IEEE Lviv Polytechnic Week

5th IEEE International Conference on Advanced Information and Communication Technologies (AICT) - 2023

Conference Program

Lviv, Ukraine
November 21-25, 2023
IEEE AICT-2023

ORGANIZERS
- IEEE Ukraine Section
- IEEE Ukraine Section COM Society Chapter
- Lviv Polytechnic National University, Ukraine

PARTNERS
- Ministry of Education and Science of Ukraine
- Cisco Networking Academy
- UkrTelecom

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Dr. Olha Shpur, Lviv Polytechnic National University
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Anatoliy Sachenko, West Ukrainian National University
Axel Sikora, HS Offenburg
Ivan Opirskyy, Lviv Polytechnic National University, Lviv, Ukraine
Sergiy Gnatyuk, National Aviation University, Kyiv, Ukraine
Oleksandra Yeremenko, Kharkiv National University of Radio Electronics, Kharkiv, Ukraine
Oleksandr Lemeshko, Kharkiv National University of Radio Electronics, Kharkiv, Ukraine
Roman Odarchenko, National Aviation University Kyiv, Ukraine
## CONFERENCE SECTIONS

<table>
<thead>
<tr>
<th>Section ID</th>
<th>Section Title</th>
<th>Number of accepted papers</th>
</tr>
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<tbody>
<tr>
<td>S1</td>
<td>Communications and Networking</td>
<td>11</td>
</tr>
<tr>
<td>S2</td>
<td>Internet of Things</td>
<td>14</td>
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<tr>
<td>S3</td>
<td>Intelligent Systems and Networks</td>
<td>13</td>
</tr>
<tr>
<td>S4</td>
<td>Information Encoding and Cybersecurity</td>
<td>10</td>
</tr>
</tbody>
</table>

**ACCEPTED PAPERS, TOTAL** 48

**SUBMITTED PAPERS, TOTAL** 92

**ACCEPTANCE RATE** 0,52

## TIME LIMITS

| Plenary session: up to 45 min | Regular sessions: up to 15 min |
# PROGRAM AT A GLANCE

<table>
<thead>
<tr>
<th>November 21 Tuesday</th>
<th>9:00-18:00</th>
<th>Day of Arriving</th>
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</thead>
<tbody>
<tr>
<td>November 22 Wednesday</td>
<td>9:00-9:30</td>
<td>Opening Remarks</td>
</tr>
<tr>
<td></td>
<td>9:30-10:15</td>
<td>Keynote Speech 1</td>
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<tr>
<td></td>
<td>10:15-12:00</td>
<td>Regular Session S1.1</td>
</tr>
<tr>
<td></td>
<td>12:00-12:15</td>
<td>Coffee Break</td>
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<tr>
<td></td>
<td>12:15-14:00</td>
<td>Regular Session S1.2</td>
</tr>
<tr>
<td></td>
<td>14:00-14:30</td>
<td>Lunch Time</td>
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<tr>
<td></td>
<td>14:30-16:45</td>
<td>Regular Session S2.1</td>
</tr>
<tr>
<td></td>
<td>16:45-17:00</td>
<td>Coffee Break</td>
</tr>
<tr>
<td></td>
<td>17:00-18:00</td>
<td>Poster Session Miscellaneous</td>
</tr>
<tr>
<td>November 23 Thursday</td>
<td>10:00-10:45</td>
<td>Keynote Speech 2</td>
</tr>
<tr>
<td></td>
<td>10:45-11:45</td>
<td>Regular Session S3.1</td>
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<td></td>
<td>11:45-12:00</td>
<td>Coffee Break</td>
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<tr>
<td></td>
<td>12:00-13:00</td>
<td>Regular Session S3.2</td>
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<td></td>
<td>13:00-14:00</td>
<td>Lunch</td>
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<tr>
<td></td>
<td>14:00-15:15</td>
<td>Regular Session S4.1</td>
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<td></td>
<td>15:15-15:30</td>
<td>Coffee Break</td>
</tr>
<tr>
<td></td>
<td>15:30-16:30</td>
<td>Regular Session S4.2</td>
</tr>
<tr>
<td></td>
<td>16:45-18:00</td>
<td>Poster Session Miscellaneous</td>
</tr>
<tr>
<td>November 24 Friday</td>
<td>10:00-11:00</td>
<td>Conference Final Session</td>
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</table>
CONFERENCE OPENING

