



Program of The 33rd Conference of Open Innovations Association FRUCT

Žilina, Slovakia
24-26 May 2023



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**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 QUÆLIBET!
SEMPER SINT IN FLORE!**

**VIVANT OMNES VIRGINES
FACILES, FORMOSÆ!
VIVANT ET MULIERES,
TENERÆ, AMABILES,
BONÆ, LABORIOSÆ!**

**VIVAT ET RESPUBLICA,
ET QUI ILLAM REGIT!
VIVAT NOSTRA CIVITAS,
MÆCENATUM CARITAS,
QUÆ NOS HIC PROTEGIT**

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

Welcome to the University of Žilina, modern and open university with rich tradition

At present there are about 8,000 students being educated at seven faculties in 172 accredited fields of study in all forms and degrees of university studies at the University. In its over 70 years of successful existence it has become the alma mater for more than 88,000 graduates, highly skilled professionals specialising mostly in transport and technical fields as well as in management, marketing or humanities. The quality and readiness of our graduates for the needs of practice is proved by long-term high interest in hiring them by employers that cooperate with the University in the recruitment process.

In the field of science and research, our University participates in 200 national and 41 international scientific projects and organises about 60 scientific and professional events annually. There were two new significant work places established within the Operational Programme Research and Development in 2013 – University Science Park and Research Centre. Results of science and research activities of the University have an important influence not only on the educational activities but also on the development of international cooperation or interconnection with practice. One of the proofs of successful transfer of science and research results into practice is the Award for Technology Transfer for the team of authors from the Faculty of Mechanical Engineering at the University of Žilina.

The cooperation with foreign universities and institutions is crucial for our University. The University has signed bilateral cooperation agreements with more than 150 foreign partners and it belongs to the most successful universities within the Erasmus Programme, both in the number of seconded staff and students. It successfully participated in the student mobility programmes with Brazil and Korea in 2014. Students of the University of Žilina study in modern and well-equipped classrooms and laboratories centralised on the complex and modern university campus at Veľký Diel, located in quiet surroundings nearby a forest park but at a reasonable walking distance from the accommodation facilities as well as the historical centre of Žilina. University of Žilina has a burning ambition to continue in dynamic growth, to provide high quality education, to educate well-prepared and demanded graduates, to develop international cooperation both in science and education; however, its major aim is primarily to provide space and opportunities for the young generation to discover new, to broaden horizons, to learn how to cooperate, communicate and respect each other.

Rector





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Practical Information

The FRUCT33 conference is held in a hybrid mode. The first day (May 24, 2023) and the first half of the second day (May 25, 2023) are reserved for onsite presenters. The second half of the second day and the third day (May 26, 2023) are reserved for online conference. Correspondingly the conference processes are adapted to best fit on site and online participation correspondingly. For the onsite day we are going to use the traditional format of presentations at **University of Žilina, Faculty of Management Science and Informatics (not rectorship), address: Univerzitná 8215/1, 010 26 Žilina, Slovakia**. In addition the sessions will be broadcasted online.

For the online part of the conference, all presentations are pre-recorded by the authors and uploaded to Youtube. The conference program contains links to individual presentations and playlists of all talks for each session. All conference sessions consist of two modules:

- 1) **Self-watching of the presentations on Youtube.** You are welcome to use the advantages of online participation and freely manage your time. You can ask questions in the comments of the videos. Please subscribe to the FRUCT youtube channel as it will help us to organize video streaming in the future.
- 2) **Questions and Answers (Q&A) in MS Teams.** MS Teams links are in the conference program. We recommend joining a Teams session in audio mode (without video). Please prepare your questions/comments to the authors and use this time to discuss the presented works.

The conference time is CEST (GMT/UTC+2), which corresponding to Slovakia time zones. The MS Teams links are published in the conference program. You are welcome to watch video presentations in advance. Please note that all online presentations will be available online starting from Monday, May 22, 2023. If you have any further questions don't hesitate to email us at info@fruct.org.

Authors of the selected conference papers get an invitation to publish an extended version of the paper in our 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 publish extended version of the paper in the International Journal of Embedded and Real-Time Communication Systems (IJERTCS) (ISSN 1947-3176, Scopus indexing, etc.)



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Authors of the best papers of FRUCT conference can get invitation to publish extended version of the paper in the Inventions Journal (Scopus, WoS, CiteScore 5.2, rank'21: 47/300, Q1) with **30% discount**.



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Authors of the best papers of FRUCT conference can get invitation to publish extended version of the paper in the Electronics Journal (Scopus, WoS, impact factor 2.690, CiteScore 3.7) with **10% discount**.

