. Stankovic, I. Orovic, S. Stankovic, M. Dakovic	
<b>Compressive Sensing Based Image Processing in TrapView Pest Monitoring System</b>	508
M. Maric, I. Orovic, S. Stankovic	
<b>Big Data Analytics for Communication Service Providers</b>	513
D. Sipus	
<b>Role of Data Analytics in Utilities Transformation</b>	518
V. Cackovic, Z. Popovic	
<b>Using MEAN Stack for Development of GUI in Real-Time Big Data Architecture</b>	524
M. Stajcer, M. Stajcer, D. Orescanin	
<b>A Survey on Physical Layer Impairments Aware Routing and Wavelength Assignment Algorithms in Transparent Wavelength Routed Optical Networks</b>	530
H. Dizdarevic, S. Dizdarevic, M. Skrbic, N. Hadziahmetovic	

<b>A Survey on Transition from GMPLS Control Plane for Optical Multilayer Networks to SDN Control Plane</b>	537
S. Dizdarevic, H. Dizdarevic, M. Skrbic, N. Hadziahmetovic	
<b>About the Telco Cloud Management Architectures</b>	545
I. Nenadic, D. Kobal, D. Palata	
<b>CPE Virtualization by Unifying NFV, SDN and Cloud Technologies</b>	553
P. Cota, J. Sabec	
<b>Soft Sensors in Wireless Networking as Enablers for SDN Based Management of Content Delivery</b>	559
M. Tasic, O. Ikovic, D. Boskovic	
<b>A FIRM Approach for Software-Defined Service Composition</b>	565
P. Kathiravelu, T. Galinac Grbac, L. Veiga	
<b>Test Environment &amp; Application as a Service</b>	571
T. Zitnik, M. Galin, G. Paukovic, I. Devic, R. Cizmar, Z. Busic	
<b>Workaround Solutions Used During PSTN Migration of Customer to IMS Network</b>	575
N. Stokic	
<b>Development of the Generic OFDM Based Transceiver in the LabView Software Environment</b>	581
D. Hamidovic, N. Suljanovic	
<b>The Challenge of Cellular Cooperative ITS Services Based on 5G Communications Technology</b>	587
Z. Kljaic, P. Skorput, N. Amin	
<b>Performance Evaluation of Different Scheduling Algorithms in LTE Systems</b>	595
A. Marincic, D. Simunic	
<b>Performance Analysis of LTE Networks with Random Linear Network Coding</b>	601
T.D. Assefa, K. Kralevska, Y. Jiang	
<b>VoLTE E2E Performance Management</b>	607
D. Klobucarevic, Z. Klobucarevic, D. Belosic	
<b>Balancing Security and Blocking Performance with Reconfiguration of the Elastic Optical Spectrum</b>	612
S. Kumar Singh, W. Bziuk, A. Jukan	
<b>Ensuring Continuous Operation of Critical Process of Remote Control System at the Level of Network Connectivity</b>	618
I. Fosic, D. Budisa	