Wednesday, November 22  

9:00 – 9:30

Link to the online meeting

Opening Remarks

1. Ivan Demydov, Vice-Rector of Lviv Polytechnic National University
2. Mykhailo Andriychuk, IEEE Ukraine Section Chapter Coordinator
3. Mykhailo Klymash, Lviv Polytechnic National University, Conference Chair
4. Taras Maksymyuk, IEEE Ukraine Section COM Society Chapter

KEYNOTE SPEECH

Wednesday, November 22  

9:30 – 10:15

Link to the online meeting

1. Andriy Luntovskyy, BA Dresden
   Protocols, Platforms and Case Studies for IoT and Industrial IoT
S1.1: Communications and Networking

Wednesday, November 22 10:15 – 12:00

Link to the online meeting

Chair:
Dr. Oleksandra Yeremenko

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Anatolii Lozhkovskyi</td>
<td>Research of Unsteady Flow Demands for Service Arrive in the Telecommunication Network</td>
</tr>
<tr>
<td>2.</td>
<td>Volodymyr Sokolov, Pavlo Skladannyi, Volodymyr Astapenya</td>
<td>Wi-Fi Interference Resistance to Jamming Attack</td>
</tr>
<tr>
<td>3.</td>
<td>Ruslan Politanskyi, Serhii Haliuk, Serhiy Tolyupa</td>
<td>Study of Information Flows in A Network Based on Exact Solutions</td>
</tr>
<tr>
<td>5.</td>
<td>Aijun Liu, Zixuan Chen, Orest Kochan, Pavlo Hamula</td>
<td>An Adaptive Spectrum Time Assignment in OFDM Datacenter Optical Networks</td>
</tr>
</tbody>
</table>
**S1.2: Communications and Networking**

Wednesday, November 22  
12:15 – 14:00

*Link to the online meeting*

**Chair:**  
Dr. Mykola Beshley

<table>
<thead>
<tr>
<th>No.</th>
<th>Authors</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Oleksandr Lemeshko, Oleksandra Yeremenko, Maryna Yevdokymenko, Artem Akulynichev, Valentyn Lemeshko, Mykhailo Persikov</td>
<td>Traffic Engineering QoS-Driven Disjoint Path Routing Model Research</td>
</tr>
<tr>
<td>2.</td>
<td>Volodymyr Sokolov, Pavlo Skladannyi, Nataliia Mazur</td>
<td>Wi-Fi Repeater Influence on Wireless Access</td>
</tr>
<tr>
<td>3.</td>
<td>Oleksandr Pliushch, Bohdan Zhurakovskiy, Mykhailo Klymash</td>
<td>Robust Control Channel of Unmanned Aerial Vehicle</td>
</tr>
<tr>
<td>4.</td>
<td>Maryan Kyryk, Nazar Pleskanka, Maryana Pleskanka</td>
<td>Adaptive Edge Compute Module in CDN Networks</td>
</tr>
<tr>
<td>5.</td>
<td>Yevhen Odarenko, Alexandr Shmat'ko, Yana Sashkova, Yevhen Demydenko, Vladyslav Novytskyi, Nataliia Shevchenko</td>
<td>Formation and Tuning of Frequency Comb-Like Signal in Photonic Crystal Coupled-Cavities Waveguides</td>
</tr>
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</table>
S2.1: Internet of Things