The proceedings of 33rd FRUCT conference are available online:

Issue 1: <https://fruct.org/publications/fruct33/>

Issue 2: <https://fruct.org/publications/acm33/>

General Facts and Statistics for the 33rd FRUCT Conference:

Total submissions: **104**
Total authors: **269**

Accepted Full Papers: **42**
representing **28** countries

Acceptance rate: **40%**
from **all continents**



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Organization Committee of the 33rd FRUCT conference

Local Chair: Michal Kvet

Publishing team leader: Tatiana Tyutina

FRUCT President: Sergey Balandin

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Program of the 33rd FRUCT conference

May 24-26, 2023, Žilina, Slovakia

University of Žilina, Faculty of Management Science and Informatics,
Address: Univerzitná 8215/1, 010 26 Žilina, Slovakia / Online participation

NOTE: Conference time is Slovakia time (CEST, GMT/UTC+2) as conference is held in Žilina, Slovakia

DATE	TIME	PROGRAM		
24.05.23	09:30-10:00	Onsite registration to the 33 rd FRUCT conference		
	10:00-11:10	<u>Opening of the 33rd FRUCT conference</u>		
	11:20-12:10	<u>Keynote talk: Flexible Reasoning in Two Layer Agent-Based Architecture ABAsim, by Michal Varga, University of Žilina</u>		
	12:10-13:00	Lunch		
	13:00-14:00	<u>Keynote talk: Developing Robust Date- and Time-Oriented Applications in Oracle Cloud, by Michal Kvet, University of Žilina</u>		
	14:00-14:30	Coffee break		
	14:30-15:45	<u>The 6th DataWorld workshop I</u>		
	15:45-16:15	Coffee break		
	16:15-17:00	<u>The 6th DataWorld workshop II</u>	<u>Computer Vision, Image and Video Processing I</u>	
25.05.23	09:00-10:00	<u>Keynote talk: Transforming Higher Education: Meeting the Demand for Distance and Independent Learning in the Digital Age, by Frane Urem, Polytechnic of Šibenik</u>		
	10:00-10:30	Coffee break		
	10:30-11:45	<u>Innovative applications</u>	<u>Networks and Applications</u>	
	11:45-13:00	Lunch		
	13:00-15:00	<u>Artificial Intelligence and Innovative Applications</u>	<u>Big Data Analysis and Applications</u>	<u>Oracle Cloud Analytics Day + discussion</u>
	15:00-16:45	<u>Robotics Applications</u>	<u>Natural Language Processing and Text Analysis</u>	
	16:45-17:00	Break		
	17:00-18:30	<u>Demos & Posters Session</u>		
26.05.23	09:30-10:30	<u>Innovative Network Technologies</u>		
	10:30-11:45	<u>Computer Vision, Image and Video Processing II</u>		
	11:45-12:00	<u>Official closing of the 33rd FRUCT conference</u>		



KEYNOTE SPEAKER



Ing. Michal Varga, PhD. - is an assistant professor at the University of Žilina, Slovakia. For 9 years, he participated in developing a simulation tool to create and apply universal and detailed simulation models of transportation logistic terminals and their technological processes. In his research, he focuses on simulation models of transportation systems and pedestrian movement. He participates in national and international projects focused on the motivation of students to study STEM-oriented programs at universities.

Keynote talk: **Flexible Reasoning in Two Layer Agent-Based Architecture ABASim**, May 24, 10:30

Abstract: Agent-oriented simulation makes it possible to study complex systems together with aspects of these systems, such as emergency or self-organization that are hard to model when using other approaches. To create valid simulation model, proper agent architecture must be utilized. Architecture ABASim is two-layer agent architecture, which can be used with benefits to model complex service systems. The talk will present its key elements – agents, their components, and communication mechanisms among them. The core of the talk will be focused on different approaches to model agent's reasoning and the ability of agent to adapt different reasoning according to specific situations. The utilization of architecture in pedagogical praxis at the Faculty of Management Science and Informatics and participation of students of faculty in the development of the architecture will be reviewed. Lastly, its application in simulation models used in commerce will be presented.



Michal Kvet - is an associate professor at the University of Žilina. He teaches Database systems, Application development in Oracle APEX at the bachelor study level and Advanced Database systems at the master study and doctoral levels. His research primarily focuses on temporal databases, data analytics, indexing, and database system performance. He is a recognized professional and researcher in database systems by hosting lectures and co-organizing several research conferences and database workshops in Europe. He holds several certifications from Oracle and was rewarded as Oracle ACE in 2021. He implements various Erasmus + projects dealing with database analytics, cloud computing, and data-driven application development. He recently published a new book dedicated to date and time processing in Oracle databases by Packt Publishing.

Keynote talk: **Developing Robust Date- and Time-Oriented Applications in Oracle Cloud**, May 24, 13:00

Abstract: Proper date and time management is critical for the development and reliability of Oracle Databases and cloud environments, which are among the most rapidly expanding technologies today. This knowledge can be applied to cloud technology, on-premises, application development, and integration to emphasize regional settings, UTC coordination, or different time zones. The keynote will drive you through the complexity of the date and time management and processing to ensure robustness and applicability in any region by applying local rules and habits. You'll get to grips with data types, constructor principles, and existing functionalities and focus on the limitations of regional parameters and time zones, which help in expanding business to other parts of the world. You'll also explore SQL injection threats, temporal database architecture, using Flashback Technology to reconstruct valid database images from the past, time zone management, UTC synchronization across regions, and many more. During the keynote, a new book *Developing Robust Date and Time Oriented Applications in Oracle Cloud: A comprehensive guide to efficient date and time management in Oracle Cloud* published by Packt Publishing, will be presented. Get inspired.



