5th INTERNATIONAL SCIENTIFIC CONFERENCE "INTELLIGENT INFORMATION TECHNOLOGIES FOR INDUSTRY" IITI2021
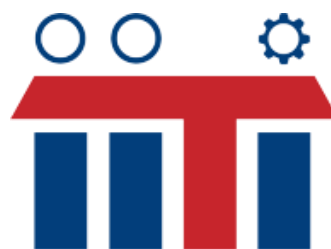
September 30 - October 4, 2021, Sochi, Russia

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PROGRAMME

Thursday, September 30
Arrival Day

Friday, October 1

09:00 – 09:30	**Registration at Sirius Arena**
09:30 – 10:00	**Opening session (Sochi Hall).** **Prof. Kovalev, Prof. Snasel**
10:00 – 11:00	**Intelligent systems and technologies in medicine: state, problems and prospects** **Prof. Boris Kobrinskiy** **The Federal Research Center "Computer Science and Control" of Russian Academy of Sciences, Problem Artificial Intelligence Institute, Russia**
11:00 – 12:00	**Signal spreading through a chain of asynchronous threshold elements** **Prof. Oleg Kuznetsov** **Institute of Control Sciences of Russian Academy of Sciences, Russia**
12:00 – 13:00	**Lunch**
13:00 – 14:00	**Possibilities of fuzzy systems in problems of artificial intelligence and predictive analytics** **Prof. Nadezhda Yarushkina** **Ulyanovsk State Technical University, Russia**
14:00 – 15:00	**Intelligent Methods of Event Correlation: Application for Cyber Security** **Prof. Igor Kotenko and Diana A. Gaifulina** **St. Petersburg Federal Research Center of the Russian Academy of Sciences, Russia**
15:00 – 15:20	**Coffee-break**
15:20 - 16:20	**Object-oriented model-based reinforcement learning** **Assoc. Prof. Alexander Panov** **Moscow Institute of Physics and Technology, Russia** **Federal Research Center "Computer Science and Control" of Russian Academy of Sciences, Russia**
16:20 – 17:20	**Differential Networks - Biologically inspired unconventional derivative neuro-computing (principles and applications)** **Ladislav Zjavka** **VSB-Technical University of Ostrava, Czech Republic**

Saturday, October 2

09:00 – 10:40	**Session 1 (Sochi Hall). Neural Networks** **Chairs: Prof. Sergey M. Kovalev, prof. Vaclav Snasel** 1. Image-based Facial Emotion Recognition using Convolutional Neural Networks and Transfer Learning *Sebastián Basterrech* 2. Integrated Approach for Data Mining Based On Case-Based Reasoning and Neural Networks *Alexander Eremeev, Pavel Varshavskii Anton Kozhevnikov and Sergey Polyakov* 3. Signal spreading through a chain of asynchronous threshold elements *Oleg P. Kuznetsov* 4. Application of Reinforcement Learning in Open Space Planner for Apollo Auto *Dmitriy Ivanov and Aleksandr I. Panov* 5. Neural network adaptation of the Kalman filter for odometry fusion *Linar Abdrazakov and Dmitry Yudin* 6. Photo-voltaic power daily statistical predictions using PDE models of stepwise evolved Polynomial networks with the sum PDE partition and L-transform substitution *Ladislav Zjavka and Václav Snášel* 7. Application of Deep Reinforcement Learning Methods in Debt Collection *Gleb Kuzmin, Aleksandr I. Panov, Ivan Razvorotnev, and Vyacheslav Rezyapkin* 8. A vessel drift prediction system on the basis of a neural network *Victor V. Deryabin* 9. Diagnostics of the technological system state for phosphorus production based on deep neural networks *Andrey Yu. Puchkov, Ekaterina I. Lobaneva, Maria A. Vasilkova* 10. Method of synthesis of systems for identification of technological processes parameters based on the use of neuralnetworks and recurrent algorithms *Andrey A. Kostoglotov and Vladimir O. Zehcer* 11. An Approach to Semantic Segmentation of Retinal Images Using Deep Neural Networks for Mapping Laser Exposure Zones for the Treatment of Diabetic Macular Edema *Nataly Yu. Ilyasova, Rustam A. Paringer, Alexander S. Shirokanev and Nikita S. Demin*