Wednesday, November 22 14:30 – 16:45

*Link to the online meeting*

Chair:
Dr. Taras Maksymyuk

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Virtual Reality Training Simulator for Weapons Shooting</td>
<td>Dmytro Fedasyuk, Vitalii Vorobiov</td>
</tr>
<tr>
<td>2.</td>
<td>AR Intelligent Real-time Method for Cultural Heritage Object Recognition</td>
<td>Oleh Pisnyi, Khrystyna Lipianina-Honcharenko, Jürgen Sieck, Anatoliy Sachenko, Maciej Dobrowolski, Grygoriy Sapozhnyk</td>
</tr>
<tr>
<td>3.</td>
<td>Intelligent Verbal Interaction Methods with Non-Player Characters in Metaverse Applications</td>
<td>Vladislav Pariy, Khrystyna Lipianina-Honcharenko, Ruslan Brukhanskyi, Anatoliy Sachenko, Fedir Tkachyk, Taras Lendiuk</td>
</tr>
<tr>
<td>5.</td>
<td>Disaster Recovery Solution for On-Premises Infrastructure Using Proxmox Backup Server</td>
<td>Marian Kyryk, Vasyl Pohranychnyi, Andrii Tarasenko, Serhii Zablotskyi</td>
</tr>
<tr>
<td>7.</td>
<td>A Method to Detect Suspicious Individuals through Mobile Device Data</td>
<td>Taras Fedynyshyn, Olha Mykhaylova, Ivan Opirskyy</td>
</tr>
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</table>
**Poster Session: Miscellaneous**

Wednesday, November 22  
17:00 – 18:00

*Link to the online meeting*

Chair:  
Dr. Taras Maksymyuk

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<thead>
<tr>
<th></th>
<th>Name</th>
<th>Title</th>
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<tbody>
<tr>
<td>1</td>
<td>Denys Balazh</td>
<td>Intelligent IoT Control System based on Hand Gesture Recognition</td>
</tr>
<tr>
<td>2</td>
<td>Maksym Mishakin</td>
<td>Extended Reality-Based Immersive User Interface for the Internet of Things Applications</td>
</tr>
<tr>
<td>3</td>
<td>Pavlo Vulchak, Stepan Dumych</td>
<td>IoT Data Collection and Processing System Using LoRaWAN Technology</td>
</tr>
<tr>
<td>4</td>
<td>Vitaliy Khomiak</td>
<td>LLM-Empowered Virtual Identities in the Metaverse</td>
</tr>
<tr>
<td>5</td>
<td>Dmytro Marchuk</td>
<td>DeepFake Content Detection using Advanced AI Solutions for FaceID</td>
</tr>
<tr>
<td>6</td>
<td>Andrii Pryhoda</td>
<td>Human Motion Tracking for Metaverse based on Wearable Sensors</td>
</tr>
</tbody>
</table>
### KEYNOTE SPEECH

**Thursday, November 23**  
**10:00 – 10:45**

*Link to the online meeting*

<table>
<thead>
<tr>
<th>1.</th>
<th>Dr. Mykola Beshley, Lviv Polytechnic National University</th>
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<tbody>
<tr>
<td></td>
<td>Intent-Based Networking</td>
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**S3.1: Intelligent Systems and Networks**

**Thursday, November 23**  
**10:45 – 11:45**

*Link to the online meeting*

**Chair:**  
Dr. Taras Maksymyuk

<table>
<thead>
<tr>
<th>1.</th>
<th>Viktoria Badz, Vasyl Teslyuk, Iryna Kazymyra, Iryna Rybak</th>
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<tbody>
<tr>
<td></td>
<td>Information Technology for Automating the Determination of the Statistical Profile of Ukrainian-Language Texts</td>
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<tr>
<th>2.</th>
<th>Yuliia Pyrih, Mykhailo Klymash, Olena Hordiichuk-Bublivska, Artur Cherkes</th>
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<tbody>
<tr>
<td></td>
<td>Investigating the Efficiency of Genetic Algorithm with Elite Strategy for TSP</td>
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<tr>
<th>3.</th>
<th>Yaroslav Stepaniak, Victoria Vysotska, Oksana Markiv, Lyubomyr Chyrun, Sofia Chyrun, Lyubomyr Pohreliuk</th>
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<tbody>
<tr>
<td></td>
<td>Technology of Text Content Topic Classification Based on Machine Learning Methods</td>
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<tr>
<td></td>
<td>Framework for Improving the Effectiveness of Discussions at English-Language Articles Analysis</td>
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<th>5.</th>
<th>Wenbin Xiao, Zhihua Yu, Can Zhou</th>
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<tbody>
<tr>
<td></td>
<td>Algorithm for Signal Intersection Phase Combination Through Considering Movement Lapping</td>
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<th>6.</th>
<th>Jianlong Feng</th>
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<tbody>
<tr>
<td></td>
<td>Self-supervised learning-based target-aware session recommendation algorithm</td>
</tr>
<tr>
<td></td>
<td>Title</td>
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<tr>
<td>2</td>
<td>Predicting the Effects of News on the Financial Market Based on Machine Learning Technology</td>
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<tr>
<td>3</td>
<td>Tone Analysis of Regional Articles in English-Language Newspapers Based on Recurrent Neural Network Bi-LSTM</td>
</tr>
<tr>
<td>4</td>
<td>Big Data Analysis for Startup of Supporting Ukraine Internet Tourism</td>
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<tr>
<td>5</td>
<td>Investigating the Efficiency of Tournament Selection Operator in Genetic Algorithm for Solving TSP</td>
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<tr>
<td>6</td>
<td>Field Cellular Automata Evacuation Model Considering Panic Emotions</td>
</tr>
<tr>
<td>7</td>
<td>Self-supervised learning recommendation algorithm based on meta-paths</td>
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## S4.1: Information Encoding and Cybersecurity