Dr. Frane Urem - is a Vice Dean and Professor at the Polytechnic of Šibenik and the University of Zadar. He lectures on software engineering, databases, and the design of information systems. With a Ph.D. in Computer Engineering and prior professional experience in the IT industry, Frane possesses expertise in various areas of computer science. He is a strong advocate of project-based and non-formal learning. Additionally, as an Oracle Academy trainer, he provides training sessions to colleagues across Central and Eastern Europe.

Keynote talk: **Transforming Higher Education: Meeting the Demand for Distance and Independent Learning in the Digital Age**, May 25, 10:00

Abstract: This keynote speech will address the challenges and opportunities the post-Covid higher education landscape presents. The focus will be on student-centric education, particularly on performance and outcomes in information technology. In addition, the speech will explore how innovative educational methods can be developed to meet the demands of an evolving and uncertain labor market.

Collaboration and innovation among higher education institutions, industry partners, and policy-makers will also be highlighted as essential in meeting these challenges. Finally, the potential impact of these changes on the future of higher education and the workforce will be discussed, emphasizing inspiring higher education leaders to embrace the opportunities presented by this rapidly evolving landscape.



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Program of the 33rd FRUCT conference

May 24 (Wednesday), University of Žilina, Faculty of Management Science and Informatics,

Address: Univerzitná 8215/1, 010 26 Žilina, Slovakia / Online participation

NOTE: Conference time is Slovakia time (CEST, GMT/UTC+2) as conference is held in Žilina, Slovakia

09:30	30m	Onsite registration to the 33rd FRUCT conference	
Onsite Session: Opening and Plenary session of the 33rd FRUCT conference , Chairman: Michal Kvet Auditorio:RC009			
10:00	10m	Welcome words of behalf of University of Žilina and practical information, by Emil Kršák and Michal Koháni	
10:10	10m	Welcome words of behalf of FRUCT Association and practical information, by Sergey Balandin	
10:20	15m	Welcome words – Oracle	
10:35	15m	Welcome words – Brain:IT	
10:50	20m	Invited speech: Architecture of an antiplagiarism system for source codes, by Patrik Hrkút	
11:10	10m	Invited speech: eduLDT: Bringing inclusive design thinking to technically-oriented subjects to create innovative solutions for a better society, by Dana Kušnířová	
11:20	50m	Keynote talk: Flexible Reasoning in Two Layer Agent-Based Architecture ABAsim , by Michal Varga, University of Žilina	
12:10	50m	Lunch	
13:00	1h	Keynote talk: Developing Robust Date- and Time-Oriented Applications in Oracle Cloud , Michal Kvet, University of Žilina	
14:00	30m	Coffee break	
Onsite Session: The 6th DataWorld workshop I		Chairman: Ivan Cimrák	
Auditorio: RC009			
14:30	15m	Identifying and Treating NULL Values in the Oracle Database – Performance Case Study, by Michal Kvet (University of Žilina)	
14:45	15m	Data sharing in RoPax Ports: Challenges and Opportunities, by Bogdan Iancu, Andrei-Raoul Morariu, Yiran Chen, Irina Wahlström, Anastasia Tsvetkova, and Johan Lilius (Åbo Akademi University)	
15:00	15m	Comparison of Unigram, HMM, CRF and Brill's Part-of-Speech Taggers Available in NLTK Library, by Michal Kvet, Miroslav Potočár (University of Žilina)	
15:15	15m	Discussion and reserve	
15:30	30m	Coffee break	
Onsite Session: The 6th DataWorld workshop II		Onsite Session: Computer Vision, Image and Video Processing I	
Chairman: Michal Kvet		Chairman: Miroslav Kvašřay	
Auditorio: RC009		Auditorio: RC006	
16:00	15m	Hyperheuristics for Determination of Non-dominated Set of Public Service System Designs, by Marek Kvet (University of Žilina)	Vehicle Offline Localization Based on Computer Vision: an Approach Based on Image Matching & Retrieval Algorithms and Implementation, by Alexey Kashevnik (SPIIRAS), Ammar Yaser Ali (ITMO University)
16:15	15m	Domain Blacklist Efficacy for Phishing Web-page Detection Over an Extended Time Period, by Ivan Skula, and Michal Kvet (University of Žilina)	Digital Verification of Optically Variable Ink Feature on Identity Cards, by Lucia Piatriková, Peter Tarábek, and Ivan Cimrāk (University of Žilina)
16:30	15m	Decision Trees in Proper Edge k-coloring of Cubic Graphs, by Adam Dudáš, and Bianka Modřovičová (Matej Bel University)	Contact-Less Oxygen Saturation Detection Based on Face Analysis: An Approach and Case Study, by Batol Hamoud (ITMO University), Walaa Othman (ITMO university), Alexey Kashevnik (SPIIRAS), Nikolay Shilov (SPIIRAS)
16:45	15m	Information system for crime monitoring in Europe, by Marek Kvet (University of Žilina)	Human Sales Ability Estimation Based on Interview Video Analysis, by Kenan Kassab (ITMO), Alexey Kashevnik (SPIIRAS), Aleksande V Maiatin (ITMO University)
17:00	15m	Reserved for discussion	Platform Attestation in Consumer Devices, by Arto Niemi, Vijay Nayani, Mariam Moustafa, and Jan-Erik Ekberg (Huawei Technologies Oy, Finland)
17:15		Closing of the Day	



