25th
INTERNATIONAL CONFERENCE
ON COMPUTER SYSTEMS
AND TECHNOLOGIES

CompSysTech '24

14-15 June 2024
University of Ruse
BULGARIA

P R O G R A M M E

"WORK,
   FINISH,
      PUBLISH"

Michael Faraday

♦ CONFERENCE OBJECTIVE

The CompSysTech'24 International conference is organised by THE BULGARIAN ACADEMIC SOCIETY OF COMPUTING and its ACM chapter BgASC. Its OBJECTIVE is to intensify the information exchange of the results in theoretical research and practical developments in this field. Its papers will be published in the ACM International Conference Proceedings Series.

CompSysTech'24 is organized under the patronage of the:
- Bulgarian Ministry of Education and Science;
- John Atanasoff Union of Automation and Informatics;
- University of Ruse "Angel Kanchev".

CompSysTech'24 is supported by the European Union-NextGenerationEU, through the National Recovery and Resilience Plan of the Republic of Bulgaria, project № BG-RRP-2.013-0001-C01.

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Emilia Golemanova	Bulgaria	Serguei Mokhov	Canada
Erika Nazaruka	Latvia	Snezhana Sulova	Bulgaria
Galina Ivanova	Bulgaria	Stavros Nikolopoulos	Greece
Galya Georgieva-Tsaneva	Bulgaria	Stoicho Stoichev	Bulgaria
Georgi Georgiev	Bulgaria	Svetlana Stefanova	Bulgaria
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Aneliya Ivanova (Bulgaria)

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Elitsa Ibryamova (Bulgaria)	Aleksandar Ivanov (Bulgaria)
Yuksel Aliev (Bulgaria)	Vasil Kozov (Bulgaria)

♦ TOPICS

1. **Computer Hardware.**
2. **Computer Software.**
3. **Application Aspects of Computer Systems and Technologies.**
4. **Educational Aspects of Computer Systems and Technologies (ICT-based educational technologies).**

Friday, 14ᵗʰ June 2024

14:30

O P E N I N G

WELCOME

Chair: **Galina Ivanova**

2Г.204, Hall Siemens
https://meet1.uni-ruse.bg/b/awu-zhk-ngm

OFFICIAL AWARD CEREMONY

Prof. Dr. Jinghui Yang
Professor of Intelligent Manufacturing at the school of Intelligent Manufacturing and Control Engineering in Shanghai Polytechnic University

PLENARY SESSION

Chair: **Tzvetomir Vassilev**

Room: 2Г.204, Hall Siemens
https://meet1.uni-ruse.bg/b/awu-zhk-ngm

Candelaria Hernández Goya
Associate Professor, University of La Laguna, Spain

Keynote on:
Refining Security: Innovations in Cryptographic Protocols for Secure Solutions

António José Mendes
Associate Professor, Department of Informatics Engineering, Faculty of Sciences and Technology, University of Coimbra, Portugal

Keynote on:
Computer Science Education Research - Key Areas and Current Research

Maya Dimitrova
Professor, Institute of Robotics, Bulgarian Academy of Sciences

Keynote on:
Psychosocial and Psychophysical Aspects of the Interaction with Humanoid Robots: Implications for Education

DISCUSSIONS

PROGRAMME SUMMARY

Saturday, 15th June 2024

9:00 – 10:30	**Session A** Number of papers: 6	**Session C** Number of papers: 7	**Session E** Number of papers: 6
10:30 – 11:00	**COFFEE BREAK**		
11:00 – 12:30	**Session B** Number of papers: 7	**Session D** Number of papers: 7	**Session F** Number of papers: 6
11:30 – 12:30	**Session G (School students)** Number of papers: 5		
15th June 13:30	**THE BEST PAPERS AWARDS** **2Г.204, Hall Siemens** **https://meet1.uni-ruse.bg/b/awu-zhk-ngm**		

Session A

Chair: **Anelya Ivanova**
Co-Chair: **Ngoc Hung Pham**
Scientific Secretary: **Yuksel Aliev**

Saturday, 15 June 2024
9:00 – 10:30
1.322 , https://meet1.uni-ruse.bg/b/pv2-7qf-jzv

