



*International Scientific Conference of Communications,
Information, Electronic and Energy Systems*

Accepted papers

25-27 November, 2021
Ruse, Bulgaria



CIEES 2021 Acceptance Rate

The conference programme of this year's edition consists of 3 special session and 7 tracks for refereed research papers. The conference attracted submissions from 166 distinct authors from 14 countries spanning three continents. Submissions were rigorously reviewed by an International Scientific Committee (ISC) and external reviewers. A total of 208 reviews were provided, with each paper receiving at least two reviews. During the discussion phase, ISC members and the Programme Committee (PC) members discussed the reviews in detail. The rebuttals from the authors were also seriously considered. For consistency across tracks, final decisions on papers were made at the face-to-face PC meeting between the Organizing Committee chairs and the PC chairs. The decision to accept a paper was entirely based on quality and not its length.

This year's CIEES 2021 conference has received a record high number of submissions, as can be seen from the following statistics:

- 136 abstracts submitted;
- 104 full papers submitted;
- 76 papers accepted for presentation;
- 73.07% acceptance rate.

We hope that you learn from and enjoy CIEES 2021 and participate actively in this hybrid conference.

Teodor ILIEV
General Conference Chair

Ivaylo STOYANOV
General Conference Chair

Authors Countries (in alphabetical order)



TOPICS:

- Telecommunication
- Information Technologies
- Electronics
- Industrial Design
- Smart Grid Systems
- Energy and Renewable Sources
- Smart Farming

- Special session 1: Spatial Information Fusion
- Special session 2: Advanced Transport Systems and Vehicle Engineering
- Special session 3: Digital Transformation within Big Data Environment

CIEES 2021 ACCEPTED PAPERS

ID	Title	Author(s)
4	Cloud computing security requirements: A Review	G Tsochev ¹ , R Trifonov ¹ ¹ <i>Technical University of Sofia, Bulgaria</i>
6	Smart Contracts based on Hyperledger Fabric Blockchain for the Purpose of Health and Life Insurance Services	V Aleksieva ¹ , H Valchanov ¹ ¹ <i>Technical University of Varna, Bulgaria</i>
7	Application of GPS-Based Information System in Studying Dynamic Properties of Vehicles	D Lyubenov ¹ , T Balbuzanov ¹ , O Dinolov ¹ ¹ <i>University of Ruse, Bulgaria</i>
10	Comparative analysis of ZigBee, 6LoWPAN and BLE technologies for the Internet of Things	A Haka ¹ , D Dinev ¹ , V Aleksieva ¹ , H Valchanov ¹ ¹ <i>Technical University of Varna, Bulgaria</i>
12	Analysis of the Load of Technical Equipment in Robotic Modules	I Peeva ¹ , C Kostadinov ² , P Vitliemov ¹ ¹ <i>University of Ruse, Bulgaria</i> ² <i>"G. S. Rakovski" National Defence College, Bulgaria</i>
13	Graphic Design of Interactive Interfaces	K Drumeva ¹ ¹ <i>St. Cyril and St. Methodius University, Bulgaria</i>
14	Dynamic Stabilization-based Trajectory Planning For Drones	A Ajami ¹ , J Sawma ¹ , J El Maalouf ¹ ¹ <i>Université Saint Joseph de Beyrouth, Lebanon</i>
15	A Model Based on Current Harmonics for Controlling the Induction Motor of a Crusher	T Hristova ¹ ¹ <i>University of Mining and Geology "St. Ivan Rilski", Bulgaria</i>
17	Numerical modeling of the airflow behavior affected by the windbreak trees in semi-flat terrains	A Terziev ¹ , G Pitchurov ¹ , Y Panteleev ¹ ¹ <i>Technical University of Sofia, Bulgaria</i>
18	Impact of Selected Teleconnection Pattern on Solar Energy Potential in Different Climatic Zones of Nigeria	O F Awe ^{1,2} , S T Ogunjo ³ , A B Rabi ¹ , O J Ajanaku ^{1,2} , I D Ijila ^{1,2} ¹ <i>National Space Research & Development Agency, Nigeria</i> ² <i>Osun State University, Nigeria</i> ³ <i>Federal University of Technology Akure, Nigeria</i>
19	Numerical modelling of thermal conduction processes in the fins of two-stage "water to air" heat exchanger	Z Kolev ¹ , S Kadirova ¹ ¹ <i>University of Ruse, Bulgaria</i>