May 25 (Thursday), University of Žilina, Faculty of Management Science and Informatics,

Address: Univerzitná 8215/1, 010 26 Žilina, Slovakia / Online participation

NOTE: Conference time is Slovakia time (CEST, GMT/UTC+2) as conference is held in Žilina, Slovakia

09:00	1h	Keynote talk: Transforming Higher Education: Meeting the Demand for Distance and Independent Learning in the Digital Age , by Frane Urem, Veleučilište u Šibeniku Auditorio: RC009	
10:00	30m	Coffee break	
Onsite Session: Innovative Applications Chairman: Adam Dudáš Auditorio: RC009		Onsite Session: Networks and Applications Chairman: Timofey Turenko Auditorio: RC006	
10:30	15m	A Format-sensitive BERT-based Approach to Resume Segmentation, by Albeiro Espinal, and Yannis Haralambous (IMT Atlantique), Dominique Bedart (DSI Global Services), John Puentes (IMT Atlantique, Lab-STICC, CNRS UMR 6285)	On Open Gateway from GSMA – Is it a Revolutionary or Too Little and Too Late Deal?, by Manfred Snepš-Sneppe (AbavaNet), Dmitry Namiot (Lomonosov Moscow State University)
10:45	15m	Current Trends in the Search for Similarities in Source Codes with an Application in the Field of Plagiarism and Clone Detection, by Patrik Hrkut, Michal Ďuračík, Štefan Toth, and Matej Meško (University of Žilina)	Enhanced derived Fast Reroute techniques in SDN, by Michal Hraška, and Jozef Papán (University of Žilina)
11:00	15m	The Underground for Value Platform, by Sergey Balandin (FRUCT Association / Tampere University)	Comparing Autoencoder and Isolation Forest in Network Anomaly Detection, by Timotej Smolen, and Lenka Benova (Slovak University of Technology)
11:15	15m	DeFi gaming platform using the layer 2 benefits, by Lukas Mastilak, and Kristián Košťál (Slovak University of Technology in Bratislava)	A System Approach in a WiFi Network Design, by Ivana Bridova, and Marek Moravcik (University of Žilina)
11:30	15m	Discussion and reserve	Discussion and reserve
11:45	1.15h	Lunch break	
13:00	3.45h	Onsite event: Oracle Cloud Analytics Day (Auditorio: RC009)	
13:00	15m	Intro: Oracle Academy in CEE , by Darko Jureković	
13:15	45m	Overview of the Oracle Cloud , by Vladimír Straka	
14:00	45m	Oracle Application Express , by Peter Raganitsch	
14:45	45m	Oracle Analytics Cloud , by Ljiljana Perica	
15:30	45m	Oracle for Research , by Richard Pitts	
16:15	30m	Discussion	
13:00	3.45h	Online sections of the FRUCT33 conference: self-watching Youtube + Q&A session in MS Teams	
Online Session: Artificial Intelligence and Innovative Applications Chairman: Rajeev Kanth Auditorio: RC001 Playlist: https://www.youtube.com/watch?v=sdinl5x3Huc&list=PLKIZJpq1JqdPmLiQBqR8uWhc-jmePDSA		Online Session: Big Data Analysis and Applications Chairman: Dmitry Korzun Auditorio: RC006 Playlist: https://www.youtube.com/watch?v=fIRqCd4Zcbk&list=PLKIZJpq1JqdOaHrdot6dkUF6EkcHI9SCg	
13:00	1.15h	An Image Classification Method Using Hashing Preprocessing , by Sergei E Ivanov, Tatiana Victorovna Zudilova, Alexander O Ruban, Igor V Anantchenko, and Lubov N Ivanova (ITMO University) Multimodal Emotion Recognition and Sentiment Analysis Using Masked Attention and Multimodal Interaction , by Tatiana Voloshina, and Olesia Makhnytina (ITMO University) SmartHealth: a Service-based Platform for Information Integration and Clinical Evaluation Support , by Inês Lopes (Fraunhofer Portugal)	Fast Discovery of Inclusion Dependencies with Desbordante , by Alexander A Smirnov, Anton Chizhov, Ilya Shchuckin, Nikita Bobrov, and George Chernishev (Saint-Petersburg State University) Recommending Machine Learning Pipelines Based on Cumulative Metadata , by Maxim Aliev, and Sergey B Muravyov (ITMO University) FastGFDs: Efficient Validation of Graph Functional Dependencies with Desbordante , by George Chernishev, Anton Chernikov, Yurii Litvinov, and Kirill Smirnov (Saint-Petersburg State University) Vulnerability Categorization for Fast Multistep Attack Modelling , by Dmitry Levshun, and Andrey