NETWORK AND INFORMATION SECURITY

1. **Analysis of the Security Level of Information Systems and Methods for Detecting Network Anomalies**
   Besik Beridze and Mikheil Donadze
2. **ProtAIN: Protecting the Authenticity and Integrity Properties of NFT Images**
   Iosif Polenakis, Vasileios Vouronikos, Eftychia Kiafa, Maria Chroni and Stavros Nikolopoulos
3. **The Use of Blockchain Technology for the Validation and Certification of Competencies in Education**
   Marian Ileana and Angel Popgeorgiev
4. **Machine Learning Algorithms for Cyber Attack Detection And Classification**
   Johan Note, Erind Mullalli and Betim Cico
5. **Security and privacy enhancing framework for Social Media Influencers and Content Creators**
   Kia Finska, Antti Hakkala and Anne-Maarit Majanoja
6. **Third-Party Data Leaks and Dark Patterns in Finnish Political Websites**
   Panu Puhtila, Timi Heino and Sampsa Rauti

DISCUSSIONS

10:30 – 11:00
Coffee Break
1.311

Session B

Chair: **Anelya Ivanova**
Co-Chair: **Leon Rothkrantz**
Scientific Secretary: **Yuksel Aliev**

Saturday, 15 June 2024
11:00 – 12:30
1.322 , https://meet1.uni-ruse.bg/b/pv2-7qf-jzv

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

1. **Machine Learning Models for Advanced Air Quality Prediction**
   Zuhra Sadriddin, Remudin Reshid Mekuria and Mekia Shigute Gasoa
2. **Handwritten Text Recognition of Letters in Kyrgyz Language**
   Burul Shambetova, Ilgiz Zhumaev and Ruslan Isaev
3. **Expanding the Capabilities of Robot NAO to Enable Human-Like Communication with Children with Speech and Language Disorders**
   Anna Andreeva, Anna Lekova, Paulina Tsvetkova and Miglena Simonska
4. **Social Humanoid Robots as Assistive Technology for individuals with ASD – assessment of good practices**
   Snezhana Kostova and Anna Lekova
5. **Utilizing Machine and Deep Learning Techniques for Predicting Re-admission Cases in Diabetes Patients**
   Mekia Shigute Gaso, Remudin Reshid Mekuria, Al Khan, Mohammad Imtiyaz Gulbarga, Iskender Tologonov and Zuhra Sadriddin
6. **Authorship Profiling in Political Discourse on Twitter: Age and Gender Determination**
   Adam Skurla and Juraj Petrik
7. **Localization in cellular network using machine learning and fingerprint methods**
   Ngoc Hung Pham, Huy Dinh Nguyen, Dinh Thuan Nguyen, The Vinh La, Hai Tung Ta and Van Hiep Hoang

DISCUSSIONS

13:30
2Г.204, Hall Siemens,
https://meet1.uni-ruse.bg/b/awu-zhk-ngm

THE BEST PAPERS AWARDS

Session C

Chair: **Adriana Borodzhieva**
Co-Chair: **Levent Eren**
Scientific Secretary: **Elitsa Ibryamova**

Saturday, 15 June 2024
9:00 – 10:30
1.422.4 , https://meet1.uni-ruse.bg/b/cfg-8wo-xqo-pnf

COMPUTER SOFTWARE

1. **HPC Jobs Classification and Resource Prediction to Minimize Job Failures**
   Tariq Daradkeh, Gillian Roper, Carlos Alarcon Meza and Serguei A. Mokhov
2. **Transformation of Scientific Competitions in the Digital Age: Prospects of Expert System Automation in Kyrgyzstan**
   Bekzhan Torobekov, Almaz Arzybaev, Bibigul Koshoeva and Aigiuzel Bakalova
3. **Digital Tools for Medieval South Slavic Manuscripts Research**
   Detelin Luchev, Maxim Goynov, Desislava Paneva-Marinova, Radoslav Pavlov, Konstantin Rangochev and Lubomir Zlatkov
4. **Gamified Crowdsourcing in Support of the Semantic Transformation of Digital Libraries**
   Ivan Kratchanov and Detelin Luchev

IMAGE PROCESSING & VISUALIZATION

5. **Approaches for Object Detection and Depth Estimation in Digital Images**
   Kaloyan Yovchev and Lyubomira Miteva
6. **Design and implementation of wall-scale vector art drawing robot**
   Ruslan Isaev, Gulzada Esenalieva, Andrei Ermakov and Zhavlon Khamidov
7. **Developing an Artificial Intelligence Tool for Image Generation Using a Unique Dataset with Image-to-Image Functionality**
   Akbiike Toktosunova, Alymbek Ergeshov, Gulzada Esenalieva, Andrei Ermakov and Ruslan Isaev

