

Program of

The 28th Conference of Open Innovations Association FRUCT

Moscow, Russia
27-29 January 2021

GAUDEAMUS IGITUR,
JUVENES DUM SUMUS!
POST JUCUNDAM JUVENTUTEM,
POST MOLESTAM SENECTUTEM
NOS HABEBIT HUMUS.

UBI SUNT, QUI ANTE NOS
IN MUNDO FUERE?
VADITE AD SUPEROS,
TRANSITE AD INFEROS,
UBI JAM FUERE.

VITA NOSTRA BREVIS EST,
BREVI FINIETUR,
VENIT MORS VELOCITER,
RAPIT NOS ATROCITER,
NEMINI PARCETUR.

VIVAT ACADEMIA,
VIVANT PROFESSORES!
VIVAT MEMBRUM QUODLIBET,
VIVANT MEMBRA QUAELIBET!
SEMPER SINT IN FLORE!

VIVANT OMNES VIRGINES
FACILES, FORMOSAE!
VIVANT ET MULIERES,
TENERAE, AMABILES,
BONAE, LABORIOSAE!

VIVAT ET RESPUBLICA,
ET QUI ILLAM REGIT!
VIVAT NOSTRA CIVITAS,
MAECENATUM CARITAS,
QUAE NOS HIC PROTEGIT

PEREAT TRISTITIA,
PEREANT DOLORES,
PEREAT DIABOLUS,
QUIVIS ANTIBURSCHIUS,
ATQUE IRRISORES!

Practical Information

Due to COVID-19 absolute majority of the 28th IEEE FRUCT conference participants selected distant participation option. Correspondingly all conference processes are adapted to best fit for online participation. All conference presentations are pre-recorded by the authors and uploaded to Youtube. The conference program contains links to individual presentations as well as links to plays lists to watch all presentations of a session. The conference sessions are split into 2 parts:

- Self-watching of the session presentations on Youtube. Let's take advantage of distant participation - you can invite colleagues to watch videos and the online session. I also ask you to ***subscribe to FRUCT youtube channel*** – we need to get 1000 subscribers to be allowed make video streaming in the future.
- Online questions and answers session held in Zoom. As some conference participants report issues with Internet connection quality we recommend to held Zoom session in Audio only mode (without video). Please prepare your questions/comments to the authors and use this time to discuss the presented works.

The conference program consists of two parallel tracks. Please note that each track uses own Zoom ID (the corresponding Zoom credentials can be found in the program text in session header). The Q&A sessions for both tracks are scheduled with minimal overlapping, so potentially one can take part in most of Q&A sessions. For that you shall watch video presentations beforehand and don't forget to switch Zoom telco numbers when changing the sessions. Please note that all conference presentations (except for keynote talk and demos) will be available online starting on Monday January 25, 2021. In case of any further questions related to the conference organization don't hesitate email to us info@fruct.org.

Authors of the selected FRUCT conference papers will be invited to publish extended version of the paper in the partner journals. If you are interested in this opportunity please express it clearly to the chair of your session. The list of partner journals is as follows:

An official publication of the Information Resources Management Association

IGI PUBLISHING WWW.IGI-GLOBAL.COM

INTERNATIONAL JOURNAL OF **Embedded and Real-Time Communication Systems**

Authors of the best papers of FRUCT conference can get invitation to **FREE of charge** publish extended version of the paper in the International Journal of Embedded and Real-Time Communication Systems (IJERTCS) (ISSN 1947-3176, **Scopus** indexing, etc.).

sensors

Authors of the best papers on "Smartphone Sensors for Driver Behavior Monitoring Systems" can get invitation to publish extended version of the paper in the Special Issue of the Sensors Journal (impact factor 3.275, **Scopus** indexing, etc.)

The proceedings of 28th FRUCT conference are available online:
Volume 1 (Full Papers): https://fruct.org/publications/fruct28/
Volume 2 (ACM Volume): https://fruct.org/publications/acm28/

General Facts and Statistics for the 28th FRUCT Conference:

Total submissions: **151**	Accepted Full Papers: **67**	Acceptance rate: **44%**
Total authors: **382**	representing **22** countries	From **6 continents**

Organization Committee of the 28th IEEE FRUCT

Local Chair: Vladimir Deart

FRUCT President: Sergey Balandin ***Publishing team leader:*** Tatiana Tyutina

Program Committee

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Program of the 28th IEEE FRUCT conference

January 27-29, 2021, Moscow, Russia

Moscow Technical University of Communications, Moscow, Russia / Online participation by Youtube + Zoom

NOTE: Conference time is in Moscow time (GMT+3) as conference is held in Moscow, Russia