		<p>Recognition of Diffuse Hepatic Steatosis, by Danil Yevdokimov, and Viacheslav Gorikhovskii (Saint Petersburg State University)</p> <p>Model for the Prediction of Dropout in Higher Education in Peru applying Machine Learning Algorithms: Random Forest, Decision Tree, Neural Network and Support Vector Machine, by Omar A Jimenez, Ashley Jesús Llontop, and Lenis Wong (Universidad Peruana de Ciencias Aplicadas)</p> <p>Web Tool for Automated Document Formatting Verification, by Andrei Berezhev, and Viacheslav Martsinkevich (ITMO University)</p> <p>Enhancing Eye Emotion Recognition with the Haar Classifier Using Co-Evolutionary Hybrid Intelligence, by Grusha G S, Dharani Dharan, and Nikhil M (East West Institute of Technology), Kirill Krinkin (krinkin.com), Yulia Shichkina (ETU), Nagabhushana T N (East West Institute of Technology)</p>	<p>Chechulin (SPC RAS)</p> <p>Towards a Dataset of Programming Contest Plagiarism in Java, by Evgeniy Slobodkin, and Alexander Sadovnikov (Sirius.Courses)</p> <p>Performance Evaluation of Ordering Services and Endorsement Policies in Hyperledger Fabric, by Christopher G Harris (University of Northern Colorado)</p>
14:15	10m		<p>Q&A for the Big Data Analysis and Applications session</p>
14:25	20m		
14:45		<p>Q&A for the Artificial Intelligence and Innovative Applications session</p>	
14:45	15m		<p>Online Session: Natural Language Processing and Text Analysis Chairman: Ksenia Lagutina Auditorio: RC006 Playlist: https://www.youtube.com/watch?v=a6bOCvR1Hq4&list=PLKIZJpq1JqdNMY9jxtF7LSScDogINeNSn</p>
		<p>Online Session: Robotics Applications Chairman: Nikolay Teslya Auditorio: RC001 Playlist: https://www.youtube.com/watch?v=s0KcOZRInXk&list=PLKIZJpq1JqdNdGa5uwJxafCXJf9Po-8Hk</p>	<p>Detection of Truthful, Semi-truthful, False and Other News with Arbitrary Topics Using BERT-based Models, by Elena Shushkevich, and John Cardiff (Technological University of Dublin)</p> <p>Automatic Irony and Sarcasm Detection in Russian Sentences: Baseline Methods, by Maksim Kosterin, Ilya Paramonov, and Nadezhda Lagutina (P.G. Demidov Yaroslavl State University)</p> <p>Sentiment Analysis of Literary Texts vs. Reader's Emotional Responses, by Tatiana Sherstinova (National Research University Higher School of Economics, Saint Petersburg), Anna Moskvina (Saint-Petersburg State University)</p> <p>Enhancing Human-Computer Interaction through Emotion Recognition in Real-Life Speech, by Eshwari Rao K P (NA), Anjan S (NA), Nagabhushan T N (East West Group of Institutions), Kirill Krinkin (krinkin.com), Yulia Schichkina (ETU)</p> <p>Comparison of Algorithms for Automatic Terminology Extraction on Material of Educational Texts on Biology, by Ilia Tomin, Elvira Sharifullina, and Farida Ismaeva (Kazan Federal University)</p> <p>A Brief Overview of Few-Shot Prompting in the Large Language Models, by Vladlen Kulikov (Consultant), Radoslav Neychev (Harbour.Space University)</p> <p>AMPEL: An Approach for Machine-learning Based</p>
15:00	1.10h	<p>Review of Drone Swarms Usage for 3D Reconstruction, by Dmitry Ivanov, and Mark Zaslavskiy (SPB ETU "LETI")</p> <p>Dynamic Environments and Robust SLAM: Optimizing Sensor Fusion and Semantics for Wheeled Robots (demo), by Andrey Penkovskiy, and Jaafar Mahmoud (ITMO University)</p> <p>Distributed Visual-Based Ground Truth System For Mobile Robotics, by Sergey Sorokumov, and Sergey Glazunov (Saint Petersburg Electrotechnical University "LETI"), Konstantin Chaika (Constructor University)</p> <p>Conceptual Modeling of Information Quality for System Actions, by Alexander S Geyda (SPC RAS)</p> <p>Influence of the Output Circuits in Piezoelectric Vibrational Harvesters, by Rumyana A Stoyanova, and Dimo Kolev (TU Gabrovo)</p> <p>Some Methods of Applying Attributes for the</p>	