CIEES 2021 ACCEPTED PAPERS

ID	Title	Author(s)
23	Flexible Access Network Design for Futuristic Mobile 5D Communications and Services	V Stoynov ¹ , A Ivanov ¹ , D Mihaylova ¹ ¹ <i>Technical University of Sofia, Bulgaria</i>
25	On Change Detection and Process Diagnosis based on Information and Frequency Domain Models	D Aiordachioaie ¹ ¹ <i>Dunarea de Jos University of Galati, Romania</i>
27	Simulation, Modelling and Analysis of a Series Oscillating Circuit	V Ivanov ¹ ¹ <i>University "Prof. D-r Asen Zlatarov", Bulgaria</i>
30	Modeling Techniques of Electricity Consumption Forecasting	V Shendryk ¹ , Y Parfenenko ¹ , S Tymchuk ² , Y Kholiavka ¹ , Y Bielka ¹ ¹ <i>Sumy State University, Ukraine</i> ² <i>Kharkiv Petro Vasilenko National Technical University of Agriculture, Ukraine</i>
31	Development of New Fault Evaluation Procedure for Thermography in the Field	J Fantidis ¹ , G Tsakalos ¹ , K. Karakoulidis ¹ ¹ <i>International Hellenic University, Greece</i>
33	Discrete Event Models for Railway Traffic Control	C Ciufudean ¹ , C Buzduga ¹ ¹ <i>"Stefan cel Mare" University, Romania</i>
35	Development of Three-Dimensional Models of the Spread of Pollution on Agricultural Land in Industrial Cities	N Kulenova ¹ , M Toguzova ¹ , Z Assylkhanova ¹ , A Mamysheva ¹ , M Sadenova ¹ , M Rakhymberdina ¹ ¹ <i>D. Serikbayev East Kazakhstan Technical University, Republic of Kazakhstan</i>
37	Types of Smart Systems and their Application in Power Grids	M Mehmed-Hamza ¹ , A Filipov ¹ , M Ivanova ² ¹ <i>Medical University of Varna, Bulgaria</i> ² <i>Technical University of Varna, Bulgaria</i>
39	Applicability Assessment of Energy Detection Spectrum Sensing in Cognitive Radio based Ultra-Dense Networks	A Ivanov ¹ , V Stoynov ¹ , D Mihaylova ¹ , V Poulkov ¹ ¹ <i>Technical University of Sofia, Bulgaria</i>
41	Connectivity in Sensor Networks	F Tsvetanov ¹ ¹ <i>South-West University, Bulgaria</i>
42	Assessment of Energy Efficiency of a Motor Yacht Depending on Routes and Sailing Area	G Ivanova ¹ , V Gyurov ¹ ¹ <i>Technical University of Varna, Bulgaria</i>
43	Study on Technical Solutions for Shore Power Supply of Motor Yacht	V Gyurov ¹ , G Ivanova ¹ ¹ <i>Technical University of Varna, Bulgaria</i>