<b>Requirements and Challenges in Wireless Network's Performance Evaluation in Ambient Assisted Living Environments</b>	624
A. Koren, D. Simunic	
<b>Long Term Evolution as a Precondition for Internet of Postal Things</b>	628
A. Kosovac, A. Veispahic, M. Berkovic	
<b>Advanced Sensing and Internet of Things in Smart Cities</b>	632
D. Capeska Bogatinoska, R. Malekian, J. Trengoska, W. Asiama Nyako	
<b>Security Challenges of the Internet of Things</b>	638
M. Weber, M. Boban	
<b>Promoting Health for Chronic Conditions: a Novel Approach That Integrates Clinical and Personal Decision Support</b>	644
I. Lasorsa, M. Ajcevic, P. D'Antrassi, G. Carlini, A. Accardo, S. Marceglia	
<b>A Taxonomy of Localization Techniques Based on Multidimensional Scaling</b>	649
B. Risteska Stojkoska	
<b>Distributed Real-Time Lift Kinematic Monitoring Using COTS Smartphones</b>	655
N. Miskic-Plethenac, K. Lenac	
<b>Mobile Devices as Authentic and Trustworthy Sources in Multi-Agent Systems</b>	661
V. Vryroubal, A. Stancic, I. Grgurevic	
<b>Comparative Analysis of Functional and Object-Oriented Programming</b>	667
D. Alic, S. Omanovic, V. Giedrimas	
<b>Improving the Composition and Assembly of APIs in Service Dominant Ecosystem Environments</b>	673
D. Ramljak	
<b>Challenges of a Service Transition in Multi Domain Environment</b>	677
I. Golub, B. Radojevic	
<b>Teaching "Ten Commandments" of Software Engineering</b>	682
Z. Putnik, M. Ivanovic, Z. Budimac, K. Bothe	
<b>Methodologies for Development of Mobile Applications</b>	688
Z. Stapic, M. Mijac, V. Strahonja	
<b>Restructuring of Telco Products</b>	693
I. Vrbovcan, T. Pavic, M. Sosa Anic	
<b>Moving from Network-Centric toward Customer-Centric CSPs in Bosnia and Herzegovina</b>	696
N. Banovic-Curguz, D. Ilisevic	

<b>Future Communication Model: Challenges and Opportunities for Society as a Whole</b>	702
D. Ilisevic, N. Banovic-Curguz	
<b>Some Aspects of Network Management System for Video Service</b>	707
O. Jukic, I. Hedji	
<b>Influence of OTT Service Providers on Croatian Telecommunication Market</b>	711
I. Drazic Lutilsky, M. Ivic	
<b>Implementing Shared Service Center in Telecom Environment as More Efficient and More Cost Effective Business Model</b>	716
T. Zilic, V. Cosic	
<b>Fieldbus Diagnostic Online Solution Program Establishment at Rijeka Oil Refinery</b>	720
B. Zezelj, H. Hajdo	
<b>Automatic Communication System Ship to Shipping Terminal, for Reporting Potential Malfunctions of a Ballast Water Treatment System Operation</b>	725
G. Bakalar, M. Baggini	

## Future Networks and Services

<b>A Survey of IoT Cloud Providers</b>	730
T. Pflanzner, A. Kertesz	
<b>QoS-Aware Deployment of Data Streaming Applications over Distributed Infrastructures</b>	736
M. Nardelli	
<b>QoS-Aware Application Placement Over Distributed Cloud</b>	742
F. Bianchi, F. Lo Presti	
<b>Energy-Aware Control of Server Farms</b>	748
M.E. Gebrehiwot, S. Aalto, P. Lassila	
<b>SDN Based Service Provisioning Management in Smart Buildings</b>	754
M. Tasic, O. Ikovic, D. Boskovic	

## Computers in Education

<b>New Informatics Curriculum - Croatian Tradition with World Trends – Invited Paper</b>	760
L. Kralj	

