Technical University of Sofia

Faculty of Computer Systems and Technologies

P R O G R A M

2022 10th International Scientific Conference

COMPUTER SCIENCE

30 May – 2 June 2022

organized by

the Faculty of Computer Systems and Technologies

Technical University of Sofia

IEEE Bulgaria Section

IEEE

Advancing Technology for Humanity

in cooperation with

Computer Engineering Department,

Akdeniz University, Turkey

The 2022 10th International Scientific Conference "Computer Science", organized by the Faculty of Computer Systems and Technologies at the Technical University of Sofia, Bulgaria, continues the tradition of a series of nine conferences organized between 2004 and 2020 as a scientific forum to present a discussion of innovative ideas, concepts and technologies in the field of computer science, computer and software engineering, information technology and their application. Participation in the conference of researchers from different countries stimulates the building of a scientific community and encourages interaction and international cooperation.

The 2022 10th International Scientific Conference "Computer Science" is part of the "Science Days of TU-Sofia" forum.

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2022 10th International Scientific Conference COMPUTER SCIENCE, 30 May – 2 June, Sofia, Bulgaria	
Monday, 30th May 2022 **Conference Hall of the Library and Information Center, Technical University of Sofia** **Virtual MS Teams meeting**	
9:00 – 10:00	Registration (Library and Information Center of the Technical University of Sofia, 4th floor
10:00 – 10:30	Official Conference Opening
10:30 – 12:00	Plenary Session, Invited talks
12:00 – 13:00	Lunch Break
13:00 – 14:00	Plenary Session, Invited talks
14:00 – 14:30	Coffee break
14:30 – 16:30	Center of Excellence and Research Projects Workshop
Tuesday, May 31st, 2022 **Hall 1434, Technical University of Sofia** **Virtual MS Teams meeting**	
10:00 – 11:30	Section "Artificial Intelligence, Robotics And Control", Session 1
11:30 – 12:00	Coffee break
12:00 – 13:30	Section "Artificial Intelligence, Robotics And Control", Session 2
13:00 – 14:00	Lunch break
14:00 – 15:30	Section "Artificial Intelligence, Robotics And Control", Session 3
Wednesday, June 1st, 2022 **Hall 1434, Technical University of Sofia** **Virtual MS Teams meeting**	
10:00 – 11:30	Section "Software Technologies and Applications Systems" & "Software Engineering"
11:30 – 12:00	Coffee break
12:00 – 13:00	Section "Cyber Security And Cyber Protection"
13:00 – 14:00	Lunch break
14:00 – 15:30	Section "Education 4.0"
15:30 – 16:00	Coffee break
16:00 – 16:30	Section "Smart Cities and Smart Society"
Thursday, June 2nd, 2022 **Hall 1434, Technical University of Sofia** **Virtual MS Teams meeting**	
10:00 – 13:00	Poster Session, Section "Artificial Intelligence, Robotics And Control"
13:00 – 14:00	Lunch break
14:00 – 16:30	Poster Session, Sections "Data Structures and Storage, Cloud and Block Chain Technologies", "High Technology Management", "Renewable and Green Energy", "Software Technologies and Applications Systems"
17:00	Official Conference Closing Ceremony

Link for Virtual MS Teams meeting:

https://teams.microsoft.com/l/meetup-join/19%3aTr-YPIKzZoEp3gDlXC_XttnfK9X-6scB00wJcpJVOc41%40thread.tacv2/1653389025293?context=%7b%22Tid%22%3a%227feeb5c0-34f4-4a4b-8cc0-e59f06920156%22%2c%220id%22%3a%226a932676-d9f2-42ef-943f-cad9f37b156a%22%7d

Monday, May 30th, 2022

9:00 – 10:00   Registration

Library and Information Center of the Technical University of Sofia, 4th floor

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10:00 – 10:30

Official Conference Opening

Chair: Prof. Valeri Mladenov

Conference Hall of the Library and Information Center, Technical University of Sofia and virtual MS Teams meeting

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10:30 – 12:00

Plenary Session, Invited talks

Chair panel: *Prof. Valeri Mladenov, Prof. Milena Lazarova*

Conference Hall of the Library and Information Center, Technical University of Sofia

and virtual MS Teams meeting

A SYSTEM OF INDICATORS FOR EVALUATION OF THE DEGREE OF DIGITALIZATION OF THE UNIVERSITY

Acad. Prof. Hristo Beloev, Prof. Angel Smrikarov, Assoc. Prof. Valentina Voinohovska