CIEES 2021 ACCEPTED PAPERS

ID	Title	Author(s)
44	Analysis of the Attenuation of Electromagnetic Fields Strength Using Spectrum Analyzer in the Area of University Campus II, Kavala, Greece	M Malamatoudis ¹ , P Kogias ¹ <i>¹International Hellenic University, Greece</i>
46	Sensor Network Hardware Security	F Tsvetanov ¹ <i>¹South-West University, Bulgaria</i>
48	Voice Analysis for Personal Identification Using FFT, Machine Learning and AI Techniques	I Balabanova ¹ , G Georgiev ¹ , B Karapenev ¹ , V Rankovska ¹ <i>¹Technical University of Gabrovo, Bulgaria</i>
49	Synthesis of Classification and Predictive FFNN Models on the Basis of Tenzoresistive Transducer Data	I Balabanova ¹ , S Sadinov ¹ , D Daskalaki ¹ , G Georgiev ¹ <i>¹Technical University of Gabrovo, Bulgaria</i>
52	Overview of Methods and Technologies Used for Smart Management of Pastures and Meadows	K Gabrovska-Evstatieva ¹ , B Evstatiev ¹ <i>¹University of Ruse, Bulgaria</i>
53	The Operation Optimizing Experience for a High-intensity Closed Water Circulation Aquabiofarm Based on a Combination of Digital Twin Technologies and the Industrial Internet of Things	M Zhabitskii ¹ , Y Andryenko ¹ , A Josanov ² , V Malyshev ² <i>¹National Research Nuclear University, Russian Federation</i> <i>²JSC "Paninskoe", Russian Federation</i>
59	Assessment of the Cumulative Combustion Pressure in the IC Engine	L. Sitnik ¹ , R Wróbel ¹ , M Andrych-Zalewska ¹ , Z Ivanov ² , R Dimitrov ² , V Mihaylov ² <i>¹Wroclaw University of Science and Technology, Poland</i> <i>²Technical University of Varna, Bulgaria</i>
60	Design of ICT Prototype for Big Data Economic Analysis	I Balabanova ¹ , B Karapenev ¹ , V Rankovska ¹ , G Georgiev ¹ <i>¹Technical University of Gabrovo, Bulgaria</i>
63	Building Expert Maps for Ergonomic, Compositional and Colour Scheme Evaluation of Machine Control Panels	A Bankova ¹ <i>¹Technical University of Varna, Bulgaria</i>
64	Investigation on the Influence Large – Scale Sliding Valve Support Relative Positions Have on their Performance	A Bankova ¹ <i>¹Technical University of Varna, Bulgaria</i>
67	Cloud Based System for Reservation of Medical Appointments	V Aleksieva ^{1*} , H Valchanov ¹ , M Vangelova ¹ <i>¹Technical University of Varna, Bulgaria</i>

CIEES 2021 ACCEPTED PAPERS

ID	Title	Author(s)
68	Physical Layer Security Methods against Eavesdropping on the Far User by the Near User in NOMA Networks – a Comparison	D Mihaylova ¹ , I Kuzmanova ¹ , V Stoynov ¹ , A Ivanov ¹ , Z Valkova-Jarvis ¹ , G Iliev ¹ <i>¹Technical University of Sofia, Bulgaria</i>
70	Statistical Models Expressing Relations Between Soil Moisture, Aggregate Speed, and Tillage Depth at Plowing and Cultivation	P Veleva ¹ , G Hristova ¹ <i>¹Trakia University, Bulgaria</i>
71	Use of Optical Approaches to Improve Microscopic Imaging of Wood Samples	T Valkovski ¹ , N Christoff ¹ <i>¹Technical University of Sofia, Bulgaria</i>
74	Evaluation of the Behavior of an Induction Motor for Fan System under Various External Factors	S Rachev ¹ , L Dimitrov ¹ <i>¹Technical University of Gabrovo, Bulgaria</i>
77	Statistical Approach and Multiplicative Models for Electric Vehicles Charging Behavior Patterns	D Y Koeva ¹ <i>¹Technical University of Gabrovo, Bulgaria</i>
78	A Mathematical Model for the Virtual Simulator of the Power Unit Electrical Part	P Baran ¹ , Y Varetsky ¹ , V Kidyba ¹ , Y Pryshliak ¹ <i>¹Lviv Polytechnic National University, Ukraine</i>
79	Modern Materialistic Understanding of the “Energy” Notion and the Method of its Systemic Evaluation in Chemicals	O S Sirotkin ¹ and R O Sirotkin ¹ <i>¹Kazan State Power Engineering University, Russian Federation</i>
80	Study Heat Exchange in Porous Structures	A Genbach ¹ , H Beloev ² , D Bondartsev ¹ , N Genbach ¹ <i>¹Almaty University of Energy and Communications, Republic of Kazakhstan ²University of Ruse, Bulgaria</i>
81	Heat Transfer for the Boiling Crisis in Porous Systems	A Genbach ¹ , H Beloev ² , D Bondartsev ¹ , N Genbach ¹ <i>¹Almaty University of Energy and Communications, Republic of Kazakhstan ²University of Ruse, Bulgaria</i>
82	RFID Tracking System for the Basketball Game	L A Szolga ¹ , J Szocs ¹ <i>¹Technical University of Cluj-Napoca, Romania</i>
84	Smart Car Parking System Developed on IoT	L A Szolga ¹ , S Laza ¹ <i>¹Technical University of Cluj-Napoca, Romania</i>