<b>Creativity, Communication and Collaboration: Grading with Open Badges</b>	764
I. Salopek Cubric, G. Cubric	
<b>A Study of Students' Attitudes and Perceptions of Digital Scientific Information Landscape</b>	770
R. Vrana	
<b>Researcher Measured - Towards a Measurement-driven Academia</b>	776
H. Jaakkola, J. Henno, J. Mäkelä, K. Ahonen	
<b>Use of 'Learning Analytics'</b>	783
J. Henno, H. Jaakkola, J. Mäkelä	
<b>Smart Immersive Education for Smart Cities with Support via Intelligent Pedagogical Agents</b>	789
M. Soliman, A. Elsaadany	
<b>Review of Source-Code Plagiarism Detection in Academia</b>	796
M. Novak	
<b>The Comparison of Impact Offline and Online Presentation on Student Achievements: A Case Study</b>	802
P. Esztelecki, G. Körösi, Z. Námostovski, L. Major	
<b>Digital Competences for Teachers: Classroom Practice</b>	807
M. Filipovic Tretinjak, V. Andjelic	
<b>Introducing Collaborative e-Learning Activities to the e-Course "Information Systems"</b>	812
M. Asenbrener Katic, S. Candrllic, M. Holenko Dlab	
<b>A Curriculum for Unified Embedded Engineering Education</b>	818
I. Kastelan, M. Temerinac	
<b>Individual versus Collaborative Learning in a Virtual World</b>	824
P. Pürcher, M. Höfler, J. Pirker, L. Tomes, A. Ischebeck, C. Gütl	
<b>Preparation of a Hybrid e-Learning Course for Gamification</b>	829
D. Kermek, D. Strmecki, M. Novak, M. Kaniski	
<b>Implementation of Fundamental Ideas into the Future Managers' Informatics Education</b>	835
L. Révészová	
<b>Fostering Creativity in Technology-Enhanced Learning</b>	841
A. Zizic, A. Granic, I. Sitin	
<b>Teaching Physics in Primary Schools with Tablet Computers: Key Advantages</b>	847
V. Grubelnik, L. Grubelnik	

<b>Project Based Learning (PBL) in the Teachers' Education</b>	852
M. Krasna	
<b>Didactical Suitability of e-Generated Drill Tests for Physics</b>	857
R. Repnik, M. Sovic	
<b>Utilizing MOOCs in the Development of Education and Training Programs</b>	861
P. Linna, T. Mäkinen, H. Keto	
<b>Distance Delivery and Technology-Enhanced Learning in Information Technology and Programming Courses at RIT Croatia</b>	865
K. Marasovic, B. Mihaljevic, I. Bacic	
<b>Overview of IT Solutions for Career Services and Quality Assurance at Higher Education</b>	871
E. Gjorgjevska, P. Tonkovicj, M. Gusev	
<b>Selecting the Most Appropriate Web IDE for Learning Programming Using AHP</b>	877
I. Skoric, B. Pein, T. Orehovacki	
<b>Using Real Projects as Motivators in Programming Education</b>	883
M. Konecki, S. Lovrencic, M. Kaniski	
<b>Making Programming Education More Accessible for Visually Impaired</b>	887
M. Konecki, N. Ivkovic, M. Kaniski	
<b>Use of Computer Programs in Teaching Photography Courses at Schools of Applied Arts and Design in Croatia</b>	891
Z. Prohaska, Z. Prohaska, I. Uroda	
<b>Universti Search Engine</b>	897
Z. Knok, M. Marcec	
<b>Experience with Usage of LMS Moodle not Only for the Educational Purposes at the Educational Institution</b>	901
D. Pal'ová	
<b>Using Robot Simulation Applications at the University – Experiences with the KUKA Sim</b>	907
D. Lukac	
<b>Implementation and Analysis of Open Source Information Systems in Electronic Business Course for Economy Students</b>	912
H. Jerkovic, P. Vranesic, G. Slamic	
<b>Virtual Firms as Education Tool in the Field of eCommerce</b>	918
M. Vejacka	