<table>
<tr><th>DATE</th><th>TIME</th><th colspan="2">PROGRAM</th></tr>
<tr><td rowspan="5">27.01.21</td><td>11:30-13:30</td><td colspan="2">Opening of the 28th FRUCT conference
Keynote talk: Using Fractals and Multi-Fractals for Network Anomaly and Cyber-Attack Detection, by Oleg Sheluhin
Invited talk: Temporal Databases and Index Techniques, by Michal Kvet</td></tr>
<tr><td>13:30-14:30</td><td colspan="2">Lunch break</td></tr>
<tr><td>14:30-16:00</td><td>DataWorld 1: Data Mining, Distribution, Real-time and Fuzzy Management</td><td rowspan="2">5G and Emerging Wireless Technologies</td></tr>
<tr><td>16:00-16:30</td><td rowspan="2">Location Based Services: Navigation, Logistics and e-Tourism</td></tr>
<tr><td>16:30-18:00</td><td>Natural Language Processing and Speech Technologies I</td></tr>
<tr><td rowspan="9">28.01.21</td><td>10:45-11:30</td><td colspan="2">Keynote talk: Development of Signal Processing Algorithms on the Way to 6G Systems, by Vitaly Kreyndelin</td></tr>
<tr><td>11:30-13:00</td><td rowspan="2">Internet of Things and Future Network Technologies</td><td>Computer Vision, Image and Video Processing I</td></tr>
<tr><td>13:00-13:30</td><td>Lunch break</td></tr>
<tr><td>13:30-14:00</td><td colspan="2">Lunch break</td></tr>
<tr><td>14:00-14:30</td><td>Lunch break</td><td rowspan="2">Security and Privacy</td></tr>
<tr><td>14:30-15:45</td><td rowspan="2">Artificial Intelligence, Robotics and Automation Systems I</td></tr>
<tr><td>15:45-16:15</td><td rowspan="2">e-Health and Wellbeing I</td></tr>
<tr><td>16:15-17:30</td><td>DataWorld 2: Data Retrieval Performance</td></tr>
<tr><td>17:30-18:30</td><td colspan="2">Demos & Posters Session</td></tr>
<tr><td rowspan="10">29.01.21</td><td>10:30-11:30</td><td colspan="2">Keynote talk: Application of SDN/NFV Technology in 5G Communication Networks, by Yury Mironov</td></tr>
<tr><td>11:30-13:00</td><td>Artificial Intelligence, Robotics and Automation Systems II</td><td rowspan="2">Software Design and Innovative Applications</td></tr>
<tr><td>13:00-13:30</td><td>Lunch break</td></tr>
<tr><td>13:30-14:00</td><td colspan="2">Lunch break</td></tr>
<tr><td>14:00-14:15</td><td rowspan="2">Computer Vision, Image and Video Processing II</td><td>Lunch break</td></tr>
<tr><td>14:15-15:30</td><td>e-Health and Wellbeing II</td></tr>
<tr><td>15:30-16:45</td><td>Big Data and Data Mining, Data Storage and Management I</td><td>Natural Language Processing and Speech Technologies II</td></tr>
<tr><td>16:45-18:00</td><td>Big Data and Data Mining, Data Storage and Management II</td><td>Smart Systems and Embedded Networks</td></tr>
<tr><td>18:00-18:10</td><td colspan="2">Official closing of the 28th FRUCT conference</td></tr>
</table>

Thank you and looking forward to see you at the 29th FRUCT in Tampere, Finland on May 12-14, 2021!
(Note that it has been agreed that the 29th IEEE FRUCT conference will allow distant participation)

Program of the 28th IEEE FRUCT conference

January 27 (Wednesday)
Moscow Technical University of Communications, Moscow, Russia / Online participation by Youtube + Zoom
NOTE: Conference time is in Moscow time (GMT+3) as conference is held in Moscow, Russia

Session: Opening and Plenary session of the 28th FRUCT conference Chairman: Sergey Balandin Playlist: https://www.youtube.com/watch?v=mYR5qQiQudQ&list=PLKlZJpq1JqdPCcHfxSaC_YcK-DUOwh3FZ			
11:30	10m	Welcome words from the Rector and overview of 100 years of MTUCI history, by Sergey Erokhin	
11:40	10m	Welcome words from Ministry of Digital Development, Communications and Mass Media of the Russian Federation	
11:50	5m	Welcome from the local team of FRUCT28, by Vladimir Deart	
11:55	5m	Official opening of 5G radio monitoring center at MTUCI, by Taoufik Ben Rejeb	
12:00	35m	Keynote talk: Using Fractals and Multi-Fractals for Network Anomaly and Cyber-Attack Detection, by Oleg Sheluhin, MTUCI, Russia	
12:35	10m	Q&A session for the keynote talk, Zoom 280-192-1973, passcode 535851	
12:45	35m	Invited talk: Temporal Databases and Index Techniques, by Michal Kvet, University of Zilina, Slovakia	
13:20	10m	Q&A session for the invited talk, Zoom 280-192-1973, passcode 535851	
13:30	1h	**Lunch break**	
14:30	**DataWorld workshop**: Data Mining Distribution, Real-time and Fuzzy Management Chairman: Karol Matiasko Playlist:https://www.youtube.com/watch?v=k1iLTv3VgRk&list=PLKlZJpq1JqdNaE5LyNjXHalhjFjAymNZg		**Session:** 5G and Emerging Wireless Technologies Chairman: Vladimir Deart Playlist:https://www.youtube.com/watch?v=AY5ZrWE1QBA&list=PLKlZJpq1JqdPmndAilNRhYPsw9seU5G2R
14:30	1h	Influencing Migration Processes by Real-Time Data, by Roman Ceresnak, Karol Matiasko, Adam Dudas The Application of Text Mining Algorithms to Discover One Topic Objects in Digital Learning Repositories, by Svetlana Vachkova, Roman Kupriyanov, Ruslan Suleymanov, Elena Petryaeva Fuzzy Logic Data Protection Management, by Anastasya Zhila, Alexander Bolshakov Improvement of Parallelism Process in Distributed Data Processing, by Roman Ceresnak, Karol Matiasko Exam System, by Marek Kvet, Martin Forgac, Erik Kalina	Protrusion Location Optimization in Communication via Diffusion, by Goshgar Ismayilov A Framework for Evaluating 5G Infrastructure Sharing with a Neutral Host, by Vanessa Vasconcellos, Paulo H. Portela de Carvalho On One D2D Usage Model for 5G Networks, by Dmitry Namiot, Manfred Sneps-Sneppe On Information Technology Issues in the Nanosatellite Era, by Manfred Sneps-Sneppe, Romass Pauliks, Dmitry Namiot Low-Complexity Iterative Detector for Massive MIMO Systems, by Mikhail Bakulin, Taoufik Ben Rejeb, Vitaly Kreyndelin, Aleksey Smirnov Experimental Study of Underwater Optical Wireless Communication Link, by Nataliia Miroshnikova, Pavel Titovets, Gennadyi Petruchin, Vladislav Lipatkin, Alexey Kuleshov On Joint Satellite, Terrestrial, and Delay Tolerant Networks for Railroad Communications, by Eugene Tikhonov, Donat Sshneps-Sshneppe, Manfred Sneps-Sneppe
15:30	30m	Q&A in Zoom with authors of **Data Mining Distribution, Real-time and Fuzzy Management** session (**DataWorld workshop**), Zoom 974-238-2704, passcode 490571	

