**35th International Conference on
Information Technologies (InfoTech-2021)
(IEEE conference, Rec. # 52 438)**

16th – 17th September 2021
St. St. Constantine and Elena resort, Varna, Bulgaria



#### PROCEEDINGS

Edited by Prof. Radi Romansky, D.Sc.

Sofia, 2021

**Copyright © 2021**

**®**

|  |  |
| --- | --- |
| *All rights reserved for SAER Forum Group. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the copyright owner.* |  |

**InfoTech-2021 Organizers**

|  |  |
| --- | --- |
| http://www.tu-sofia.bg/Logos/LogoTU-ENG-black.jpg | ***Technical University of Sofia***(http://www.tu-sofia.bg/) |
| CEEC-Logo | ***Union of Electronics, Electrical Engineering and Communications***(<http://ceec.fnts-bg.org>) |
|  | ***Union of Scientists in Bulgaria***([http://www.usb-bg.org](http://ceec.fnts-bg.org)) |
|  | ***Institute of Electrical and Electronics Engineers, Section Bulgaria*** ([http://www.ieee.bg](http://www.ceec.fnts-bg.org)) |

**InfoTech-2021 Conference Sections**

Section [A]: “Information Technologies”

Section [B]: “Information Security”

Section [C]: “Networking – Social Communications”

Section [D]: “Intelligent Systems and Applications”

Section [E]: “Technologies for System Design & Investigation”

ISSN: 1314-1023

**International Program Committee**

Assoc. Prof. Rebecca BARTLET, Ph.D. (UK)

Prof. Dencho BATANOV, Ph.D. (Thailand)

Prof. Francesco BERGADANO (Italy)

Prof. Dumitru Dan Burdescu, Ph.D. (Romania)

Assoc. Prof. Vassil FOURNADJIEV, Ph.D. (Bulgaria)

Prof. Vangel FUSTIK, D.Sc. (North Macedonia)

Assoc. Prof. V. Gayoso Martínez, Ph.D. (Spain)

Prof. Iliya GEORGIEV, Ph.D. (USA)

Assoc. Prof. Alaine M. Guimarães, Ph.D. (Brazil)

Prof. Zoran HADZI-VELKOV (North Macedonia)

Prof. Luis Hernández Encinas, D.Sc. (Spain)

Prof. Atanas ILIEV, Ph.D. (North Macedonia)

Assoc. Prof. Ivan JELINEK, Ph.D. (Czech Republic)

Dr. Karl O. JONES (UK)

Dr. Zeashan H. KHAN (Pakistan)

Prof. Dong Hwa KIM, Ph.D. (Korea)

Michal KVET, Ph.D. (Slovakia)

Prof. Dmitry MAEVSKY, D.Sc. (Ukraine)

Prof. Karol MATIAŠKO, Ph.D. (Slovakia)

Assoc. Prof. Brojo MISHRA, Ph.D. (India)

Prof. Sanjay MISRA, Ph.D. (Nigeria)

Assoc. Prof Jezabel Molina-Gil (Spain)

Assoc. Prof. Irina NONINSKA, Ph.D. (Bulgaria)

Prantosh Kumar PAUL, Ph.D. (India)

Prof. Evelina PENCHEVA, D.Sc. (Bulgaria)

Prof. Goran RAFAJLOVSKI, Ph.D. (North Macedonia)

Prof. Radi ROMANSKY, D.Sc. (Chairman) (Bulgaria)

Prof. Leon Rothkrantz, D.Sc. (The Netherlands)

Assoc. Prof. Sudhir K. ROUTRAY, Ph.D. (India)

Prof. Heather RUSKIN, Ph.D. (Ireland)

Prof. Eugene Semenkin, D.Sc. (Russia)

Prof. Radomir STANKOVIĆ, Ph.D. (Serbia)

Prof. Ivan TASHEV, Ph.D. (USA)

Assoc. Prof. Dimitar TSANEV, Ph.D. (Bulgaria)

Prof. Kalum P. UDAGEPOLA, Ph.D. (Australia)

Prof. Larissa Zaitseva, D.Sc. (Latvia)

**National Organizing Committee**

*Chairman:* Radi Romansky

*Members:*  Dimitar TSanev, Irina Noninska, Nikolay HINOV, Elena Parvanova,
Katya ASPARUHOVA, Desislava IVANOVA, Todor KOBUROV

Web site: [**http://infotech-bg.com**](http://infotech-bg.com)

**Contents**

Remarks:
The **InfoTech-2021 Conference Proceeding (ISSN 1314-1023)** contains full text of the articles included in the Part I. The rest articles included in the **InfoTech-2021-eProceedings (CD-ROM), ISBN 978-1-6654-0323-8** which will be published in the IEEE Xplore Digital Library are presented here by abstract only (see the Part II).