<b>Systems and Software Assurance - A Model Cyber Security Course</b>	923
V. Jovanovic, J. Harris	
<b>Analysis of Learning Management Systems Features and Future Development Challenges in Modern Cloud Environment</b>	928
H. Jerkovic, P. Vranesic, A. Radan	
<b>Markov Model of Mathematical Competences in Elementary Education</b>	934
G. Paic, B. Tepes, K. Pavlina	
<b>PYTHON as Pseudo Language for Formal Language Theory</b>	940
Z. Dovedan Han, K. Kocijan, V. Lopina	
<b>Croatian Students' Attitudes Towards Technology Usage in Teaching Asian Languages – a Field Research</b>	946
M. Janjic, S. Librenjak, K. Kocijan	
<b>Adaptive e-Learning System for Language Learning: Architecture Overview</b>	951
V. Slavuj, B. Kovacic, I. Jugo	
<b>L2L – Learn to Learn: Teach to Learn: CARTOON ENGLISH (A constructivist approach to teaching and learning)</b>	956
K. Bedi	
<b>Facilitating Mobile Learning by Use of Open Access Information Resources</b>	962
R. Vrana	
<b>Work-Based Learning: New Skills for New Technologies</b>	967
M. Lamza Maronic, I. Ivancic	
<b>Creating Assets as a Part of Tertiary Education of Technical Domains</b>	973
J. Brozek, D. Hamernik, Z. Kopecky	
<b>Software Solution Incorporating the Steganographic Principle for Hiding Pictures within Pictures</b>	979
J. Brozek, J. Marek, V. Svoboda	
<b>A Platform Independent Tool for Programming, Visualization and Simulation of Simplified FPGAs</b>	986
M. Cupic, K. Brkic, Z. Mihajlovic	
<b>Digital Risks and Experiences of Future Teachers</b>	992
T. Bratina	
<b>A Study of Factors Influencing Higher Education Teachers' Intention to Use e-Learning in Hybrid Environments</b>	998
S. Babic, M. Cicin-Sain, G. Bubas	

<b>Development and Implementation of E-Learning System in Smart Educational Environment</b>	1004
A. Elsaadany, K. Abbas	
<b>Introducing Inquiry-Based Learning to Estonian Teachers: Experiences from the Creative Classroom Project</b>	1010
N. Hoic-Bozic, M. Laanpere, K. Pata, I. Frankovic, S. Teder	
<b>Mobile Robots Approach for Teaching Programming Skills in Schools</b>	1016
W. Werth, C. Ungermanns	
<b>Age Independent Examination of Algorithm Creating Abilities</b>	1020
Z.A. Godó, D. Kocsis, G. Kiss, G. Stóka	
<b>The Digitalization Push in Universities</b>	1025
H. Jaakkola, H. Aramo-Immonen, J. Henno, J. Mäkelä	
<b>Toby the Explorer – an Interactive Educational Game for Primary School Pupils</b>	1032
N. Kaevikj, A. Kostadinovska, , M. Mihova, K. Trivodaliev, B. Risteska Stojkoska	
<b>The Use of Contemporary e-Services and e-Contents at Mother Tongue Classes</b>	1037
V. Jesenek	
<b>Migration from in-House LMS to Google Classroom: Case of SEEU</b>	1040
L. Abazi Bexheti, A. Kadriu, M. Apostolova Trpkovska	
<b>Survey Analyses of Impacting Factors in ICT Usage in School Management: Case Study</b>	1044
B. Fetaji, M. Fetaji, R. Azemi, M. Ebibi	
<b>Case Study Analyses of Semantic Security Using SQL Injection in Web Enabled ORACLE Database</b>	1050
M. Fetaji, B. Fetaji, M. Ebibi	
<b>Using Web Applications in Education</b>	1056
A. Babic, S. Vukmirovic, Z. Capko	
<b>Qualitative Approach to Determining the Relevant Facets of Mobile Quality of Educational Social Web Applications</b>	1060
T. Orehovacki, S. Babic	
<b>Computers in Technical Systems</b>	
<b>Architecture and Application of Virtual Desk and 3D Process Simulation for Wire Rod Rolling Mills – <i>Invited Paper</i></b>	1066
A. Venuti	