<table>
<tr><td>16:00</td><td colspan="2">Session: Location Based Services: Navigation, Logistics and e-Tourism
Chairman: Dmitry Korzun
Playlist:https://www.youtube.com/watch?v=DCWt_KqNYWQ&list=PLKlZJpq1JqdN92qmovb11Ws3l-sHSHiiC</td><td rowspan="2">Q&A in Zoom with authors of 5G and Emerging Wireless Technologies session,
Zoom 280-192-1973, passcode 535851</td></tr>
<tr><td>16:00</td><td>30m</td><td>Deep Leaning-Based Trajectory Estimation of Vehicles in Crowded and Crossroad Scenarios, by Arslan Siddique, Ilya Afanasyev
ToA-based Algorithm of Joint Filtering of Coordinates and Time of Transmission for MLAT Systems, by Alexander Chugunov, Vladimir Pudlovskiy, Roman Kulikov, Natalia Masalkova, Sergey Chernyh</td></tr>
<tr><td>16:30</td><td>1h</td><td>Comparative Study of Dashcam-Based Vehicle Incident Detection Techniques, by Farzanuddin Ahmad, Yunpeng Zhang, Fengxiang Qiao
Driver Identification With OBD-II Public Data, by Kirill Uvarov, Andrew Ponomarev
Transportation Mode Detection Using Crowdsourced Smartphone Data, by Pramith Nirmal, Ishan Disanayaka, Dilantha Haputhanthri, Adeesha Wijayasiri
A Comparison of ARIMAX, VAR and LSTM on Multivariate Short-Term Traffic Volume Forecasting, by Bhanuka Dissanayake, Osanda Hemachandra, Nuwan Lakshitha, Dilantha Haputhanthri, Adeesha Wijayasiri
Anchor Self-Localization Algorithm for Ultrawideband Indoor Positioning System, by Nikita Petukhov, Alexander Chugunov, Roman Kulikov, Natalya Masalkova, Tatiana Brovko</td><td>Session: Natural Language Processing and Speech Technologies I
Chairman: Tatiana Sherstinova
Playlist:https://www.youtube.com/watch?v=iBS7NSct-6c&list=PLKlZJpq1JqdMPsYxFt7Mutzcuq1bMjhj4
Politics-Related Online Communities: Thematic Landscape and (Para)linguistic Features, by Konstantin Platonov, Kirill Svetlov
Keyphrase Extraction in Russian and EnglishScientific Articles Using Sentence Embeddings, by Mark Zaslavskiy, Quang Huy Nguyen
SPARTA: Speaker Profiling for ARabic TAlk, by Wael Farhan, Muhy Eddin Za'Ter, Qusai Abu Obaidah, Hisham Al Bataineh, Zyad Sober, Hussein Al Natsheh
Speaker Diarization Based on Speech Signal Approximation by Step Function, by Rustam Latypov, Evgeni Stolov
Word Sense Induction for Russian Texts Using BERT, by Aleksandr Slapoguzov, Konstantin Malyuga, Evgenij Tsopa</td></tr>
<tr><td>17:30</td><td>10m</td><td rowspan="2">Q&A in Zoom with authors of Location Based Services: Navigation, Logistics and e-Tourism session, Zoom 974-238-2704, passcode 490571</td></tr>
<tr><td>17:40</td><td>20m</td><td>Q&A in Zoom with authors of Natural Language Processing and Speech Technologies I session,
Zoom 280-192-1973, passcode 535851</td></tr>
<tr><td>18:00</td><td></td><td colspan="2">Closing of Day</td></tr>
</table>

January 28 (Thursday)
Moscow Technical University of Communications, Moscow, Russia / Online participation by Youtube + Zoom
NOTE: Conference time is in Moscow time (GMT+3) as conference is held in Moscow, Russia

10:45	35m	Keynote talk: Development of Signal Processing Algorithms on the Way to 6G Systems, by Vitaly Kreyndelin, MTUCI, Russia
11:20	10m	Q&A session for the keynote talk, Zoom 280-192-1973, passcode 535851