DISCUSSIONS

10:30 – 11:00
Coffee Break
1.311

Session D

Chairs: **Desislava Baeva**
Co-Chair: **Mikheil Donadze**
Scientific Secretary: **Angel Popgeorgiev**

Saturday, 15 June 2024
11:00 – 12:30
1.422.4, https://meet1.uni-ruse.bg/b/cfq-8wo-xqo-pnf

APPLICATION ASPECTS OF COMPUTER SYSTEMS AND TECHNOLOGIES

1. **A Wavelet Based Hybrid Method for Time Interval Series Determining**
   Galya Georgieva-Tsaneva, Krasimir Cheshmedzhiev and Penio Lebamovski
2. **A Gaussian-based hybrid method for simulating photoplethysmographic signals**
   Galya Georgieva-Tsaneva and Krasimir Cheshmedzhiev
3. **Smartphone-based Bearing Fault Diagnosis in Rotating Machinery using Audio Data and 1D Convolutional Neural Networks**
   Cansu Celebioglu, Sertac Kilickaya and Levent Eren
4. **A Pressure Sensor-based Sleeping Posture Classification using SNN model combined with CNN feature extractor**
   Huy Hoang Nguyen, Ba Luan Dang, Thi Hue Dang and Duc Minh Nguyen
5. **Use Case Feasibility Study: Decentralized Identity on Blockchain for Cultural Heritage Artifacts**
   Ivan Lambov
6. **Enhancing Environmental Sound Recognition in Digital Simulations: A Novel Approach to Beamforming and Signal Identification**
   Stephen Stroud Stroud, Karl Jones, Gerard Edwards, Colin Robinson, Sebastian Chandler-Crnigoj and David Ellis
7. **Case study: LoRa/LoRaWAN as a suitable LPWAN choice for pressure and flow monitoring in Bulgarian water utility sector**
   Nikolay Milovanov

DISCUSSIONS

13:30
2Г.204, Hall Siemens,
https://meet1.uni-ruse.bg/b/awu-zhk-ngm

THE BEST PAPERS AWARDS

Session E

Chair: **Galina Ivanova**
Co-Chair: **Paola Shasivari**
Scientific Secretary: **Pavel Zlatarov**

Saturday, 15 June 2024
9:00 – 10:30
1.411.4, https://meet1.uni-ruse.bg/b/awu-zhk-ngm

EDUCATIONAL ASPECTS
OF COMPUTER SYSTEMS AND TECHNOLOGIES
(ICT-based Educational Technologies)

1. **Application of Natural Language Processing Technologies to Improve Accessibility of E-Learning Resources**
   Snezhana Sulova

2. **Microlearning-Inspired Approach for Teaching Business Modeling to Computer Engineering Students**
   Angel Popgeorgiev, Elitsa Ibryamova and Galina Ivanova

3. **Validation of Felder-Solomon Index of Learning Styles Questionnaire and Learning Style Preferences for the Mozambique Context**
   Geraldo Nhadumbuque, Anabela Gomes and Maria Jose Marcelino

4. **Criteria for Assessing the Quality of Educational Games and Their Impact on Student Learning Outcomes**
   Dim Shaiakhmetov, Remudin Reshid Mekuria, Gulnaz Gimaletdinova, Mohammad Imtiyaz Gulbarga, Zhenishbek Orozakhunov, Mohammad Tauheed Khan and Artur Davletshin

5. **Impacts of virtual tools on achieving course objectives in case of teaching engineering topics**
   Bayram Ashyrmyradovich Jumayev

6. **Enhancing educational resources through augmented reality-based assessment materials: a comprehensive study**
   Talgat Sembayev, Zhanat Nurbekova, Parassat Tazabekova, Kanagat Baigusheva and Dinara Naimanova

DISCUSSIONS

10:30 – 11:00
Coffee Break
1.311

Session F

Chair: **Galina Ivanova**
Co-Chair: **Besik Beridze**
Scientific Secretary: **Pavel Zlatarov**

Saturday, 15 June 2024
11:00 – 12:30
1.411.4,   https://meet1.uni-ruse.bg/b/awu-zhk-ngm