<b>Use of Offline Computational Tools for Plant Data Analysis and Setup Model Calibration: a Perspective in the Industry of Flat Metal Production – <i>Invited Paper</i></b>	1071
C. Aurora, F.A. Cuzzola	
<b>Architecture and Implementation of a MES System in a Large Scale Steel Plant: Severstal Cherepovets Success Story – <i>Invited Paper</i></b>	1077
G. Brunetti	
<b>Anfis as a Method for Determinating MPPT in the Photovoltaic System Simulated in Matlab/Simunlink</b>	1082
D. Mlakic, S. Nikolovski	
<b>Linear Motion Calculation of the High Voltage Circuit Breaker Contacts Using Rotary Motion Measurement with Nonlinear Transfer Function</b>	1087
K. Obarcanin, R. Ostojic	
<b>Robot Arm Teleoperation via RGBD Sensor Palm Tracking</b>	1093
F. Maric, I. Jurin, I. Markovic, Z. Kalafatic, I. Petrovic	
<b>A Proposal for a Fully Distributed Flight Control System Design</b>	1099
M. Segvic, K. Krajcek Nikolic, E. Ivanjko	
<b>Control of Thermal Process with Simulink and NI USB-6211 in Real Time</b>	1104
I. Tikvic, G. Vujisic, M. Fruk	
<b>Stabilization of Multi-AUV Formation with Digital Control</b>	1108
S.A. Ul'yanov, N.N. Maksimkin	
<b>A Hybrid Approach to Solve the Dynamic Patrol Routing Problem for Group of Underwater Robots</b>	1114
M.Yu. Kenzin, I.V. Bychkov, N.N. Maksimkin	
<b>Multi - Heater Induction Heating System with Sandwich Material Heater</b>	1120
A. Smrke	
<b>Two-Rate Motion Control of VTAV by NARMA-L2 Controller for Enhanced Situational Awareness</b>	1126
I. Astrov	
<b>LADDER Program Solution for Multi-probe Monitoring and Control in Simple Cooling Process</b>	1132
T. Spoljaric, M. Spoljaric	
<b>An M2M Solution for Smart Metering in Electrical Power Systems</b>	1141
M.P. Shopov	
<b>Noise within a Data Center</b>	1145
D. Miljkovic	

<b>Active Noise Control: From Analog to Digital – Last 80 Years</b>	1151
D. Miljkovic	
<b>Responding to Stakeholders' Resistance to Change in Software Projects – A Literature Review</b>	1157
S.L.R. Vrhovec	
<b>Object-Oriented Programming Model for Synthesis of Domain-Specific Application Development Environment</b>	1162
T. Lugaric, Z. Pavlic, D. Skvorc	
<b>Logistic and Production Computer Systems in Small-Medium Enterprises</b>	1168
M. Pighin	
<b>The Implications of Employing Component Based Software Design in Non-Commercial Applications</b>	1173
B. Zoric, G. Martinovic, I. Crnkovic	
<b>Extended Approach to Selecting a Project-specific Reliability Growth Model</b>	1179
J. Krini, A. Krini, O. Krini, J. Börcsök	
<b>Embedded Linux Controlled Sensor Network</b>	1185
M. Saari, A.M. Baharudin, P. Sillberg, P. Rantanen, J. Soini	
<b>Portable Sensor System for Reliable Condition Measurement</b>	1190
J. Soini, P. Sillberg, P. Rantanen, J. Nummela	
<b>Architecture of an Interoperable IoT Platform Based on Microservices</b>	1196
T. Vresk, I. Cavrak	
<b>Performance Estimation in Heterogeneous MPSoC Based on Elementary Operation Cost</b>	1202
N. Frid, D. Ivosevic, V. Sruk	

## Intelligent Systems

<b>Computer Vision for the Blind: a Dataset for Experiments on Face Detection and Recognition</b>	1206
S. Carrato, S. Marsi, E. Medvet, F.A. Pellegrino, G. Ramponi, M. Vittori	
<b>Impact of Light Conditions on the Vertical Traffic Signs Detection in Vertical Traffic Signs Recognition System</b>	1212
D. Solus, L. Ovseník, J. Turán	
<b>Wound Detection and Reconstruction Using RGB-D Camera</b>	1217
D. Filko, E.K. Nyarko, R. Cupec	