11:30	**Session:** Internet of Things and Future Network Technologies Chairman: Taoufik Ben Rejeb Playlist:https://www.youtube.com/watch?v=nlSXQ_AdZDA&list=PLKlZJpq1JqdME6eXeDy4FVRD8uaTuvQer		**Session:** Computer Vision, Image and Video Processing I Chairman: Vladimir Khryashchev Playlist:https://www.youtube.com/watch?v=gMvp_cE09g&list=PLKlZJpq1JqdNNRKwCBkDkxS1vLhOpTv8_
11:30	1h	Agglomerative Clustering of Network Traffic Based on Various Approaches to Determining the Distance Matrix, by Vladimir Deart, Vladimir Mankov, Irina Krasnova Multicriteria Optimization of Virtual Machine Placement in Cloud Data Centers, by Natalia Toutova, Andrew Toutov, Anatoly Vorozhtsov, Ilya Andreev Control Sensor Network Configuration Management, by Nikolay Zakharov, Vladimir Klepikov, Dmitry Podkhvatilin Stability Analysis of a Multi-Class Retrial Queue with General Retrials and Classical Retrial Policy, by Ruslana Nekrasova One Approach in Improving Communication Quality of Smart Environment, by Narves Behlilovic Modeling Approaches of DLT for Business Purposes, by Mikhail Komarov	Deep Neural Networks for Ring Artifacts Segmentation and Corrections in Fragments of CT Images, by Anton Kornilov, Ilia Safonov, Iryna Reimers, Ivan Yakimchuk Image-Based Approaches for Automating GUI Testing of Interactive Web-Based Applications, by Federico Macchi, Pierpaolo Rosin, Juan Marcos Mervi, Luca Turchet Full Reference Video Quality Assessment Metric on Base Human Visual System Consistent with PSNR, by Anastasia Mozhaeva, Igor Vlasyuk, Aleksey Potashnikov, Lee Streeter Review of Photogrammetry Techniques for 3D Scanning Tasks of Buildings, by Mark Zaslavskiy, Maxim Kovynev Using a Hybrid Intelligent Information Systems Approach for Advertising Video Generation, by Sergey Chernobrovkin, Igor Latkin, Marina Belyanova, Yuriy Gapanyuk
12:30	30m		Q&A in Zoom with authors of **Computer Vision, Image and Video Processing I** session, Zoom 280-192-1973, passcode 535851
13:00	30m	Q&A in Zoom with authors of **Internet of Things and Future Network Technologies** session, Zoom 974-238-2704, passcode 490571	**Lunch break**
13:30	30m	**Lunch break**	
14:00	30m	**Lunch break**	**Session:** Security and Privacy Chairman: Valtteri Niemi Playlist:https://www.youtube.com/watch?v=ImCwPUeZnnI&list=PLKlZJpq1JqdMBljySrZxq3RRvYw2fmWII
14:30		**Session:** Artificial Intelligence, Robotics and Automation Systems I Chairman: Alexey Kashevnik Playlist:https://www.youtube.com/watch?v=98UsLt3bXsg&list=PLKlZJpq1JqdM0mBbj6d45j9Hwc8XhrM1p	Influence of Fractal Dimension Statistical Characteristics on Quality of Network Attacks Binary Classification, by Oleg Sheluhin, Mikhail Kazhemskiy Co-Designing Employees Data Privacy: A Technology Consultancy Company Use Case, by Waliyah Sahqani, Luca Turchet Dual Mathematical Model for Calculating of Deep Packet Inspection, by Boris Goldstein, Vadim Fitsov Comparison of Information Security Systems for Asymptotic Information Security Management Critical Information Infrastructures, by Sergey Erokhin, Andrey Petukhov, Pavel Pilyugin Threats and Security Issues in Cloud Storage and Content Delivery Networks: Analysis, by Jean
14:30	45m	Gradient Boosting Machine with Partially Randomized Decision Trees, by Andrei Konstantinov, Lev Utkin, Vladimir Muliukha Modular Approach in CNC Kernel Development, by Maxim Afanasiev, Kseniia Zimenko, Yuriy Andreev, Yuriy Fedosov, Anastasiya Krylova,	