CIEES 2021 ACCEPTED PAPERS

ID	Title	Author(s)
88	System for Remote Visualization and Control of Data from Low Voltage Power Supply Grids	K Angelov ¹ , S Sadinov ¹ ¹ <i>Technical University of Gabrovo, Bulgaria</i>
90	Influence of the Efficiency of Optical Conversion Modules on the Performance in Passive Optical Networks	K Angelov ¹ , S Sadinov ¹ , P Kogias ² ¹ <i>Technical University of Gabrovo, Bulgaria</i> ² <i>International Hellenic University, Greece</i>
94	Comparative Evaluation of Traffic Load Balancing and QoS in SDN Networks	D Todorov ¹ , H Valchanov ¹ , V Aleksieva ¹ ¹ <i>Technical University of Varna, Bulgaria</i>
97	Machine Learning Prediction of Solar Energy Potential in Nigeria	S Ogunjo ¹ , O Aderonke ² , B Rabi ² ¹ <i>Federal University of Technology, Nigeria</i> ² <i>National Space Research and Development Agency, Nigeria</i>
98	Application of Images Segmentation and Median Filter for White Brined Cheese Structure Evaluation	A Bosakova-Ardenska ¹ , M Kutryanska ¹ , P Boyanova ¹ , P Panayotov ¹ ¹ <i>University of Food Technologies, Bulgaria</i>
101	Optimization Techniques for p-GTO Thyristor Design	M Cristea ¹ , F Babarada ¹ ¹ <i>University Politehnica of Bucharest, Romania</i>
102	Analysis of Methods for Assessing the Energy Efficiency of Data Centers Using the Power Usage Effectiveness Method	R Uanov ¹ , A Begimbetova ² ¹ <i>Satbayev University, Republic of Kazakhstan</i> ² <i>Almaty University of Energy and Communications, Republic of Kazakhstan</i>
103	Mobility patterns as contributors to Covid-19 spread in Croatia	H Kalaminec ¹ , I Popović ¹ , R Spudić ¹ , R Filjar ² ¹ <i>Krapina University of Applied Sciences, Croatia</i> ² <i>University of Rijeka, Croatia</i>
104	Virtual Instrument for Measuring the Operational Characteristics of Hydrogen-Powered Hybrid Vehicles	S Penchev ¹ , P Daskalov ¹ , T Georgieva ¹ , V Pencheva ¹ , A Asenov ¹ ¹ <i>University of Ruse, Bulgaria</i>
105	Employee Turnover Reduction by Analyzing Textual Data with SPARK	S Yordanova ¹ , D Kabakchieva ¹ ¹ <i>University of National and World Economy, Bulgaria</i>
106	Investigation of a Gasoline Engine Working with Different Compression Ratio and Fueled with Ethanol Additives	S Iliev ¹ ¹ <i>University of Ruse, Bulgaria</i>