		Definition of Static Semantics , by Ludmila N. Fedorchenko), and Alexander Geyda (SPIIRAN)	Prediction and Evaluation of the Learned Success of Social Media Posts , by Max-Emanuel Keller, Alexander Döschl, and Peter Mandl (Munich University of Applied Sciences)
16:10	35m	Q&A for the Robotics Applications session	Q&A for the Natural Language Processing and Text Analysis session
16:45	15m	Break	
17:00	1.5h	Demo & Poster Session in hybrid mode combined with Social Event (pre-recorded presentations) Playlist: https://www.youtube.com/watch?v=vIFwYwGb0uM&list=PLKIZJpq1JqdPHYEomvsGi3PJZLUAhbZic , Auditorio: RC-ATRIUM	
18:30		Closing of the Day	

May 26 (Friday)

University of Žilina, Univerzitna 8215/1, 010 26 Žilina, Slovakia / Online participation

NOTE: Conference time is Slovakia time (CEST, GMT/UTC+2) as conference is held in Žilina, Slovakia

09:30		Online Session: Innovative Network Technologies Playlist: https://www.youtube.com/watch?v=n3d2MnyA2kw&list=PLKIZJpq1JqdPJa0B0E6ioNdbMDpdzxb2X	Chairman: Jozef Papán
09:30	40m	Changing the Properties of the Audio Broadcast Signal In Adaptive Transmission Channels , by Tatiana Vasilevnaa Chernysheva, Oleg Popov, Andrey Borisov, Pavel Saponov, and Kirill Orlov (MTUCI) Decentralised Authentication Protocol for Devices & Users to Access Private Network Services Using Blockchain , by Shashi Prakash Aenugutala, Praneeth Gosu, Rishik Tanguturu, Tyson Baptist D Cunha, Kiran M (National Institute of Technology Karnataka) A Novel Emotion-Aware Networking Model for Enhanced User Experience in 5G Networks , by Viktor Stoykov (Technical University - Sofia) Stand Alone and Clustered Base Stations Approaches for AI Based Congestion Prediction on ORAN RIC Layer , by Ibraheem A Alqwaiz, and Ibrahim S Alnomay (KACST)	
10:10	20m	Q&A for the Innovative Network Technologies session	
10:30		Online Session: Computer Vision, Image and Video Processing II Playlist: https://www.youtube.com/watch?v=2avzNZowUUM&list=PLKIZJpq1JqdNxe8OI4EnsY7YPHx4FRuWu	Chairman: Marek Kvet
10:30	50m	Efficient Deep Learning Algorithm for Egyptian Sign Language Recognition , by Mostafa A Abdelrazik (Benha Faculty of Engineering), Abdelhalim Zekry (Electronics and Communication Department Ain Shams University), Wael Mohamed (Benha Faculty of Engineering) Research and Application of the Adaptive Model of the Human Visual System for Improving the Effectiveness of Objective Video Quality Metrics , by Vladimir A Mazin, and Ksenia Nezhivleva (Moscow Technical University of Communications and Informatics), Michael Cree (University of Waikato), Lee Streeter (University of Waikato), Anastasia Mozhaeva (The University of Waikato) Enhancing Robustness and Accuracy of 3D SLAM Algorithm Using Dempster-Shafer Theory , by Tatiana Berlenko (JetBrains Limited) Vision Based Stationary Railway Track Monitoring System , by Mirjam Klammsteiner, and Mario Döller (University of Applied Sciences Kufstein) Transformer-Based Dual-Modal Visual Target Tracking Using Visible Light and Thermal Infrared, by Pengfei Lyu (Nanjing University of Aeronautics and Astronautics)	
11:20	25m	Q&A for Computer Vision, Image and Video Processing II session	
11:45	15m	Official closing of the 33rd FRUCT conference	

**Thank you and looking forward to see you at the 34th FRUCT in Riga, Latvia on November 15-17, 2023!
(Note that the 34th FRUCT conference allows online participation)**

Cloud Analytics Day

part of the conference FRUCT33

25th May 2023 Thursday



VENUE:

Faculty of Management Science and Informatics
Univerzitná 8215/1, 010 26 Žilina, Slovakia

TOPICS:

- 13:00 - Oracle Academy in CEE (Darko Jureković)
- 13:15 - Oracle Cloud Infrastructure (Vladimír Straka)
- 14:00 - Oracle Application Express (Peter Raganitsch)
- 14:45 - Oracle Analytics Cloud (Ljiljana Perica)
- 15:30 - Oracle for Research (Richard Pitts)



Developing Robust Date and Time
Oriented Applications in Oracle Cloud



UNIVERSITY OF ŽILINA
Faculty of Management Science
and Informatics



Co-funded by the
Erasmus+ Programme
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1ST EDITION

Developing Robust Date and Time Oriented Applications in Oracle Cloud

A comprehensive guide to efficient
date and time management in Oracle Cloud

MICHAL KVET

**400+ pages on DEVELOPING ROBUST DATE AND TIME
ORIENTED APPLICATIONS IN ORACLE CLOUD :**
**A comprehensive guide for efficient Date and Time
management in Oracle Cloud.**

It's my pleasure to announce my new book, in which I share my long-year knowledge about the date and time processing, temporal databases, synchronization across time zones, SQL injection related to the date and time definition, modelling and storage principles, conversion functions, date management functions, and many other topics related to the temporal concepts, timestamp enhancements or Flashback technology to reconstruct data images as existed in the past.