"Angel Kanchev" University of Ruse, Bulgaria

SELF HEALING CYBERSECURE ENERGY SYSTEMS

Prof. Subham Sahoo

AAU Energy, Aalborg University, Denmark

12:00 – 13:00   Lunch Break

13:00 – 14:00

Plenary Session, Invited talks

Chair panel: **Prof. Milena Lazarova, Prof. Nikolay Hinov**

Conference Hall of the Library and Information Center, Technical University of Sofia and virtual MS Teams meeting

SCHEDULING TIME-CRITICAL APPLICATIONS IN CLOUD, FOG AND MIST COMPUTING ENVIRONMENTS – STATE OF THE ART AND RESEARCH CHALLENGES

Prof. Helen Karatza

Department of Informatics, Aristotle University of Thessaloniki, Greece

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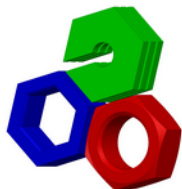**14:00 – 14:30   Coffee Break**

14:30 – 16:30

National Centre of Excellence Universities for ScieNce, Informatics and Technologies in e-Society (UNITe) Workshop

National Centre of Excellence HeritageBG Workshop

National Centre of Excellence of Mechatronics and Clean Technologies Workshop

Presentation of National Research Projects in TU-Sofia, funded by Bulgarian National Science Fund

Chair panel: **Prof. Milena Lazarova, Prof. Nikolay Hinov**

Conference Hall of the Library and Information Center, Technical University of Sofia and virtual MS Teams meeting

Tuesday, May 31st, 2022   Hall 1434, Technical University of Sofia and virtual MS Teams meeting

10:00 – 11:30   SECTION "ARTIFICIAL INTELLIGENCE, ROBOTICS AND CONTROL", Session 1

Chair: Prof. Rumen Trifonov

1. The voltage prediction of a buck converter using machine learning approaches
   Mirjana Kocaleva, Zoran Zlatev, Nikolay Hinov
2. CNN-based approaches for weed detection
   Aizhan Tlebaldinova Markhaba Karmenova, Elena Ponkina, Andrei Bondarovich
3. Risk optimization on husbandry management
   Todor Stoilov, Krasimira Stoilova
4. Image fusion and its denoisation by using a new fusion rule
   Tanima Ghosh Raghunath Ghosh

11:30 – 12:00   Coffee break

12:00 – 13:30   SECTION "ARTIFICIAL INTELLIGENCE, ROBOTICS AND CONTROL", Session 2

Chair: Prof. Rumen Trifonov

1. The use of intelligent methods to protect industrial systems
   Roumen Trifonov, Ognyan Nakov, Georgi Tsochev, Plamen Nakov
2. Analytical choice of an effective cyber security structure with artificial intelligence in industrial control systems
   Roumen Trifonov, Slavcho Manolov, Georgi Tsochev, Galya Pavlova, Kamelia Raynova
3. Comparative analysis of the interoperability assessment methods and approaches in the industry 4.0
   Ognyan Nakov, Roumen Trifonov, Galya Pavlova, Plamen Nakov
4. Artificial intelligence in content moderation – legal challenges and EU legal framework
   Ralitza Dimitrova

13:00 – 14:00   Lunch break

14:00 – 15:30   SECTION "ARTIFICIAL INTELLIGENCE, ROBOTICS AND CONTROL", Session 3

Chair: Prof. Milena Lazarova

1. Evolution of the concept of self-organization by the Founding fathers of A.I.
   Angel Marchev, Milena Piryankova
2. Optimization of packet transmission mechanism for multipath technologies
   Valentin Hristov, Aleksandar Hristov
3. Convolutional autoencoders for image comparison in printing industry quality control
   Stefan Angelov, Milena Lazarova
4. Collecting a custom database for image classification in recommender systems
   Maria Vlahova, Milena Lazarova

10:00 – 11:30   SECTION "SOFTWARE TECHNOLOGIES AND APPLICATIONS SYSTEMS" & "SOFTWARE ENGINEERING"

Chair: Prof. Georgi Popov

1. Unified national digital framework for exchange and storage of medical image information
   Ivan Evgeniev Ivanov, Borislav Ivanov

2. FPGA based edge detection: algorithm for integer division by a constant
   Dimitre Kromichev

3. "Metaverse" is a new ICT blockbuster
   Vesselin Gueorguiev, Desislava Georgieva

4. Column-oriented data model for data-intensive systems
   Simeon Emanuilov, Aleksandar Dimov

5. Adaptation of seven-layered IoT architecture for energy efficiency management in smart house
   Milka Kutseva

11:30 – 12:00   Coffee break

12:00 – 13:00   SECTION "CYBER SECURITY AND CYBER PROTECTION"