		Sergey Shorokhov, Mikhail Kolesnikov Learning From Satisfying Assignments Using Risk Minimization, by Manjish Pal, Subham Pokhriyal	Daniel Kouam Waguia, Alexander Menshchikov Security Issues of Smart Contracts in Ethereum Platforms, by Tomas Krupa, Michal Ries, Ivan Kotuliak, Kristian Kostal, Rastislav Bencel
15:15	30m	Prediction of Telecommunication Network State Based on Knowledge Graphs, by Kirill Krinkin, Igor Kulikov, Alexander Vodyaho, Nataly Zhukova Neural ODE Machine Learning Method with Embedded Numerical Method, by Andrey Televnoy, Sergei Ivanov, Tatiana Zudilova, Tatiana Voitiuk Deep Reinforcement Learning for Path Planning by Cooperative Robots: Existing Approaches and Challenges, by Walaa Othman, Nikolay Shilov	Q&A in Zoom with authors of **Security and Privacy** session, Zoom 280-192-1973, passcode 535851
15:45	30m	Q&A in Zoom with authors of **Artificial Intelligence, Robotics and Automation Systems I** session, Zoom 974-238-2704, passcode 490571	**Session:** e-Health and Wellbeing I Chairman: Kirankumari Patil Playlist:https://www.youtube.com/watch?v=zLQ4hQCA8e4&list=PLKlZJpq1JqdNs-Lc-vySkI8EjXLwPa5uc Sensor System for Analyzing Human Respiration in Arctic Conditions, by Gennadij Lukyanov, Anna Rassadina Emotions and Activity Recognition System Using Wearable Device Sensors, by Mikhail Rumiantcev An Extensive Survey of Machine Learning Based Approaches on Automated Pathology Detection in Chest X-Rays, by Ravidu Suien Rammuni Silva, Pumudu Fernando Studying Facial Activity in Parkinson's Disease Patients Using an Automated Method and Video Recording, by Anastasia Moshkova, Andrey Samorodov, Ekaterina Ivanova, Ekaterina Fedotova, Natalia Voinova, Alexander Volkov A Hybrid Intelligence System for Assisting Individuals with Gastrointestinal Tract Diseases, by Yulia Vishnevskaya, Maria Skvortsova, Evgeny Pugachev Specifications for Biological Effects Assessment of 5G Networks on Humans, by Denis Pankratov, Dmitry Sizov
16:15	**DataWorld workshop**: Data Retrieval Performance Chairman: Michal Kvet Playlist:https://www.youtube.com/watch?v=vw8kYMAeRgo&list=PLKlZJpq1JqdOtBXFajZM8zKn_UX3L0yyY		
16:15	45m	Relational Data Index Consolidation, by Michal Kvet Development of a Model and Algorithms for Servicing Traffic in a Cloud Computing System, by Aleksandr Volkov, Sergey Stepanov Indexing of Cloud Stored Electronic Health Records for Consented Third Party Accessing, by Athanasios Kiourtis, Argyro Mavrogiorgou, Chrysostomos Symvoulidis, Charalampos Tsigkounis, Dimosthenis Kyriazis Relational Pre-Indexing Layer Supervised by the DB_index_consolidator Background Process, by Michal Kvet, Marek Kvet	
17:00	5m		Q&A in Zoom with authors of **e-Health and Wellbeing I** session, Zoom 280-192-1973, passcode 535851
17:05	25m	Q&A in Zoom with authors of **Data Retrieval Performance** session (**DataWorld workshop**), Zoom 974-238-2704, passcode 490571	
17:30	30m	**Pecha Kucha pitches for posters and demos followed by show of demos and posters;** Playlist: https://www.youtube.com/watch?v=sc2DGpt56tc&list=PLKlZJpq1JqdP0C8CgzC26YTPYcfRlidxV	
18:00	30m	The conference meetup in Zoom: discussion on demos and any other topics, Zoom 280-192-1973, passcode 535851	

January 29 (Friday)
Moscow Technical University of Communications, Moscow, Russia / Online participation by Youtube + Zoom
NOTE: Conference time is in Moscow time (GMT+3) as conference is held in Moscow, Russia

10:30	45m	Keynote talk: Application of SDN/NFV Technology in 5G Communication Networks, by Yury Mironov, MTUCI, Russia	
11:15	15m	Q&A session for the keynote talk, Zoom 280-192-1973, passcode 535851	
11:30		**Session:** Artificial Intelligence, Robotics and Automation Systems II Chairman: Alexander Smirnov Playlist:https://www.youtube.com/watch?v=q9qgijfcc6s&list=PLKlZJpq1JqdMLbWSv5-7ep7_B3jxQfKU8	**Session:** Software Design and Innovative Applications Chairman: Nikolay Teslya Playlist:https://www.youtube.com/watch?v=q1gmj6c-sfE&list=PLKlZJpq1JqdP8YndhFPx2Jts-hUdgoyMd
11:30	1h	Combining an Autoencoder and a Variational Autoencoder for Explaining the Machine Learning Model Predictions, by Lev Utkin, Pavel Drobintsev, Maxim Kovalev, Andrei Konstantinov Automatic Proving of Stability of the Cyber-Physical Systems in the Sense of Lyapunov with KeYmaera, by Sergey Staroletov SemOI: Semantic Augmentation for the Open Images Detection, by Achim Reiz, Kurt Sandkuhl, Birger Lantow Story Creation Algorithm Using Q-Learning in a 2D Action RPG Video Game, by Diego Fernandez-Samillan, Carlos Guizado-Diaz, Willy Ugarte Classification of Fruit Ripeness Grades Using a Convolutional Neural Network and Data Augmentation, by Mauricio Rodriguez, Franco Pastor, Willy Ugarte	Constructing a 3D Game with UNITY 3D Game Engine, by Gizem Boyraz, Pinar Kirci Towards CCTV-aware Routing and Navigation for Privacy, Anonymity, and Safety - Feasibility Study in Jyvaskyla, by Tuomo Lahtinen, Lauri Sintonen, Hannu Turtiainen, Andrei Costin Development of a Block of Graphical Input of Schematic and Structural Diagrams for Electra CAD, by George Dolin Designing Learning Games and Tools for Karelian Language - Considerations Based on Beginners' Experiences of Gameplay, by Leena Arhippainen, Paula Alavesa Reference Business Processes-Based Method for Multi-Tenant SaaS Architecture Deployment and Adaptation, by Artem Levchenko, Victor Taratukhin A Methodology for Testing the Microprocessor Core of a System on Chip with X86-Compatible Microprocessor, by Evgeniy Saksonov, Mikhail Dyabin, Artyom Reshetnikov Conceptual Model of Communication Service Provider Digital Twin Based on Infocommunication System Cross-Domain Model, by Sergey Kislyakov
12:30	30m	Q&A in Zoom with authors of **Artificial Intelligence, Robotics & Automation Systems II** session, Zoom 974-238-2704, passcode 490571	
13:00	30m	**Lunch break**	Q&A in Zoom with authors of **Software Design and Innovative Applications** session, Zoom 280-192-1973, passcode 535851
13:30	30m	**Lunch break**	
14:00		**Session:** Computer Vision, Image and Video Processing II Chairman: Vladimir Khryashchev Playlist:https://www.youtube.com/watch?v=eMtFDpDz6Js&list=PLKlZJpq1JqdMGCKABL8FsuZxHgAtm5jnb	**Lunch break**
14:00	15m	Segmentation of Satellite Images of the Earth's Surface Using Neural Network Technologies, by Stanislav Bagaev, Elena Medvedeva	
14:15	45m	YOLOv4 for Urban Object Detection: Case of Electronic Inventory in St. Petersburg, by	**Session:** e-Health and Wellbeing II Chairman: Dmitry Korzun

