2021 56th International Scientific Conference on Information, **Communication and Energy Systems and Technologies** (ICEST 2021)

Sozopol, Bulgaria 16 – 18 June 2021



IEEE Catalog Number: CFP21UWE-POD ISBN:

978-1-6654-2888-0

Copyright © 2021 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:
 CFP21UWE-POD

 ISBN (Print-On-Demand):
 978-1-6654-2888-0

 ISBN (Online):
 978-1-6654-2887-3

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

COMPUTER SYSTEMS, INTERNET TECHNOLOGIES, DIGITAL SIGNAL AND IMAGE PROCESSING I

2egular	papers:
vegulai	Predicting the Ecological Footprint: A Case Study for Italy, Pakistan and China
	IT Service Management Challenges in Condition of Pandemic and Post-pandemic Environment
	Unsubscribe Rate of Chatbots Users Received Broadcast Messages for France, Germany, Russia, and the Global Market
	Overview of Methods for 3D Reconstruction of Human Models with Applications in Fashion E-commerce
	Human Action Recognition for Pose-based Attention: Methods on the Framework of Image Processing and Deep Learning
	Improving a Digital Elevation Model of Mars Based on Principal Curvature Directions
	Local Adaptive LMS Filtration of Multidimensional Images
	COMPUTER SYSTEMS, INTERNET TECHNOLOGIES,
	DIGITAL SIGNAL AND IMAGE PROCESSING II
Posters:	
	Contemporary Authentication Access Approach for High Security Information Systems
	Operating Systems for IoT Devices

	Research of MQTT versus LwM2M IoT Communication Protocols for IoT	45
	Communication System for Remote Control of Infrared Heating	49
	Classifying Dual-Energy X-ray Absorptiometry Images Using Machine Learning	53
	An Algorithm of Segmentation of a Human Spine X-ray Image with the Help of Mask R-CNN Neural Network for the Purpose of Vertebrae Localization	55
	Accessing LinkedIn and Google E-mail Databases Using Kali Linux and TheHarvester	59
	DIGITAL SIGNAL AND IMAGE PROCESSING III	
Regular	papers:	
Ü	Improved Classes of CIC Filter Functions: Design and Analysis of the Quantized-Coefficient Errors	65
	Sensitivity of notch filters realized by parallel connection of allpass subfilters	69
	Multimodal Motor Imagery BCI Based on EEG and NIRS	73
	A Planar MIMO UWB Array Design for High-Resolution Microwave Imaging	77
	A Comparison of Two Layers in a Convolution Network Implemented by Python, Keras and TensorFlow	81
	MRI/SPECT Image Fusion of Brain Based on Multi-Scale Wavelet Decomposition	85
	3D SUSAN Filtering of CT Images with Adaptive Selection of the Brightness Threshold	89

INFORMATICS, COMPUTER SCIENCE, ELECTRONICS, CONTROL SYSTEMS, DIGITAL SIGNAL AND IMAGE PROCESSING IV

_			
Ю.	റടി	۱.	ro.
	()5	ı	18

Methods to Increase Distance in Wireless Power Transfer Systems
Authorization Concept in the 4th Railway Package
Buck-Boost DC-DC Converter Designed for PCB Applications
Electrophoretic Deposition of Rochelle Salt on Cu2O Plate
Designing a NFC System
Design of Navigation System with Multiband GNSS Receiver with RTK and DR Algorithms115 Rosen Miletiev*, Emil Iontchev**, Rumen Yordanov* * Technical University of Sofia, Faculty of Telecommunications, Bulgaria ** Higher School of Transport "T. Kableshkov", Bulgaria
Analysis of Changes in the Probability of an Incident with Information Security
Forecasting the Volume of Postal Services using Savitzky-Golay Filter Modification
Criteria for the Existence of a Sustainable Limit Cycle. Application of the Criteria in the First Approximation for the Van der Pol Equation
Crowd-Sourcing: Citizens as Scientists for Air Pollution Monitoring

ANTENNAS I AND CONTROL SYSTEMS

Regular papers:

Improving an antenna radiation pattern using photonic band gap structure......137 Ivaylo Nachev and Ilia Iliev

