



**AIES  
2022**

**ARTIFICIAL INTELLIGENCE**

**IN ENGINEERING AND SCIENCE**

**15 - 18 NOVEMBER**

# PROGRAMME



Ulyanovsk State  
Technical  
University



Yuri Gagarin  
State Technical  
University of  
Saratov



Al-Farabi Kazakh  
National University



Saratov State  
Medical University  
named after V. I.  
Razumovsky



Russian  
Association for  
Artificial  
Intelligence



# First International Conference Artificial Intelligence in Engineering and Science – AIES-2022

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# PROGRAMME

Ulyanovsk time = MSK+1

Saratov time = MSK+1

Almaty time = MSK+3

## Day 1. Tuesday, 15 November 2022

Time MSK	Title / Authors
10:00-10:10	Opening Session
<b>Plenary Section</b>	
<p><b>Chair:</b> Nadezhda Yarushkina  <b>University:</b> Ulyanovsk State Technical university  <b>Online</b> <a href="https://jit.ulstu.ru/AIES">https://jit.ulstu.ru/AIES</a></p>	
10:10-10:40	<p><b>Keynote speech №1</b>  <i>Hybrid and integrated AI systems</i>                      Nadezhda Yarushkina</p>
10:40-11:10	<p><b>Keynote speech №2</b>  <i>Problems and features of the implementation of interdisciplinary research projects using AI technologies</i>                      Vladislav Kovalnogov</p>
<b>SECTION 1.</b>	
<b>Image and sound processing, image recognition, computer vision</b>	
<p><b>Chair:</b> Vitaliy Dementiev  <b>University:</b> Ulyanovsk State Technical university  <b>Online</b> <a href="https://jit.ulstu.ru/AIES">https://jit.ulstu.ru/AIES</a></p>	
Time MSK	Title / Authors
11:15-11:30	<p><b>Method for Detecting Person in a Frame of Video Stream and Classifying His Position Using an Artificial Neural Network</b>                      Alexander Brovko, Svetlana Kumova, Ivan Timohin, Olga Toropova</p>
11:35-11:50	<p><b>Deep learning approach to recognition of car driver's closed eyes for safety reasons</b>                      Vitaly Dementiev, Alexandr Tashlinsky, Konstantin Vasiliev, Nikita Andriyanov</p>
11:50-12:05	<p><b>Russian Sign Language Recognition Using MediaPipe</b>                      Yuriy Philippovich, Lyubov Tsilenko, Arifa Ashrafi, Alexey Harlamenkov, Viktor Mokhnachev</p>
12:05-12:20	<p><b>Deep Machine Learning Techniques in the Problem of Estimating the Expression of Psychological Characteristics of a Social media User</b>                      Lev Livshits, Maxim Abramov, Anastasiia Khlobystova, Fedor Bushmelev</p>
12:20-12:35	<p><b>Development of software for managing treadmills based on computer vision</b>                      Kirill Patutin, Daniil Teselkin, Alexandra Nazarova, Ekaterina Surkova, Artem Obukhov</p>
12:35-12:50	<p><b>3D artifact localization using connected components</b>                      Marina Lisnichenko, Stanislav Protasov,</p>

<b>SECTION 2.</b> <b>Study of Artificial Intelligence, Fuzzy models and soft calculations</b>	
<b>Chair:</b> Anton Romanov <b>University:</b> Ulyanovsk State Technical university <b>Online</b> <a href="https://jit.ulstu.ru/AIES">https://jit.ulstu.ru/AIES</a>	
<b>Time MSK</b>	<b>Title / Authors</b>
14:00-14:15	<b>Semantic Modeling of Predicate Calculus Based on N-Tuple Algebra</b> Alexander Fridman, Boris Kulik
14:15-14:30	<b>Preventive Analytics in Safety Tasks for Critical Infrastructures Development</b> Alexander Fridman
14:30-14:45	<b>Method of Iterative-Order Optimization of Multicriteria Problems Using the Local Importance of Criteria</b> Aram Terterian, Alexander Brovko
14:45-15:00	<b>Neural Network Representation for Ordinary Differential Equations</b> Vladimir Kozynchenko, Anna Golovkina
15:00-15:15	<b>Modeling Situations in Spatial Analysis</b> Alexander Bozhenyuk, Marina Belyakova, Stanislav Belyakov, Igor Rozenberg
15:15-15:30	<b>Development of a program code review system using machine learning methods</b> Vadim Moshkin, <i>Ilya Andreev</i>
15:30-15:45	<b>Assessment of the vine--copula for the gamma Poisson model of risky person's behavior with synthetic data</b> Alexander Tulupyev, Valeriia Stoliarova
15:45-16:00	<b>Implementation of the Constraints Principle in Problems of Multicriteria Choice under Conditions of Fuzzy Assignment of Criteria Values</b> Dmitry Vasiliev, Nikita Mityashin, Anna Spivak, Ekaterina Mirgorodskaya
16:00-16:15	<b>Divergence of comparative possibility distributions as a numerical measure of how difficult it is to reach a consensus</b> Andrey Zubyyuk, Michael Yashchenko, Egor Fadeev
16:15-16:30	<b>Production Control based on a Quality Guarantor Computer Vision System</b> Anton Ivaschenko, Vladimir Avsievich, Oleg Golovnin, Margarita Aleksandrova, Pavel Sitnikov