		Ebrahim Najafi Kajabad, Petr Begen, Boris Nizomutdinov, Sergey Ivanov Comparison Platform Design for Neural Network Models Evaluation in Driver Monitoring Systems, by Alexey Kashevnik, Ammar Ali Zero-Shot Semantic Segmentation Using Relation Network, by Yindong Zhang, Oleksiy Khriyenko Estimating Position of Multiple People in Common 3D Space via City Surveillance Cameras, by Igor Ryabchikov, Nikolay Teslya	Playlist:https://www.youtube.com/watch?v=gmpWJa1PDZ0&list=PLKlZJpq1JqdPMLPAzJumyXR5h5htbx0iq Epilepsy Seizure Prediction Model Based on Dual Mode EEG Overlapping Technique Using Neural Network, by Thanuja Kothakota, Kirankumari Patil, Karthik Reddy K Contribution of Various Sensory Inputs to Vertical Stance and Locomotion in Humans: Robust Assessment with Stabilography and Motion Videocapture, by Alexander Meigal, Elena Kravtsova, Liudmila Gerasimova-Meigal, Kirill Prokhorov, Aleksandra Peskova Intelligent Decision Support During Hospitalization in a Pandemic: Methodology and Process Model, by Alexander Smirnov, Nikolay Shilov, Nikolay Teslya, Elena Moll Studying the Navigation Assistance System for the Visually Impaired and Blind Persons and ICT Use by Their Caretakers, by Babar Chaudary, Iikka Paajala, Leena Arhippainen, Petri Pulli
15:00	10m	Q&A in Zoom with authors of **Computer Vision, Image and Video Processing II** session, Zoom 974-238-2704, passcode 490571	
15:10	20m		Q&A in Zoom with authors of **e-Health and Wellbeing II** session, Zoom 280-192-1973, passcode 535851
15:30	**Session:** Big Data and Data Mining, Data Storage and Management I Chairman: Alexander Geida Playlist:https://www.youtube.com/watch?v=yOj3L7EiyVw&list=PLKlZJpq1JqdMh7z4qtZydQM9KkyknEOqf		**Session:** Natural Language Processing and Speech Technologies II Chairman: Svetlana Popova Playlist:https://www.youtube.com/watch?v=6A9qrj7jCGc&list=PLKlZJpq1JqdMSF4HkZymzWCREERJmqfbe
15:30	50m	Metagraph Representation for Overcoming Limitations of Existing Knowledge Bases, by Anton Kanev, Yury Gapanyuk, Valery Terekhov Multi-Label Classification Based on Domain Analysis in Fixed Point Method, by Anna Berger, Sergey Guda Anomaly Detection Method for Aggregated Cellular Operator Data, by Mark Bulygin, Dmitry Namiot Clustering Based Approach to Enhance Association Rule Mining, by Samruddhi Kanhere, Anu Sahni, Paul Stynes, Pramod Pathak	Application of Machine Learning Methods for a e-Justice Platform, by Georgy Kopanitsa Text Creation with Artificial Neural Networks, by Oguzhan Guldibi, Batuhan Demircan, Pinar Kirci Authorship Verification of Literary Texts with Rhythm Features, by Ksenia Lagutina, Nadezhda Lagutina, Elena Boychuk, Vladislav Larionov, Ilya Paramonov Semantic Search System with Metagraph Knowledge Base and Natural Language Processing, by Anton Kanev, Valery Terekhov
16:20	25m	Q&A in Zoom with authors of **Big Data and Data Mining, Data Storage and Management I** session, Zoom 974-238-2704, passcode 490571	Q&A in Zoom with authors of **Natural Language Processing and Speech Technologies II** session, Zoom 280-192-1973, passcode 535851
16:45	**Session:** Big Data and Data Mining, Data Storage and Management II Chairman: Dmitry Namiot Playlist:https://www.youtube.com/watch?v=d-		**Session:** Smart Systems and Embedded Networks Chairman: Valentin Olenev Playlist:https://www.youtube.com/watch?v=Wf3pyVZc810&list=PLKlZJpq1JqdMd_eB7b5riMgP-