|  |  |
| --- | --- |
| ***Part I. Full text of conference reports*** | **9** |
| 03PL. **A Survey of Periodic Binary Nearly Perfect Signals with Lengths N≡0mod4***Mihail Iliev, Borislav Bedzhev, Nikolay Nikolov, Kaloyan Kanchev* (Bulgaria) | **9** |
| A06. **An Electric Network Frequency Analysis Technology Demonstrator for Educational Purposes***K.O. Jones, L. Hamilton, D.L. Ellis, C. Robinson, J. Reed-Jones, K. Morrison* (United Kingdom) | **23** |
| A07. **Recognition of Handwritten Numbers with Data Sets***M. Fatih Cambek, Pinar Kirci* (Turkey)  | **35** |
| A10. **Digital Industry Transformation – Complex Analysis of Technologies, Benefits, Success Factors and Barriers***Natalija Petrova, Vangel Fustik* (North Macedonia) | **41** |
| B05. **People-centric Security Awareness Program***Federico Giovannetti* (USA) | **51** |
| E09. **Power Transformer No-Load Losses in Case of Non-Linear Loads***Mihail Digalovski*1*, Goran Rafajlovski*1,2*, Krste Najdenkoski*1(1R. North Macedonia & 2Germany) | **63** |
| E10. **Optimal Configuration Assessment of Hybrid Energy System***Sofia Nikolova-Poceva* (R. North Macedonia) | **73** |
| E11. **Feasibility Analysis and Optimization of GRID-Connected Microturbine/Fuel Cell/PV Hybrid Energy System***Sofia Nikolova-Poceva* (R. North Macedonia) | **85** |
| E12. **Unit Commitment and Economic Dispatch of Hybrid Microgrid with Residental Load***Natasha Dimishkovska, Atanas Iliev, Sofija Nikolova- Poceva*(R. North Macedonia) | **97** |
| E13. **An Application that Separate Recyclable Materials***Mustafa Sungur Polater, Pinar Kirci* (Turkey) | **107** |