10:40 – 11:10	**Session 2 (Sochi Hall). Non-classical Logic**
	Chairs: Prof. Vadim L. Stefanuk, prof. Igor Fominykh
	    1. Logic Theory of Text Contents
	       L.V.Savinitch , A.V.Zhozhikashvilly, V.L.Stefanuk
	    2. Extended First-order Step Theories
	       Michael Vinkov, Vladimir Ivanov, Igor Fominykh, Andrey Sukhanov
	    3. A new worldview at the practice of formalizing the abilities of natural intelligence
	       Yuri Rogozov

11:10-11:30	**Coffee Break**

11:30 – 12:30	**Session 3 (Grenoble Hall). Fuzzy Models and Systems**
	Chairs: Prof. Sergey M. Kovalev, Prof. Vadim V. Borisov
	    1. Method for Forecasting Multidimensional Time Series Based on Neuro-Fuzzy Cognitive Temporal Models
	       Vadim Borisov and Victor Luferov
	    2. Fuzzy approach to car retarding adaptation on hump yards
	       Ivan A. Olgeyzer, Andrey V. Sukhanov, Alexaner N. Shabelnikov and Olesya V. Ignatieva
	    3. Adaptive Fuzzy Systems for Predictive Diagnostics of Railway Facilities
	       Yury V. Gurov, Agop E. Khatlamadzhiyan, Danil V. Khilkov, Yulia Shapovalova
	    4. Diagnostics of the Technical Condition of Industrial Equipment Based on a System of Hierarchical Production Rules
	       Anna E. Kolodenkova, Alexander N. Guda, Svetlana S. Vereshchagina, Valeriya O. Tuvaeva
	    5. Properties of an Algebraic Model of a Distributed Intelligent System with Fuzzy Rules
	       Sergey D. Makhortov
	    6. Integrated Approach to Modeling the Objects of Complex Technical Systems
	       Vladimir D. Vereskun, Anna E. Kolodenkova, Evgenia R. Muntyan

12:30-13:00	**Session 4 (Grenoble Hall). Bayes Networks and Social Networks Modeling** **Chairs: Prof. Alexander L. Tulupyev and Pavel Kromer** 1. Online social network post classification: a multiclass approach *Valerii D. Oliseenko, Tatiana V. Tulupyeva and Maxim V. Abramov* 2. Time-based model of the success of a malefactor's multistep social engineering attack on a user *A. Khlobystova and M. Abramov* 3. The non–parametric Bayes belief network for the physical activity parameters modelling: the pilot study *Valerie Stoliarova, Gulnara Sadykova, Anna Olina and Alexander Tulupyev*
11:30-13:00	**Session 5 (Sochi Hall). Evolution Modeling and Genetic Algorithms** **Chairs: Prof. Sergey M. Kovalev, Assoc. prof. Valery Tarassov** 1. Efficiency Indicators of Certain Parallel Population-Based Optimization Algorithms *Alexey A. Kaurov , Valery A. Zasov and Denis S. Kabizhskiy* 2. Comparative Study of a New Problem Decomposition Method for Solving Global Optimization Problems on Loosely Coupled Systems *Maxim Sakharov and Anatoly Karpenko* 3. Algorithm of VLSI planning by the method of crystallization of alternatives field *Boris K. Lebedev , Oleg B. Lebedev , Ekaterina O. Lebedeva , Artemy A. Zhiglatiy* 4. Study of the Stability of Mutually Influencing Processes Based on Discrete Modeling Methods *Vera V. Ilicheva and Alexander N. Guda* 5. Application of Genetic Algorithms in Solving the Problem of Placing Elements on a Crystal Taking into account the Criterion of the Maximum Number of Linear Segments *Vladislav I. Danilchenko, Evgeniya V. Danilchenko and Victor M. Kureichik* 6. Solving problem of computer-aided design of digital computing devices based on a hybrid approach *Yaser M.J., L.A. Gladkov, N.V. Gladkova*