<b>Clustering of Affective Dimensions in Pictures: An Exploratory Analysis of the NAPS Database</b>	1223
M. Horvat, K. Jednoróg, A. Marchewka	
<b>Challenges in Adopting Big Data Strategies and Plans in Organizations</b>	1229
A. Budin, S. Krajnovic	
<b>A Survey of Intelligent System Techniques for Indian Stock Market Forecasting</b>	1235
S. Panwar, V.P. Upadhyay, S.K. Bishnoi	
<b>The Effect of Class Distribution on Classification Algorithms in Credit Risk Assessment</b>	1241
K. Andric, D. Kalpic	
<b>Software Solution for Optimal Planning of Sales Persons Work Based on Depth-First Search and Breadth-First Search Algorithms</b>	1248
E. Zunic, A. Djedovic, B. Zunic	
<b>Iterated Local Search Algorithm for Planning the Sequence of Arrivals and Departures at Airport Runways</b>	1254
E. Bytyçi, K. Sylejmani, A. Dika	
<b>Energy Efficiency with Intelligent Light Management Systems</b>	1259
I. Britvic, A. Nikitovic	
<b>Adaptive and Modular Urban Smart Infrastructure</b>	1265
M. Klaric, I. Kuzle, I. Livaja	
<b>Automatic Pothole and Speed Breaker Detection Using Android System</b>	1270
V. Rishiwal, H. Khan	
<b>The Influence of the CAPTCHA Types to Its Solving Times</b>	1274
D. Brodic, S. Petrovska, M. Jevtic, Z.N. Milivojevic	
<b>Techniques and Applications of Emotion Recognition in Speech</b>	1278
S. Lugovic, I. Dundjer, M. Horvat	
<b>Word Occurrences and Emotions in Social Media: Case Study on a Twitter Corpus</b>	1284
I. Dundjer, M. Horvat, S. Lugovic	
<b>The Application of Parameterized Algorithms for Solving SAT to the Study of Several Discrete Models of Collective Behavior</b>	1288
S. Kochemazov, A. Semenov, O. Zaikin	
<b>Logical-Algebraic Equations Application in Discrete-Event Systems Studying</b>	1293
N. Nagul	

<b>An Evaluation Framework and a Brief Survey of Decision Tree Tools</b> N. Vlahovic	1299
<b>Positive Constructed Formulas Preprocessing for Automatic Deduction</b> E. Cherkashin, A. Davydov, A. Larionov	1305
<b>Monte-Carlo Randomized Algorithm: Empirical Analysis on Real-World Information Systems</b> R. Kudelic, D. Oreski, M. Konecki	1309
<b>Control Flow Graph Visualization in Compiled Software Engineering</b> A. Mikhailov, A. Hmelnov, E. Cherkashin, I.V. Bychkov	1313
<b>Bottom-Left and Sequence Pair for Solving Packing Problems</b> T. Rolich, D. Domovic, M. Golub	1318
<b>Automatic Image Annotation Refinement</b> M. Pobar, M. Ivasic-Kos	1324
<b>Defining Ontology Combining Concepts of Massive Multi-Player Online Role Playing Games and Organization of Large-Scale Multi-Agent Systems</b> B. Okresa Djuric, M. Schatten	1330
<b>Comparison of Solution Representations for Scheduling in the Unrelated Machines Environment</b> M. Djurasevic, D. Jakobovic	1336

## Biometrics & Forensics & De-Identification and Privacy Protection

<b>Shape and Texture Combined Face Recognition for Detection of Forged ID Documents</b> D. Sáez-Trigueros, H. Hertlein, L. Meng, M. Hartnett	1343
<b>Simple Method Based on Complexity for Authorship Detection of Text</b> L. Meluch, I. Tokárová, P. Farkas, F. Schindler	1349
<b>Privacy Protection Performance of De-identified Face Images with and without Background</b> Z. Sun, L. Meng, A. Ariyaeenia, X. Duan, Z.-H. Tan	1354
<b>Deep Metric Learning for Person Re-Identification and De-Identification</b> I. Filkovic, Z. Kalafatic, T. Hrkac	1360
<b>Deformable Part-Based Robust Face Detection under Occlusion by Using Face Decomposition into Face Components</b> D. Marcetic, S. Ribaric	1365