	UranxrkXE&list=PLKlZJpq1JqdPdL30yqaobjQgZ-B300-z1		IbdbvPNM
16:45	50m	Families of Alternative Stochastic Action Networks: Use for Process Science, by Alexander Geida Artificial Intelligence Methods for Services and Product Sustaining Phase, by Alexandra Sokolova, Danil Safronov, Kirill Stonozhenko, Maxim Solomonov, Igor Nikiforov, Artem Kovalev A Hierarchical Data Mining Process Ontology, by Man Tianxing, Nataly Zhukova, Myo Myint, Wang Guan, Mustafin Gabdrakhmanovich Reducing the Dimension of Input Data for IDS by Using Match Analysis, by Sergey Erokhin, Boris Borisenko, Aleksander Fadeev	Comparison of Graph Visualization Tools for the Problem of Evaluating the Characteristics of SpaceFibre Networks, by Ilya Korobkov, Danila Korobkov, Andrey Gurjanov, Anatoly Shukalov Applying MPLS Technique as On-Chip Communication Means for Network-On-Chip With Mesh Topology, by Azeddien Sllame, Hadeel Ben Rajab, Nagwa Salama SpaceFibre Virtual Channels Behavior Under Control Stimuli, by Ilya Korobkov, Danila Korobkov, Andrey Gurjanov, Anatoly Shukalov Time Synchronization in SpaceFibre Networks, by Elena Suvorova
17:35	25m	Q&A in Zoom with authors of **Big Data and Data Mining, Data Storage and Management II** session, Zoom 974-238-2704, passcode 490571	Q&A in Zoom with authors of **Smart Systems and Embedded Networks** session, Zoom 280-192-1973, passcode 535851
18:00	10m	**Official closing of the 28th FRUCT conference,** Zoom 280-192-1973, passcode 535851	

Demos/Posters Session of the 28th FRUCT Conference

The first part of the Demos/Posters section is a promotional section to present/introduce demo projects to the public. Presentations will be done as 2 minutes videos on Youtube in the Pecha Kucha style. The second part of the session will be held in form of open discussion held by Zoom teleconference.

All conference participants are warmly welcome to take part in voting for the best demo/poster of the 28th IEEE FRUCT conference by giving your "Like" for the demos you like the most. One person can vote for as many demos as he/she liked. If you have some special requirements please contact organizing committee by email info@fruct.org.

Pecha Kucha Presentation Format

Pecha Kucha is a presentation technique where a speaker shows a definite number of slides (usually 20 or 15), each for 20 seconds. The slides are changed automatically. The main intention for Pecha Kucha presentation style is to prevent participants from being too verbose and to make their talks more dynamic and impressive.

Pecha Kucha Night is an event where each speaker uses Pecha Kucha presentation, and speakers change each other in non-stop fashion. Initially invented by architects, this kind of event is often used to present creative projects or work; nowadays it is also used for R&D talks too. Pecha Kucha Night format allows all participants to make announcements about their demos in attractive and time-efficient way. That is why we have chosen this format for demo promotion section at FRUCT conference. More information can be found at http://www.fruct.org/demo28.

How to prepare Pecha Kucha presentation

Here is an instruction on how to prepare your Pecha Kucha style presentation for Demo promotion section. Your presentation must contain exactly 6 slides, and each of them will be displayed for 20 seconds. The slides will be changed automatically. The presentation will take exactly 2 minutes (it should be noted that classical Pecha Kucha has 20 slides, but we have to reduce the number due to a large amount of submitted presentations). Provide the information about yourself and your presentation on the first slide (name, institution, title of your presentation).

The main purpose of your talk would be to interest people, so your presentation should make absolutely clear the main ideas of your project and explain what you plan to show at the demo stand. Make your presentation fascinating to attract attendees and avoid technical details in your talk. Reveal one main idea on each slide. Do not overload your slides with information. Remember, that each slide is displayed only for 20 seconds. Place no more than 2 lines of text per slide, or one big picture. Avoid using slide titles. Do not duplicate the same slides in your presentation — it is cheating! If you see that 20 seconds for a particular slide is not enough for you, try to decouple it into the two or more, or omit the details. Do not place "Thank you" or "Q&A" slides in the presentation. Pecha Kucha session does not imply any questions from the auditory. All the questions will be asked afterwards in a poster room. Prepare your speech thoroughly and beforehand. As you have only 20 seconds per slide, it is quite impossible to improvise during the talk. Rehearse your speech several times to be sure in the absence of pauses when you wait for the slide change, or accelerations when you fails to follow your slides. Try to speak in the same pace during all the presentation. It definitely depends on your text, so try to prepare near the same amount of text in speech for each slide.

Check list

- Use exactly 6 slides.
- Place information about yourself and your presentation (name, institution) on the first slide.
- Reveal one main idea on each slide.
- Place no more than 2 lines of text or 1 large image per slide.
- Do not duplicate the same slides, do not place "Thank you" or "Q&A" slides in the presentation.
- Do not use any slide change animation.
- Prepare your speech thoroughly and do not forget to rehearse it.