|  |  |
| --- | --- |
| ***Part II. Abstracts of conference reports*** | **115** |
| **Section “PL”: “Plenary Reports”**01PL. **Detecting Emotions in Communication via Social Media during Crisis Events***L. J. M. Rothkrantz* (The Netherlands)02PL. **Theoretical Foundations of Fractal Electrotechnic. Fractal Elements and its Properties***Dmitry Maevsky, Andriy Bojko, Elena Maevskaya, Aleksandr Besarab* (Ukraine)**Section “A”: “Information Technologies”**A01. **Computation of Source-to-site Distance Distributions for Seismic Hazard Analysis***Radan Ivanov* (Bulgaria)A02. **A Bloom Filter Application for Processing Big Datasets through MapReduce Framework**Milko Marinov (Bulgaria)A03. **Application of Image Analysis Techniques for Quality Assessment of Swiss-type of Cheese***Atanaska Bosakova-Ardenska, Angel Danev, Petya Boyanova, Peter Panayotov* (Bulgaria)A04. **Real-time Velocity Based Cloth Simulation with Ray-tracing Collision Detection on the Graphics Processor***Tzvetomir Ivanov Vassilev* (Bulgaria)A05. **Approaches for Implementation of Golay’s Complementary Signals and Welti’s Quaternary Signals in Radio-Communication Systems** *Mihail Iliev, Borislav Bedzhev, Monika Bedzheva, Kaloyan Kanchev* (Bulgaria)A08. **Using Agile Methodology in ERP-System Implementation Projects***Dmitry Yurievich Stepanov* (Russian Federation)A09. **Analyzing Performance of Clustering Algorithms on a Real Retail Dataset***Ledion Lico, Indrit Enesi, Betim Cico* (Albania)A11. **The Educational Use of a Website in the Teaching of Chemistry Module on “Acids-Bases-Salts”***A. Thysiadou, S. Christoforidis, D. Marmanis, A. Solomanidoy, P. Giannakoudakis* (Greece)A12. **Distance Learning for Teaching “Simple Colloid” with the Assistance of Moodle***A. Thysiadou, D. Marmanis, S. Christoforidis, V. Gaki, P. Giannakoudakis, A. Mitropoulos, G. Kyzas* (Greece)**Section [B]: “Information Security”**B01. **The "Self-Assessment" Method within a Mature Third-Party Risk Management Process in the Context of Information Security***Veselin Monev* (Switzerland)B02. **Mini-Cave Automatic Virtual Environment Application in Security, Safety, and Defence Studies***Małgorzata Gawlik-Kobylińska, Paweł Maciejewski, Jacek Lebiedź* (Poland & Czech Republic) B03. **A Model for Identification of Compromised Devices as a Result of Cyberattack on IoT Devices***Aleksandar Hristov, Roumen Trifonov* (Bulgaria)B04. **Cybersecurity Analysis of Wind Farm SCADA Systems***Evgeni Sabev, Roumen Trifonov, Galya Pavlova, Kamelia Rainova* (Bulgaria)**Section [C]: “Networking – Social Communications”**C01. **An Approach of Utilizing Exponential Rank and In-Inverse Closeness Centrality on Recommender Systems***Korab Rrmoku, Besnik Selimi, Lule Ahmedi* (R. North Macedonia & Kosovo)C02. **Research on Web Applications for Remote Laboratory Exercises on Computer Networks***Georgi Tsochev* (Bulgaria)**Section [D]: “Intelligent Systems and Applications”**D01. **Toward Self-Aware Machines: Insights of Causal Reasoning in Artificial Intelligence***Elis Pelivani, Betim Cico* (R. North Macedonia & Albania)D02. **The Aspects of Choosing the Time Series Length when Constructing a Fuzzy Regression Model***Liliya Anatolievna Demidova, Maksim Anatolievich Stepanov* (Russian Federation)D03. **Development of Multifactor Forecasting Model based on Fuzzy time Series** *Liliya Anatolievna Demidova, Maksim Anatolievich Stepanov* (Russian Federation)D04. **Intelligent Technologies in E-learning and Intelligent Tutoring Systems***Tatyana Ivanova* (Bulgaria)D05. **Component Based Development of Ontology-based Intelligent Tutoring Systems***Tatyana Ivanova* (Bulgaria)D06. **Multi-agent Consensus Convergence Study***Vanya Markova, Ventseslav Shopov* (Bulgaria)D07. **Application of Hungarian Algorithm for Assignment Problem***Ventseslav Shopov, Vanya Markova* (Bulgaria)D08. **Toward Robot-Assisted Psychosocial Techniques for Sound Stimulation of Babies Born with Hearing Loss***Anna Lekova, Paulina Tsvetkova* (Bulgaria)**Section [E]: “Technologies for System Design & Investigation”**E01. **Investigation of Communication Parameters in Multicomputer Architecture with Ring Topology***Radi Romansky, Irina Noninska* (Bulgaria)E02. **Genetic Programming using Cooperative Coevolution and Problem Decomposition for Solving Large-scale Symbolic Regression Problems***Evgenii Sopov, Mariia Semenkina* (Russian Federation & Austria)E03. **On the Automatic Identification of Differential Equations using a Hybrid Evolutionary Approach***Tatiana Karaseva, Eugene Semenkin* (Russian Federation)E04. **An Approach to Training Decision Trees with the Relearning of Nodes***Sergei Mitrofanov and Eugene Semenkin* (Russian Federation)E05. **Measurement of PCB Deformation during Functional Testing of Electronic Modules***Valentin Tsenev, Valentin Videkov, Nadejda Spasova* (Bulgaria)E06. **Installation of Electronic Modules in a Housing by Means of a Screw Assembly and Assessment of the Influence of the Deformation of the PCB on the Installed Components***Valentin Tsenev, Valentin Videkov, Nadejda Spasova* (Bulgaria)E07. **Modeling and Representation of Power Electronic Converter Parameters***Polya Gocheva, Valeri Gochev, Nikolay Hinov* (Bulgaria)E08. **N-1 Security Constrained Short-Term Hydrothermal Scheduling by Self Adaptive Genetic Algorithm with PTDF***Borce Postolov, Atanas Iliev, Dimitar Dimitrov, Natasa Dimishkoska* (R. North Macedonia) |

|  |  |
| --- | --- |
| **Advertisement (Conference Sponsors – Information)** | **129** |
| **Conference Proceedings Dissemination, Referring and Indexing** | **131** |
| **InfoTech Conferences in IEEE Xplore DL**  | **133** |
| **InfoTech Proceedings in Google Books** | **134** |
| **Authors Index – Pat I** | **135** |

***Selected InfoTech papers are indexed and referred in:***



***Additional InfoTech papers indexing and abstracting in:***



***See Cover III for extended information***

**InfoTech Proceedings in EBSCO*host***

Source: EBSCO*host*, 26 July 2021

<http://web.b.ebscohost.com/ehost/command/detail?vid=6&sid=ae7769ce-c17b-415f-8277-e83c50f9dc65%40pdc-v-sessmgr02&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#jid=6DSI&db=asn>