## Day 2. Wednesday, 16 November 2022

### SECTION 3.

#### Smart City Technologies and the Internet of Things

Chair: Madina Mansurova

University: Al-Farabi Kazakh National University

Online

Zoom: <https://us02web.zoom.us/j/6760985614?pwd=Z05sZG5lVkJicUZ6RW81R2Y0aU54QT09>

Conference ID: 676 098 5614

Password: 499653

Time MSK	Title / Authors
10:00-10:10	<b>Opening Session</b>
10:10-10:25	<b>Timeliness of Multipath Redundant Transmissions when all Paths are not Accessible for Some Request Sources</b> Stanislav Bogatyrev, Vladimir Bogatyrev, Anatoly Bogatyrev
10:25-10:40	<b>Off-road Autonomous Vehicle Control System</b> Vitaliy Dementiev, Ivan Rubcov, Vladislav Mikhailov, Roman Jhitkov, Daniil Kanin, Kirill Sviatov
10:40-10:55	<b>Adaptive city traffic lights as collective IoT devices</b> Madina Mansurova, Baurzhan Belgibaev, Dusmat Zhamangarin, Nurassyl Zholdas

### SECTION 4.

#### Computational Linguistics and the Semantic Web, Data Mining & Knowledge Representation

Chair: Madina Mansurova

University: Al-Farabi Kazakh National University

Online

Zoom: <https://us02web.zoom.us/j/6760985614?pwd=Z05sZG5lVkJicUZ6RW81R2Y0aU54QT09>

Conference ID: 676 098 5614

Password: 499653

Time MSK	Title / Authors
12:00-12:10	<b>Opening Session</b>
12:10-12:25	<b>Process-semantic analysis of words and texts</b> Ilya Surov
12:25-12:40	<b>Topic modeling algorithm using quantum probability theory</b> Alexey Platonov, Anna Avdyushina, Igor Bessmertny
12:40-12:55	<b>Case-based reasoning and ontology-based approach to selecting equipment solutions in oilfield engineering</b> Igor Glukhikh, Mikhail Pisarev, Dmitry Liss, Anastasia Shestakova, Кристина Нониева
12:55-13:10	<b>Associative classification based on the table constraints satisfaction</b> Alexander Zuenko
13:10-13:25	<b>Extracting Entity Relationship from Arabic texts</b> Alaa Shaker, Igor Bessmertny, Alaa Aldarf
13:25-13:40	<b>A Probabilistic-Statistical Approach to Detection of Semantic Relations between Indexing Terms</b> Irina Kozlova
13:40-13:55	<b>Creating a Metagraph Dataset Based on the ATOMIC Dataset</b> Danila Fedyukin, Danila Gromozdov, Yuriy Gapanyuk
13:55-14:10	<b>TableProcessor: the tool for the analysis and the interpretation of web tables to create the Geo Knowledge Base of Kazakhstan</b> Barakhnin Vladimir, Grigorieva Irina, Kozhemyakina Olga, Mansurova Madina, Assel Ospan