**Thursday, November 23**

14:00 – 15:15

[Link to the online meeting]

**Chair:**

Prof. Ivan Opirskyy

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<tr>
<th></th>
<th>Title</th>
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</thead>
</table>
| 1 | Maksym Pastushenko, Mykola Pastushenko, Maksym Petrachenko  
Clarification of Procedures for Voice Signal Pre-Processing in Authentication System |
| 2 | Igor Melnyk, Mykhailo Skrypka  
A Universal Software Package for Research and Development of Various Types of Natural Universal and Error-Correcting Codes |
| 3 | Roman Voliansky, Mykola Pushkar, Oleg Sergienko, Nataliya Krasnoshapka, Oleksiy Sinkevych, Nina Volianska  
Design of the Generalized Infinite-Dimensional Chaotic System |
| 4 | Yurii Babenko, Valeriy Barannik, Oleksandr Semenchenko, Andrii Yermachenkov, Maksym Savchuk, Evgeniy Eliseev  
Approach for Enhancing the Availability of Low-Information Video Segments within a Video Information Resource |
| 5 | Vladimir Barannik, Oleksandr Ignatyev, Gennady Pris, Yevhenii Sidchenko, Tatyana Belikova  
A Method of Encoding Video Information to Increase its Reliability in an Information and Telecommunications Network |
S4.2: Information Encoding and Cybersecurity

Thursday, November 23 15:30 – 16:30

Link to the online meeting

Chair:
Dr. Yuliia Pyrih

1. Vladimir Barannik, Anatolii Berchanov, Valeriy Barannik, Mykhailo Babenko, Roman Onyshchenko, Leonid Kolodiichuk
Method of Mini Segments Encoding in Difference Space Using Haar Wavelet

2. Andrii Krasnorutsky, Volodymyr Barannik, Sergii Shulgin, Vitalii Kolesnyk, Nataliia Kharchenko, Kiril Revva
Integration of Video Image Decryption Coding into a Remote Video Information Service

3. Vladimir Barannik, Fedir Ustymenko, Dmitry Barannik, Volodymyr Manakov, Pavlo Hurzhii, Yurii Tsimura
Method of selective video segment processing for intelligent video image quality enhancement technologies

4. Olexandr Manko, Oleksiy Konovalov, Liudmila Kharlai, Yuliia Sotnichenko, Anna Kviatkovska, Kostyntin Nikiforenko
Optical Cryptography Using Passive Optical Elements

5. Danyil Zhuravchak, Valerii Dudykevych
Real-time ransomware detection by using eBPF and Natural Language Processing and Machine Learning

Poster Session: Miscellaneous

Thursday, November 23 16:45 – 18:00

Link to the online meeting

Chair:
Dr. Taras Maksymyuk

Reserved poster session will be available for the participants to present their papers, which have not been presented at the regular sessions due to the technical or connectivity issues.
FINAL SESSION

Friday, November 24 10:00-11:00

Link to the online meeting

Chair:
Prof. Mykhailo Klymash

1. Concluding reports of Section Chairs
2. Discussion
3. Conference summary

CONFERENCE CLOSING