09:00 – 10:50	**Session 6 (Sochi Hall). Decision-Making Intelligent Systems. Part 1** **Chairs: Prof. Georgy Burdo, Assoc. prof. Anna Kolodenkova** 1. Approaches to the Creation of Automated Production Systems in Mechanical Engineering and Instrument-Making Industry *Georgy Burdo* 2. Search Engine Decision-Relevant Information and Exchange with the Information System *Kobrinskii B.* 3. Intelligent Control of Advanced Autonomous Systems *Gennady P. Vinogradov, Igor A. Konyukhov, Aleksey A. Prokhorov* 4. Intelligent decision support system for improving the efficiency of higher education institutions *Irina V. Dergacheva* 5. Optimization of Material Flows in Production under Conditions of Uncertainty *Alexander Bozhenyuk, Olesiya Kosenko, Evgeny Kosenko, and Igor Rozenberg* 6. Neural Multigranular 2-tuple Average Operator in Neural-Symbolic Decision Support Systems *Alexander Demidovskij and Eduard Babkin* 7. Multi-agent green logistics technologies in the export transport *Lyudmila Makolova, Enver Mamaev* 8. Ontologies To Reduce Uncertainty In R&D Project Planning *Olga V. Stoianova and Valeriia D. Moskaleva* 9. Intelligent Decision Support System When Assessing Risk Significance *Inna Nurutdinova and Liubov Dimitrova* 10. Formalization of knowledge by tools of system-object simulation *Alexander G. Zhikharev* 11. Overview of Vulnerabilities of Decision Support Interfaces based on Virtual and Augmented Reality Technologies *Ksenia Zhernova and Andrey Chechulin*
09:00 – 10:50	**Session 8 (Grenoble Hall). Automation and Intellectualization for Industrial, Transport and Energetic Systems. Part 1** **Chairs: Prof. Sergey M. Kovalev, Prof. Andrey V. Chernov** 1. The problem of rotor eddy-current losses in a permanent magnet motor with high power density *Tomasz Wolnik, Vítezslav Styskala, Roman Hrbac and Alexey M. Lyaschenko* 2. Cognitive Measurements and Predictive Analytics for Railway Infrastructure Components *Agop E.Khatlamadzhiyan, Sergey M. Kovalev, Valery B. Tarassov* 3. Kalman Filter Adaptive to Constant Perturbations of the Observable Object Parameters

9	*Alexander A. Manin, Andrey V. Sukhanov, Sergey S. Sokolov, Arthur I. Novikov and Marianna V. Polyakova* 4. Design Workflows Analysis Software Development in Complex Products Design Automation *Voit N.N., Bochkov S.I. , Ukhanova M.E., Kanev D.S., Kirillov S.Yu.* 5. Active rectifier control method influence on losses in a high-speed generator *Pavel G. Kolpakhchyan, Alexander E. Kochin, Margarita S. Podbereznaya, Boris N. Lobov, Ivan S. Ivanov* 6. Spreadsheet Data Transformation for Ontology Engineering in Petrochemical Equipment Inspection Tasks *Nikita O. Dorodnykh and Aleksandr Yu. Yurin* 7. An Estimation of the Workload Relocation Techniques Application in Distributed CAD Systems Area *I.B. Safronenkova and Y.E. Melnik* 8. Development of a Structurally Fuzzy Regulator Based on the Condition of the Maximum of the Generalized Power Function under Constraints on Control *Andrey A. Kostoglotov, Sergey V. Lazarenko, Alexander A. Agapov* 9. Analysis of the Possibility of Intellectualization of Algorithms for Estimating the Parameters of Dynamic Systems Based on Adaptive Model of Motion *Andrey A. Kostoglotov, Anton A. Penkov, Sergey V. Lazarenko and Valery M. Pavlov* 10. Synthesis of Multimode Control Laws under Disturbances Conditions Based on the Condition for Maximum of the Generalized Power Function in Automation Problems *Andrey A. Kostoglotov, Zoya V. Lyaschenko, Alexander A. Agapov*
10:50-11:10	**Coffee Break**
11:10-12:40	**Session 7 (Sochi Hall). Decision-Making Intelligent Systems. Part 2** **Chairs: Prof. Sergey O. Kuznetsov, Prof. Igor Kotenko** 1. Pattern Structures for Knowledge Processing and Information Retrieval *Sergei O. Kuznetsov and Elizaveta Goncharova* 2. Feature selection for intelligent detection of targeted influence on public opinion in social networks *Lidia Vitkova, Andrey Chechulin, Igor Kotenko* 3. Power Quality parameters analysis in Off-Grid platform *Ibrahim Jahan, Stanislav Misak, and Vaclav Snasel* 4. An approach to modeling of the security system of intelligent transport systems based on the use of flat graphs *Igor Kotenko, Igor Saenko, Oleg Lauta, Mihail Karpov and Ksenia Kribel*