## SECTION 5. Applied Intelligent Systems

**Chair: Alexander Brovko**

**University: Yuri Gagarin State Technical University of Saratov**

**Online**

Yandex Telemost: <https://telemost.yandex.ru/j/39864029397104>

12:00-12:10	<b>Opening Session</b>
12:10-12:25	<b>Mathematical model for training a neural network used to predict atmospheric pollutants from vehicles</b> Alexander Rezchikov, Oleg Dranko, Aleksey Bogomolov, Elena Kushnikova, Ekaterina Kusheleva
12:25-12:40	<b>The Concept of Intelligent Support for Laser Additive Manufacturing Process Engineer</b> Yuriy Kulchin, Alexander Nikitin, Andrei Velichko, Artem Basakin, Valeriya Gribova, Vadim Timchenko
12:40-12:55	<b>Socio-economic Sustainability Monitoring based on Intelligent Analysis of Social Media</b> Arkadiy Krivosheev, Evgeniya Dodonova, Irina Dubinina, Anton Ivaschenko, Oleg Golovnin
12:55-13:10	<b>Service-oriented architecture for block-base construction building</b> Ilya Senokosov, Artem Voinov
13:10-13:25	<b>Rule-based Model for Describing the Processes of Rise and Transfer of Anthropogenic Emissions in the Atmosphere</b> Elena Kushnikova, Aleksey Bogomolov, Irina Stepanovskaya, Alexander Rezchikov, Vladimir Petrov
13:25-13:40	<b>Approach to building an intelligent repository of software projects</b> Julia Stroeva, Dmitrii Iastrebov, Aleksey Filippov
13:40-13:55	<b>Models and methods for searching cohesive teams of software developers</b> Vladislav Moiseev, Nadezhda Yarushikina, Alex Zhelepov
13:55-14:10	<b>Anomaly Detection in a Granulation Plant for Uranium Dioxide Powder Pressing into Fuel Pellets</b> Viacheslav Kozitsin, Maxim Mezhov, Iurii Katser
14:10- 14:25	<b>Using convolutional neural networks for training forest machine operators</b> Liudmila Steshina, Andrey Glazyrin, Dimiter Velez, Plamena Zlateva, Igor Petukhov
14:25- 14:40	<b>Artificial intelligence systems in the field of safety at work and life</b> Vadim Zhmud
14:40- 14:55	<b>Ensuring the Robustness of Modern Mechatronic Systems Using Artificial Intelligence Methods</b> Alexey Lvov
14:55- 15:10	<b>Features of Knowledge Representation of Automatic Control Systems Design Methods</b> Mikhail Stepanov



## Day 3. Thursday , 17 November 2022

### SECTION 6.

#### Artificial intelligence in medicine and bioengineering

**Chair:** Alexander Fedonnikov

**Co-chairs:** Marina Barulina, Tatyana Kaluta

**University:** Saratov State Medical University named after V. I. Razumovsky

**Offline:** Saratov, Kutyakova st., 109 (Building 6.1), conference hall.

**Online** <https://events.webinar.ru/45264249/128807470>

Time MSK	Title / Authors
10:00 – 10:15	<b>Non-invasive control of blood viscosity and hematocrit (The Possibilities of Artificial Intelligence to Control the Adequacy of Hypovolemia Correction)</b> <i>Oleg Tsarev</i> , Andrey Senin, Nikita Korchakov, Fedor Prokin
10:15 – 10:30	<b>Application of convolutional neural networks in the analysis of microimages of skin neoplasms in the early diagnosis of melanoma</b> Anton Sapunkov, Anastasia Khambikova, Elena Antonova, <b>Gleb Guskov</b> , Nadezhda Yarushikina
10:30 – 10:45	<b>Automated ABSDE image analysis of a skin neoplasm with interpretable results</b> Alexandra Chekina, Sofia Egova, Elena Antonova, Anastasia Khambikova, Nadezhda Yarushikina, <b>Gleb Guskov</b>
10:45 – 11:00	<b>An Overview of Using Deep Learning Algorithms for Anemia Detection</b> Alexander Fedonnikov, Tatyana Kaluta, Ivan Ulitin, <b>Marina Barulina</b>
11:00 – 11:15	<b>Using of Artificial Intelligence in Detection of the Compliance of the ophthalmic patients</b> Olga Dolinina, Alexey Kuzmin, <b>Tatjana Kamenskikh</b> , E Veselova
11:15 – 11:30	<b>Computer analysis of lumbar spine MRI scans via neural network methods and algorithms</b> Vadim Kushnikov, <b>Alexander Selyutin</b> , Olga Dolinina, Stanislav Daurov
11:30 – 11:45	Expert System KORDEX for Solving of Urgent Cardiology Problems Olga Dolinina, Yury Shwartz, <b>Alexandra Kaner</b>
11:45 – 12:00	<b>Building Vertebral Models Using Convolutional Artificial Neural Networks in Preoperative Planning Problems</b> <b>Leonid Bessonov</b> , Dmitry Sidorenko, Dmitry Ivanov, Irina Kirillova, Leonid Kossovich
12:00 – 12:30	<b>Reflection</b>