CIEES 2021 ACCEPTED PAPERS

ID	Title	Author(s)
107	Examination of rotor excavator ropes for environmental safety workers in the coalmines of Kosovo	N Baftiu ¹ , R Bytyqi ² , V Sofiu ³ ¹ University "Ukshin Hoti", Kosovo ² Rezonance College, Kosovo ³ Kolegji UBT, Kosovo
110	Control Analysis of a Bi-motor Electric Traction System for Energy and Performance Optimization	L Popescu ¹ , L Melcescu ¹ , L Dumitran ¹ , A Crăciunescu ¹ , A Stănescu ¹ ¹ University Politehnica of Bucharest, Romania
111	Roads for Farming Territories Optimization for Price and Smart Quality	A Nebylov ¹ , V Nebylov ² ¹ State University of Aerospace Instrumentation, Russia ² International Institute for Advanced Aerospace Technologies of SUAI, Russia
114	NLA-Layer: A New Data Structure for Storing of Dynamic (Streaming) Data	K Ivanova ¹ ¹ University of Telecommunications and Post, Bulgaria
118	Models and Methods of Digital Mechanisms in Anti-Corruption, their Advantages and Disadvantages, and Applications	A Nurkey ¹ , A Mukasheva ² , D Yedilkhan ³ ¹ Academy of the Public Administration, Republic of Kazakhstan ² Almaty University of Power Engineering and Telecommunications ³ Astana IT University, Republic of Kazakhstan
119	Predictive Pricing Models to Classify Potential Customers Using Data-driven Approaches	D Yedilkhan ¹ , A Mukasheva ² ¹ Astana IT University, Republic of Kazakhstan ² Almaty University of Power Engineering and Telecommunications, Republic of Kazakhstan
120	Doping a Bi Atom in Silicene Nanoribbons in The Presence of an External Electric Field	H V Ngoc ¹ ¹ Thu Dau Mot University, Vietnam
121	An Approach for Point-to-Point Link within Mobile Network Coverage	G Mihaylov ¹ , T Iliev ² , E Ivanova ² , I Stoyanov ¹ ¹ University of Telecommunications and Post, Bulgaria ² University of Ruse, Bulgaria
122	Optimization of the Operation of Dokan Hydropower Development using Cuckoo Search Algorithm	K A Rashid ¹ ¹ University of Sulaimani, Iraq
125	An Approach to Design a Semi-automated Assembly Line for the Automotive Industry Implementing the Lean 4.0 Concept	K Markov ¹ , P Vitliemov ¹ ¹ University of Ruse, Bulgaria

CIEES 2021 ACCEPTED PAPERS

ID	Title	Author(s)
126	Multi-sensor Configurations in Data Fusion Systems	P Nikovski ¹ ¹ University of food technologies, Bulgaria
127	Electrical Contact Resistance of 3D Printed Conductive Elastomer Material	M Ralchev ¹ , V Mateev ¹ , I Marinova ¹ , R Tzeneva ¹ ¹ Technical University of Sofia, Bulgaria
128	DC Electric Arc Discharge Acoustic Spectrum Analysis by Computer Measurement System	M Ralcheva ¹ , V Mateev ¹ , I Marinova ¹ ¹ Technical University of Sofia, Bulgaria
129	Investigation of a GDI Engine Working with Methanol Blends	S Iliev ¹ ¹ University of Ruse, Bulgaria
130	Quantitative Measures for Classification of Human Upper Body Posture in Video Signal to Improve Online Learning	M Horvat ¹ , D Doljanin ¹ , T Jaguš ¹ ¹ University of Zagreb, Croatia
131	Research and Justification of Running Wheels Tire Parameters of Bridge-Type Transport Energy Vehicle	H Beloev ¹ , V Bulgakov ² , V Kuvachov ³ , V Adamchuk ⁴ , V Kaminskiy ⁵ , S Ivanovs ⁶ ¹ University of Ruse, Bulgaria ² National University of LES, Ukraine ³ Dmytro Motornyi Tavria, Ukraine ⁴ Institute of MEA, Ukraine ⁵ Institute of Agriculture of NAAS, Ukraine ⁶ University of LST, Latvia
133	Optimization of a Complex Hydropower Development Operation using HEC-ResSim	E I Tică ¹ , K A Rashid ² , O V Sima ¹ , F Popa ³ , O Nedelcu ³ , B Popa ¹ ¹ University Politehnica of Bucharest, Romania ² University of Sulaimani, Iraq ³ University Valahia of Târgoviște, Romania
134	Analysis of the Efficiency of the Ziegler-Nichols Optimization Method for Closed Circuit in the Management of a Robotic System at Different Trajectories	A Anchev ¹ , T Georgieva ¹ , A Ivanov ¹ ¹ University of Ruse, Bulgaria
135	Evaluation of the Possibility for Analysis of Wind Current on Complex Terrain using Several Meteorological Masts	Y Panteleev ¹ , A Terziev ¹ , I Iliev ² , M Ivanov ¹ ¹ Technical University of Sofia, Bulgaria ² University of Ruse, Bulgaria
136	Kinematics of the Crank System of the Internal Combustion Engine	L Sitnik ¹ , R Wróbel ¹ , M Andrych-Zalewska ¹ , Z Ivanov ² , R Dimitrov ² , V Mihaylov ² ¹ Wroclaw University of Science and Technology, Poland ² Technical University of Varna, Bulgaria