	5. Argumentation in spatial analysis using geographic information systems *Stanislav Belyakov, Alexander Dolgiy, Margarita Knyazeva and Igor Rozenberg* 6. Approach to Patient Assessment based on a Spatial-Temporal Model for Decision Support Systems in Cardiology *T. Afanasieva, I. Perfilieva, V. Kozhevnikov* 7. Method of Intelligent Choice of Parameters of Swarm Intelligence Algorithms to Increase Effectiveness of Processes Control in Complex Educational Systems *Alexander V. Bobryakov, Svetlana P. Yanukovich, Tatsiana U. Mrochak and Vadim V. Borisov* 8. An approach to the psycholinguistic analysis of social media texts using the Big Five Personality Traits *Vadim Moshkin, Nadezhda Yarushkina, Roman Shakurov* 9. Analytical modeling of computer attacks on intelligent transport systems based on the transformation of stochastic networks *Sergei Sokolov, Igor Saenko, Mikhail Mitrofanov, Oleg Lepeshkin and Oleg Lauta*
11:10 – 12:40	**Session 9 (Grenoble Hall). Automation and Intellectualization for Industrial, Transport and Energetic Systems. Part 2** **Chairs: Prof. Sergey M. Kovalev, Prof. Andrey V. Chernov** 1. Models and Algorithms for Planning and Scheduling of Complex Objects Functioning and Modernization *Boris V. Sokolov, Valerii V. Zakharov, Alexey V. Krylov and Vladimir I. Salukhov* 2. Graph Methods for Improving the Non-Optimal Solution of the Locomotive Assignment Problem under Time Constraints *Liudmila Zhilyakova* 3. Hybrid evolutionary algorithm for optimizing the control of a multi-mode moving object *Konstantin I. Yurenko, Pavel A. Kharchenko and Ivan K. Yurenko* 4. Mechanisms of information support for the digital transformation of space complexes based on the concept of socio-cyber-physical self-organization *Evgeniy V. Yurkevich, Iraida A. Stepanovskaya and Lidia N. Kryukova* 5. Collective Intelligence Formation of Transport Complexes Management Based on the Application of the Theory of Active Systems *Nikolay Lyabakh, Maxim Kolesnikov, Yulia Shapovalova, Vasilii Shapovalov* 6. Image Stabilization by Orientation of the Unmanned Aerial Vehicle *Alexander Bozhenyuk, Kirill Morev and Igor Dolgiy* 7. Assistance in Creation of Project Solutions by Means of System-Object Determinant Analysis

	V.V. Mikhelev and S.I. Matorin 8. On the Issue of Liability for Harm Caused by the Actions of Drones Using Artificial Intelligence *E.S. Shirokova, A.M. Fedulin* 9. Synthetic Datasets for Testing Video Security Systems *Vladimir Polyakov, Aleksandr Mezhenin, Vladimir Vereskun, Anatoly Korobeynikov and Vasilii Shapovalov* 10. Processing of Multidimensional Data Streams in a Multi-sensor Distributed System *Boris V. Paliukh, Alexander N. Vetrov*
12:40 – 13:00	**Closing session**