<b>Creating a Face Database for Age Estimation and Classification</b>	1371
P. Grd, M. Baca	
<b>Forensic Anthropometry from Voice: An Articulatory-Phonetic Approach</b>	1375
R. Singh, B. Raj, D. Gencaga	
 <b>Information Systems Security</b>	
<b>Technical Recommendations for Improving Security of Email Communications</b>	1381
A. Malatras, I. Coisel, I. Sanchez	
<b>Performance Analysis of Two Open Source Intrusion Detection Systems</b>	1387
B. Brumen, J. Legvart	
<b>Challenges of Mobile Device Use in Healthcare</b>	1393
S.L.R. Vrhovec	
<b>Safe Use of Mobile Devices in the Cyberspace</b>	1397
S.L.R. Vrhovec	
<b>Securing Web Content and Services in Open Source Content Management Systems</b>	1402
H. Jerkovic, P. Vranesic, S. Dadic	
<b>Can Malware Analysts be Assisted in Their Work Using Techniques from Machine Learning?</b>	1408
I. Novkovic, S. Gros	
<b>Performance Evaluation of a Rule-Based Access Control Framework</b>	1414
S.A. Afonin	
<b>Going White Hat: Security Check by Hacking Employees Using Social Engineering Techniques</b>	1419
Z. Lovric Svehla, I. Sedinic, L. Pauk	
<b>Analysis of Phishing Attacks against Students</b>	1423
J. Andric, D. Oreski, T. Kisasondi	
<b>What Do Students Do with Their Assigned Default Passwords?</b>	1430
L. Bosnjak, B. Brumen	
<b>Analysing Real Students' Passwords and Students' Passwords Characteristics Received From a Questionnaire</b>	1436
V. Taneski, M. Hericko, B. Brumen	

<b>Using DEMF in Process of Collecting Volatile Digital Evidence</b>	1442
M. Baca, J. Cosic, P. Grd	
<b>From Safe Harbour to European Data Protection Reform</b>	1447
T. Katulic, G. Vojkovic	
<b>Information Security Assessment in Nature Parks</b>	1452
S. Aksentijevic, T. Djugum, K. Sakic	
<b>Clustering Approach for User Location Data Privacy in Telecommunication Services</b>	1459
M. Vukovic, M. Kordic, D. Jevtic	
 <b>Business Intelligence Systems</b>	
<b>Analyzing Air Pollution on the Urban Environment</b>	1464
E. Baralis, T. Cerquitelli, S. Chiusano, P. Garza, M.R. Kavoosifar	
<b>Application of Model Driven Architecture for Development of Data Consolidation Web-System</b>	1470
A.A. Korobko, L.F. Nozhenkova	
<b>Business Process Management Systems Selection Guidelines: Theory and Practice</b>	1476
V. Bosilj Vuksic, L. Brkic, M. Baranovic	
<b>Organization of Tax Data Warehouse for Legal Entities</b>	1482
M. Sretenovic, B. Kovacic, V. Jovanovic	
<b>Predictive Analytics in Big Data Platforms – Comparison and Strategies</b>	1488
M. Zekic-Susac, A. Has	
<b>The Analysis of CSFs in Stages of ERP Implementation - Case Study in Small and Medium - Sized (SME) Companies in Croatia</b>	1494
M. Nikitovic, V. Strahonja	
<b>Reciprocal Payers Identification in Banking Logs using SAT Solvers</b>	1500
S. Skansi, B. Dropuljic	
 <b>Digital Economy and Government, Local Government, Public Services</b>	
<b>The Modern Approach to the Analysis of Logistics Information Systems</b>	1504
A. Iskra, E. Tijan, S. Aksentijevic	