List of Demos/Posters (*preliminary list based on submissions by January 25, 2021*)

1. ***Poster:*** Intelligent Data Selection in Robot Movement, by Dmitry Korzun and Olga Bogoiavlenskaia, ***Petrozavodsk State University***

Autonomous mobile robots have been discovering recently a wide range of applications in various areas of human activities. A robot uses many data sources (sensors) to recognize its current situation, including video, inertial, acoustic, mechanical stress. The data flows from such sources are redundant, with high rate, and contain much information about the ongoing events. Recognized events are input for the robot movement control. The number of ongoing events can be large. They have different importance for the movement control. In this work-in-progress paper, we consider a method for intelligent data selection. The method is based on the Additive Increase Multiplicative Decrease (AIMD) algorithm. The effect is in filtering the most significant information to forward to the robot movement control.

2. ***Poster:*** Deviation Detection in Industrial Rotary Machinery Diagnostics, by Vladislav Ermakov, Kirill Rudkovskiy and Dmitry Korzun***, Petrozavodsk State University***
   The industrial Internet of Things (IIoT) applies monitoring of technical state and utilization conditions for rotary machinery. Monitoring is based on multiple sensors that embed or surround the machinery under monitoring. The sensed data are used for diagnostics of machinery operation and utilization. In this work, we consider existing approaches for diagnostics. We focus on construction of a digital profile for the given machinery, on transformation of raw sensed data for further analysis, and on the model of deviation detection in machinery technical state.
3.

FOR NOTES

The 28th IEEE Conference of Open Innovations Association FRUCT

Program

Moscow, Russia
27-29 January 2021

A special word of thanks goes to the

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CALL FOR PARTICIPATION

29th IEEE Conference of Open Innovations Association FRUCT

Tampere, Finland, 12-14 May 2021

Overview

FRUCT is a large Pan-European cooperation network that promotes open innovations of academia and industry. FRUCT conference is a high-quality scientific event for meeting academia and business people and setting projects. The average conference is attended by 150+ participants representing over 30 member organizations and guests from whole world, e.g., Russia, Finland, Italy, UK, Denmark, India, Brazil, etc.. The average **acceptance rate is 40%**. A lot of industrial players traditionally take part in the conference, including, Dell EMC, Nokia, MariaDB, Intel, Jolla, Open Mobile Platform, etc. The conference attracts most active and talented students to present their R&D projects, meet people alike, create new teams, and find employers and investors. The conference invites the world-class academic and industrial experts to lecture on the hottest topics. We welcome everybody to submit papers and take part in the conference, present your research results and join activities of the FRUCT Association. Due to COVID-19 situation the 29th IEEE FRUCT conference **allows both onsite and distant participation**.
Traditionally the conference offers low registration fee. FRUCT doesn't offer deadline extension, but **we offer Early-bird submission** option. For further details please refer to http://www.fruct.org/cfp29.

List of conference topics

- ✓ Internet of Things and enabling technologies
- ✓ Next Generation Networks, Wireless Technologies, 5G
- ✓ Smart Spaces, Linked Data and Semantic Web
- ✓ Big Data, Data Mining, Data Storage and Management
- ✓ Knowledge and Data Managements Systems
- ✓ Location Based Services: e-Tourism/Logistics/Navigation
- ✓ Open Source Mobile OS: Architectures and Applications
- ✓ Security and Privacy: Applications and Coding Theory
- ✓ Natural Language Processing, Speech Technologies
- ✓ Software Design, Innovative Applications
- ✓ Relational databases, Spatial databases, SQL tuning
- ✓ Bioinformatics, e-Health and Wellbeing
- ✓ Sensor Design, Ad-hoc and Sensor Networking
- ✓ Context Awareness and Proactive Services
- ✓ Artificial Intelligence, Robotics and Automation
- ✓ Computer Vision, Image and Video Processing
- ✓ Smart Systems and Embedded Networks
- ✓ Crowdsourcing and Collective Intelligence
- ✓ Intelligence, Social Mining and Web
- ✓ IoT and CPS solutions for societal challenges
- ✓ Drones and IoT convergence, Embedding flying sensors and actuators in IoT Infrastructures

Call for papers

Depending on the type and maturity level please submit your work into one of the following 3 categories:

1. **Full paper** (min 6 full pages, max 12 pages) **OR** 2. **Short paper** (min 2 pages, max 6 pages)

Submission deadline: 12 March 2021 **Early-bird deadline: 19 February 2021**

Notification of acceptance: **9 April 2021** Camera-ready deadline: **16 April 2021**

3. **Poster / Demo proposal:** submission deadline: **7 May 2021**

Publication

All submitted Full Papers will be peer reviewed by the technical committee. Accepted Full papers and extended abstracts are published in the proceeding of FRUCT conference (ISSN 2305-7254). The accepted Full Papers will be included to **IEEE Xplore** and **DOAJ,** indexed by **Scopus**, **ACM, Web of Science, RSCI/РИНЦ** (as journal publication), **DBLP**, etc. The selected papers get invitations to publish extended papers in partner journals, e.g., **IJERTCS**. The Full Papers are in **Scimago Journal Rank** (SJR) http://scimagojr.com/journalsearch.php?q=21100305223&tip=sid. FRUCT is **rated by many systems**, e.g., **Finnish (JUFO=1**, ID: 72707**)**, **Norwegian** (NSD=1), **Danish** (BFI=1, ID: 8782540).

Contacts

Paper templates, conference news and other relevant details are available at http://www.fruct.org/conference29. If you get some questions that are not covered at the conference web page, feel free to send email to info@fruct.org.