EDUCATIONAL ASPECTS
OF COMPUTER SYSTEMS AND TECHNOLOGIES
(ICT-based Educational Technologies)

1. **A MOOC for exam training mathematics using intelligent tutoring**
   Cyril Rothkrantz, Siska Fitrianie and Leon Rothkrantz

2. **Classification of Short Noisy Text**
   Emanuela Mitreva, Vladimir Georgiev and Alexandra Nikolova

3. **Virtual Reality Driving Simulation System For Left- And Right-Hand Traffic**
   Elitsa Bakalova

4. **Predicting bachelors students' academic performance**
   Aida Shasivari, Paola Shasivari and Einda Kajo Mece

5. **Predicting Higher Education Student's Aptitude to Learn to Program: A Systematic Literature Review**
   João Pires, Anabela Gomes, Ana Rosa Borges and Fernanda Brito Correia

6. **Enhancing Pedagogy with Generative AI: Video Production from Course Descriptions**
   Oshani Sisara Weerakoon, Ville Leppänen and Tuomas Mäkilä

Session G

Chairs: **Petar Kenderov**
Co-Chair: **Angel Smrikarov**
Scientific Secretary**: Syuzan Feimova**

Saturday, 15 June 2024
11:30 – 12:30
2Г.204, Hall Siemens, https://meet1.uni-ruse.bg/b/wde-g2z-3cj

1. **LearnLogic AI – assistant with artificial intelligence**
   Aleksandar Slavov, Syuzan Feimova

2. **WinSoft – educational platform with video calls**
   Nikolay Parishev, Aleksandar Slavov, Syuzan Feimova

3. **Legal Clinic**
   Lyuboslav Dimov, Nikola Velikov, Syuzan Feimova

4. **UniRank-Candidates ranking for university admission**
   Nikola Velikov, Todor Branzov, Syuzan Feimova

5. **Eco Adventure**
   Iva Vasileva, Syuzan Feimova

DISCUSSIONS

13:30
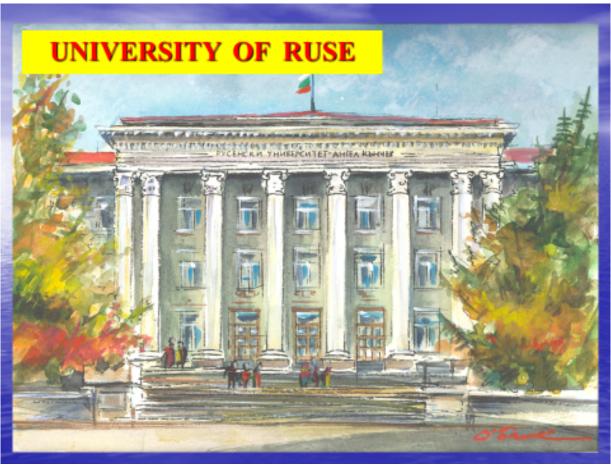**2Г.204, Hall Siemens,**
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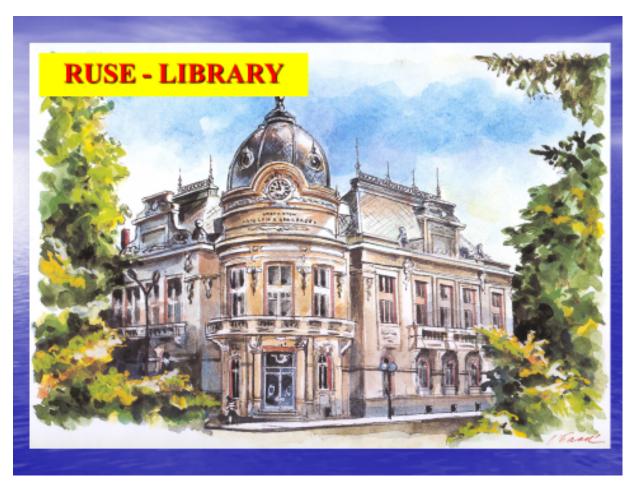
THE BEST PAPERS AWARDS

Saturday, 15th June 2024
13:30
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of the PROGRAMME COMMITTEE
and
the ORGANIZING COMMITTEE
will bestow
a CRYSTAL PRIZE
to the authors of the best papers.

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