Who is this book for?

The book will be used by IT specialists, students, system developers, database administrators, and cloud integrators. After an initial reading, the reader will receive a comprehensive view of the issue of time processing and will be able to develop complex, robust applications that are usable and portable in any region.

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Demos/Posters Session of the 33rd FRUCT Conference

Place and time: University of Žilina, RC-ATRIUM on May 26, 2023 at 17.00-18.30

[Link for Online participation](#)

Playlist: <https://www.youtube.com/watch?v=vlFwYwGb0uM&list=PLKIZJpg1JqdPHYEomvsGi3PJZLUAhbZic>

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 MS Teams teleconference.

All conference participants are warmly welcome to take part in voting for the best demo/poster of the 33rd 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/demo33>.

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

1. **Poster:** [Optimal Dynamic Regime for CO Oxidation Reaction Discovered by Policy-Gradient Reinforcement Learning Algorithm](#), by Mikhail S. Lifar (The Smart Materials Research Institute at the Southern Federal University), Alexander Guda (The Southern Federal University), ([+detailed presentation](#))

Abstract: Metal nanoparticles are widely used as heterogeneous catalysts to activate adsorbed molecules and reduce the energy barrier of the reaction. Reaction product yield depends on the interplay between elementary processes - adsorption, activation, reaction, desorption. These processes in turn depend on the inlet feed concentrations, temperature, and pressure. At stationary conditions, the active surface sites may be poisoned by reaction byproducts or blocked by thermodynamically adsorbed gaseous reagents. Thus, the yield of reaction products can significantly drop. On the contrary, the dynamic control accounts for the changes in the surface properties and adjusts reaction parameters accordingly. Therefore dynamic control may be more efficient than stationary control. In this work, a reinforcement learning algorithm has been applied to control the simulation of CO oxidation on a catalyst. The policy gradient algorithm learned to maximize the total yield of CO₂ through dynamic control of the CO and O₂ flows. Reaction models based on differential equations with and without deactivation of a catalyst were investigated and nonstationary solutions were found for the model with surface deactivation. The maximal product yield was achieved for periodic variations of the gas flows ensuring a balance between available adsorption sites and the concentration of activated intermediates. This methodology opens a perspective for the optimization of catalytic reactions under nonstationary conditions.
2. **Demo:** [Chronical Subdural Hematoma Segmentation Based on Computed Tomography Images Analysis](#), by Alexey Kashevnik (SPIIRAS), Ekaterina Alekseeva (ITMO University), Mikhail Haleev (ITMO University), Andrey Kitenko (SPC RAS), Ammar Yaser Ali (ITMO University), Konstantin Samochernikh, Konstantin Kukanov, Arkady Ivanov, and Andrey Petrov (Almozov Center)

Abstract: The aim of the demo is to show our developed system for chronicle subdural hematoma segmentation based on analysis of computed tomography images. We used convolutional neural networks to automate the process of subdural hematoma segmentation from DCOM images got from computer tomography device and made a plugin for importing the masks to the OsiriX that one of the most famous DCOM viewer. A training dataset was assembled containing a total of 41 scans consisting of 3306 DCOM images. The presence or absence of subdural hematomas and their area was determined by the radiologist (ground truth). Two architectures are being tested: Unet and FPN (Feature Pyramid Network). For each architecture there are two training options were considered: (1) on separate images, when each image is considered as a separate unit; and (2) pseudo-3D, when images were viewed in blocks and the neural network could make predictions based on predictions for neighboring images. Our best model achieved an average DICE score of 0,7949 on the validation set. We integrated the pre-trained model into OsiriX DICOM Viewer as a plugin. The plugin passes images to the model, which returns the segmentation predictions. The plugin converts them to ROI (region of interest) and transfers them to OsiriX, where, if necessary, the radiologist can edit them and get information about hematoma characteristics (such as volume).
3. **Demo:** [Human Sales Ability Estimation Service Based on Interview Video Analysis](#), by Alexey Kashevnik (SPIIRAS), Kenan Kassab (ITMO)

Abstract: The ability to sell products and services is crucial for any business to succeed and the ability to identify good salespeople is equally important. Nonetheless, recognizing the right candidate with outstanding sales skills during a job interview can prove to be challenging. To tackle this issue, a human sales ability estimation service based on interview video analysis was developed. This service uses artificial intelligence and computer vision techniques to analyze the video of a job interview and assess the participant's sales ability. This service allows the participant to record a self-interview using the website. The participant should answer predefined questions related to personality analysis and the sales topic. After a few minutes, the web service used the trained model to access the participant's abilities to work in sales and print out the classification results. It also shows the participant's personality traits according to the OCEAN model. Using this service can help the recruiting manager to decide between hiring the participant. It also can be used to select a group of participants and nominate them for the second stage of the test. Also, this service gives valuable information about the participant's personality and soft skills which is crucial in the sales field.
4. **Demo:** [Evaluation of the Human Use for Sports Training Equipment based on Multicamera Video Surveillance](#), by Nikita Bazhenov, Egor Rybin, Sergey Zavyalov, and Dmitry Korzun (Petrozavodsk State University)