Technical University of Sofia, Faculty of Telecommunications, Bulgaria

A Novel Deep Neural Network Based Antenna Selection Architecture for Spatial Modulation Systems141
ilker Ahmet Arslan* and Gökhan Altin** * Hezarfen Aeronautics and Space Technologies Institute, National Defence University, İstanbul, Turkey ** Department of Electronic Eng., Turkish Air Force Academy, National Defence University, İstanbul, Turkey
Application of Artificial Neural Networks for Modeling of the Frequency-Dependent Performance of Surface Acoustic Wave Resonators
Aperture-Coupled Microstrip Patch Antenna Design using FEM Simulation Technique149 Diana B. Petkova and Peter Z. Petkov Technical University of Sofia, Faculty of Telecommunications, Bulgaria
Research and selection of parameters determining the efficiency of the braking system of cars to improve traffic safety and environmental performance

RADIO COMMUNICATIONS, MICROWAVES, ANTENNAS II

Posters:

Approximations for ITU Rain Model using Machine Learning	9
Prediction of Radio Wave Attenuation due to Cloud using Machine Learning Techniques	3
Wireless channel prediction using ensemble of Extreme Learning Machines	7
Development and Study of a Small Radar17 Ludwig Lubich, Ivo N. Dochev, Lilyana E. Docheva, Stoycho V. Manev Technical University of Sofia, Faculty of Telecommunications, Bulgaria	1
Investigation of the interference in signal transfer between different cable operators in CATV/HFC interlaced cable distribution networks	5

ENGINEERING EDUCATION, ENERGY SYSTEMS AND EFFICIENCY I

Regular	· papers:	
	Integration of New RES in Power System of North Macedonia	181
	The Impact of Industry 4.0 on Education and Future Jobs	185
	Electomagnetic Analysis of Synchronous Generator	189
	Application of Matlab Tool for Analysis of Complex Grounding Systems of Overhead Power	
	Lines	193
	Optimal Utilization of UPQC at Different Operating Condition Using TLBO Swati Gade*, Rahul Agrawal*, Dipak Patil*, Svetlin Antonov** * Sandip University, Faculty of Electrical Engineering, India ** Technical University of Sofia, Faculty of Telecommunications, Bulgaria	197
	Reception of audio signals received from different LEDs used in the low cost LI-FI systems Tsvetan Valkovski, Kalin Dimitrov * Technical University of Sofia, Faculty of Telecommunications, Bulgaria	201
	Monitoring of disk brakes vs drum brakes using infrared thermography. Valentin Terziev*, Tsvetan Valkovski*, Kalin Dimitrov*, Iliyan Damyanov** * Technical University of Sofia, Faculty of Telecommunications, Bulgaria ** Technical University of Sofia, Faculty of Transport, Bulgaria	205
	ENGINEERING EDUCATION, ENERGY SYSTEMS AND EFFICIENCY II	
Posters	: An Approach to Application of the Event Tree Analysis for Electrical Safety Risk Assessment	211
	Marinela Y. Yordanova Medical University of Varna, Faculty of Public Health, Bulgaria	
	Application of the Situational Teaching Method in the Electrical Safety Education	215
	Formal Method for Finding Asymptotic Approximations Kostadin G. Sheiretsky* and Svetlin Antonov** * University of National and World Economy, Faculty of Applied Informatics and Statistics, Bulgaria ** Technical University of Sofia, Faculty of Telecommunications, Bulgaria	217
	Using simulation modeling to study overvoltages in the electrical networks	221
	Analysis of Amplitude Modulation and Demodulation in MATLAB Simulink Environment Lyubomir B. Laskov and Veska M. Georgieva Technical University of Sofia, Faculty of Telecommunications, Bulgaria	223

Research and Analysis of Faults in Medium Voltage Distribution Grids	
Study of Hydrogen Production by Electrolysis of Spring Waters from Bulgaria	231
The Effect of Acute Stress on the Performance of Students in Engineering Education	235
On the Minimal Fire Power for Heat Detection Ivan Trushev*, Shima Sehati**, Dipak Patil*** * Technical University of Sofia, Faculty of Automatics, Bulgaria ** Technical University of Sofia, Faculty of Telecommunications, Bulgaria *** Sandip Institute of Engineering and Management, Faculty of Electronic and Telecommunication Engineering, India	239