Chair: Prof. Rumen Trifonov

1. Location spoofing threats on e-scooter sharing
   Ahmet Saim Yilmaz, Haydar Çukurtepe, Emin Kuǧu

2. Purdue model implementation in the shipping control systems
   Blagovest Belev

3. Vendor cybersecurity risk assessment in an autonomous mobility ecosystem
   Albena Tzoneva

13:00 – 14:00   Lunch break

14:00 – 15:30   SECTION "EDUCATION 4.0"

Chair: Prof. Daniela Gotseva

1. Understanding student loans in Uzbekistan
   Masuda Isaeva

2. The application of eXtended reality for learning in higher education
   Arbër Perçuku, Daniela Minkovska

3. Design of remote labs and experiments about embedded systems and robotics learning
   Ventsislav Nachev, Daniela Gotseva

4. Modern methods of training in national security through geographic information systems
   Kiril Anguelov, Radoslav Kostev

5. Methodology for teaching human resource information systems in the training of entrepreneurs
   Kiril Anguelov, Radoslav Kostev

6. Methodology for teaching supply chain management systems in the training of entrepreneurs
   Kiril Anguelov, Radoslav Kostev

15:30 – 16:00   Coffee break

16:00 – 16:30   SECTION "SMART CITIES AND SMART SOCIETY"

Chair: Prof. Rumen Trifonov

1. An overview of intelligent information transport management systems in rail and water transport
   Ivan Stankov, Varbinka Stefanova-Stoyanova, Georgi Tsochev

2. Innovative on-demand public transportation in Sofia - a conceptual overview of the algorithmic
   Angel Marchev, Nikolay Netoff, Kaloyan Haralampiev, Boyan Lomev, Kamen Spassov

Thursday, June 2ⁿᵈ, 2022   Hall 1434, Technical University of Sofia and virtual MS Teams meeting

POSTER SESSIONS

10:00 – 13:00   SECTION "ARTIFICIAL INTELLIGENCE, ROBOTICS AND CONTROL"

Chair: Assoc. Prof. Daniela Minkovska

1. Improving the accuracy of rapid antigen tests for Covid-19 using data mining and blood
   Georgi Popov, Antoaneta Popova, Ognyan Nakov

2. Improving predictions of long sequences by hyperparameter tuning
   Kiril Koparanov, Krasin Georgiev, Vasil Shterev, Daniela Minkovska

3. Output voltage estimation from ideal vs. real circuit parameters at buck DC – DC converter
   Zoran Zlatev, Nikolay Hinov

4. Application of GPU accelerated deep learning neural networks for Covid-19 recognition from X-ray scans
   Miroslav Nikolov, Georgi Tsenov, Ognyan Nakov, Milena Lazarova, Valeri Mladenov

5. Application of the multifactor quantitative method for determination of customs value of goods
   Antoaneta Popova, Kalina Semova

6. Application of machine learning techniques for software anomaly detection
   Veska Gancheva, Ognyan Nakov

7. Workflow for medical data classification and analysis
   Veska Gancheva, Violeta Todorova

13:00 – 14:00   Lunch break

14:00 – 16:30   SECTION "DATA STRUCTURES AND STORAGE, CLOUD AND BLOCK CHAIN TECHNOLOGIES

SECTION "HIGH TECHNOLOGY MANAGEMENT"

SECTION "RENEWABLE AND GREEN ENERGY"

SECTION "SOFTWARE TECHNOLOGIES AND APPLICATIONS SYSTEMS"

Chair: Assoc. Prof. Daniela Minkovska

1. Structure of resources in an enterprise IT organization subject to optimal defect detection
   Plamen Nakov

2. Comparative analysis of specialized standards and methods on increasing the effectiveness and role of PDCA for risk control in management systems
   Varbinka Stefanova-Stoyanova

3. Technological solution for "Green Hydrogen Park" for generation of hydrogen, options for its use and seasonal energy accumulation
   Varbinka Stefanova-Stoyanova

4. Technical, economic and political parameters of the north-south transport corridor in the Caspian region in the context of the development of green energy production
   Georgy Tchankov, Nikolay Hinov

5. An overview of software of design and simulation of photo voltaic systems
   Ivelina Hinova

6. Renewable energy sources - in search of ways to solve energy problems
   Mariana Vergieva

17:00

Official Conference Closing Ceremony

Chair: Prof. Valeri Mladenov

Conference Hall of the Library and Information Center, Technical University of Sofia and virtual MS Teams meeting

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