<b>Development of the Data Warehouse Model for Public Authorities Accounts in Croatia</b>	1509
M. Sretenovic, B. Kovacic, V. Jovanovic	
<b>The Future of Digital Economy in Some SEE Countries (Case study: Croatia, Macedonia, Montenegro, Serbia, Bosnia and Herzegovina)</b>	1515
M. Vidas-Bubanja, I. Bubanja	
<b>Effects and Evaluation of Open Government Data Initiative in Croatia</b>	1521
T. Vracic, M. Varga, K. Curko	
<b>ICT Technologies and Structured Dialogue: Experience of "Go, go, NGO!" Project</b>	1527
N. Kadoic	
<b>Using ICT Tools for Decision Making Support in Local Government Units</b>	1533
N. Kadoic, I. Kedmenec	
<b>The Conceptual Risk Management Model - A Case Study of Varazdin County</b>	1539
R. Kelemen, M. Biskup, N. Begicevic Redjep	
<b>Electronic Commerce in Croatia and a Comparison of Open Source Tools for the Development of Electronic Commerce</b>	1546
J. Tomljanovic, T. Turina, E. Krelja Kurelovic	
<b>The Social Marketing as Prerequisite for the Competitiveness of South-East European Companies</b>	1552
I. Bubanja	
<b>Homeostasis and Collaborative Decision Making for Smart and Cognitive Cities</b>	1557
J. Klasinc	
<b>Can the Bank Payment Obligation Replace the International Documentary Letter of Credit?</b>	1563
R. Bergami	
<b>Implementation and Design of Cool'n'Project - Web-Based Project Management Software</b>	1569
I. Speh	
<b>Analysis of ICT Use in Private Accommodation Rentals in Croatia</b>	1576
L. Zekanovic-Korona, J. Grzunov	
<b>Records Management Challenges and Opportunities: An Australian Perspective</b>	1582
A. Davies, R. Bergami	

<b>Effectiveness Analysis of Using Solid State Disk Technology</b>	1587
A. Skendzic, B. Kovacic, E. Tijan	
<b>Information and Communication Technologies and the New Forms of Organized Crime in Network Society</b>	1592
M. Boban	

## **Mipro Junior – Student Papers**

<b>Technical Diagnosis of Basic Logic Gates</b>	1598
Z. Tucakovic	
<b>Developing a Parking Monitoring System Based on the Analysis of Images from an Outdoor Surveillance Camera</b>	1603
I.V. Sukhinskiy, E.A. Nepovinnykh, G.I. Radchenko	
<b>Laboratory Model of an Elevator: Control with Three Speed Profiles</b>	1608
A. Jozic, T. Spoljaric, D. Gadze	
<b>Security and Privacy in an IT Context – a Low-Cost WIDS Employed against MITM Attacks (concept)</b>	1614
N. Poljak, M. Sevo, I. Livaja	
<b>Use of HLA During Customer Flow Simulation in a Polyclinic</b>	1618
J. Brozek, J. Fikejz, V. Samotan, L. Gago	
<b>Revealing the Structure of Domain Specific Tweets via Complex Networks Analysis</b>	1623
E. Mocibob, S. Martincic-Ipsic, A. Mestrovic	
<b>Counting Prime Numbers in Paralell - Faster by Reducing the Synchronization Overhead</b>	1628
A. Durakovic, E. Pajic, I. Brankovic, E. Kusundzija, S. Karkelja	
<b>Parallelization Challenges of BFS Traversal on Dense Graphs Using the CUDA Platform</b>	1633
H. Milisic, D. Ahmic, H. Sinanovic, E. Saric, A. Asotic, A. Huseinovic	
<b>Buck Converter Controlled by Arduino Uno</b>	1638
H. Kovacevic, Z. Stojanovic	
<b>Audio Phonebook for the Blind People</b>	1643
G. Popovic, U. Pale	
<b>Heart Rate Variability Analysis Using Different Wavelet Transformations</b>	1649
U. Pale, F. Thürk, E. Kaniusas	