Abstract: The progress in technologies of Internet of Things (IoT) and Artificial Intelligence (AI) lead to the digitalization in various domains of human activity. In this demo, we show a digital inspector that recognizes the physical human activity with sports training equipment (mechanical simulators). We experiment with outdoor simulators produced by the MB Barbell company and located on the shore of Lake Onega in the Petrozavodsk city for free use by citizens and guests. We implemented multi-camera video surveillance system (VSS) that statistically evaluates the states of the sports equipment use such as "the simulator is occupied by a person", "the simulator is not correctly used", "the simulator is occupied but not in use", etc. The evaluation is based on well-known AI methods for image recognition, which are customized for real-time inspection. The evaluated statistics for the area with sports equipment is important for the municipality to understand the efficiency of the provided public resources for well-being and comfort life.



5. **Demo:** [Assessment of Motion Activity of a School of Rainbow Trout in an Underwater Video Surveillance System](#), by Timofey Tsvirko, Alexey Marahtanov, Maxim Pavlov, and Nikita Tsarev (Petrozavodsk State University)
Abstract: Video Surveillance Systems (VSS) are progressing towards the digitalization of industry. In this demo, we apply the Artificial Intelligence (AI) technology to assess the motion activity of a school of rainbow trout. The practical need is to detect and react on too low and too high activity. The input data come from stereo cameras installed around the pool. The activity recognition used the specifically trained YOLO-Pose neural network (NN). Our first algorithm assesses the speed of a rainbow trout based on averaging the individual fish activity parameters. Our second algorithm assesses the angle of an individual rainbow trout to detect the fish in a bad health state. Our early experimental study of the algorithms demonstrates their applicability for monitoring the fish health and condition, feeding management, water quality control and fish behavior control in aquaculture.
6. **Demo:** [Estimation of Mass Characteristics for a Rainbow Trout Based on Individual Linear Size in Underwater Video Surveillance System](#), by Nikita Tsarev, Valentin Perminov, and Timofey Tsvirko (Petrozavodsk State University)
Abstract: Video Surveillance Systems (VSS) are progressing towards the industry digitalization. In this demo, we apply the Artificial Intelligence (AI) technology to estimate the mass characteristics for a rainbow trout. To estimate the linear size, the key points of fish body are recognized in video recording of an individual rainbow trout. We constructed a data set for 356 individual fishes with approximately 50 thousand samples. The mass depends on the fish size, so regression “length-mass” is implemented. The Histogram-based Gradient Boosting Regression tree is used as an appropriate regression model. Our early experiment shows the accuracy about 90% in the mass estimation.
7. **Demo:** [Detection of Key Points for a Rainbow Trout in Underwater Video Surveillance System](#), by Maksim Pavlovich Pavlov, Alexey Marakhtanov, and Dmitry Korzun (Petrozavodsk State University)
Abstract: Video Surveillance Systems (VSS) are progressing towards the industry digitalization. In this demo, we apply the Artificial Intelligence (AI) technology to detection of key points for a rainbow trout. The well-known YOLO-Pose neural network is typically used for human pose recognition in video recordings. We use this neural network for detection of 8 key point for an individual fish. Our constructed dataset includes 10 500 images for approximately 30 thousand fishes. The YOLO-Pose network is trained on the dataset using our combined loss function. Our early experiment shows that that detection works fine even in muddy underwater conditions.
8. **Poster:** [Smart IoT-based System with Fast Feedback for Monitoring of Feeding Fish](#), by Nikita Besednyi, and Dmitry Korzun (Petrozavodsk State University)
Abstract: Feeding fish is an important technology process in aquaculture and fish farming. The process follows the schedule and depends on the feed and environment. Regular monitoring is needed to keep the fish biomass growth within the required limits. The Internet of Things (IoT) technology can be used to monitor the parameters that affect the fish growth. In this demo, we show our smart IoT-based system for monitoring of feeding fish (our use case is a rainbow trout farm). Each automatic feeder has own monitoring system to sense the feeding parameters (time events, feed properties, environment conditions) and to track the feeding status. Current and voltage sensors are used for monitoring the on/off state of the feeder as well as the battery charge. A microcontroller (ESP 32) controls its feeder according to the predefined schedule, monitors the power-ups using a current sensor, and tracks the battery voltage. The fast feedback makes the monitoring system smarter. For instance, a discharged battery is detected as no change in the current strength when the feeder is turned on or off, and the system generates alarm messages to the personnel.
9. **Demo:** [A Mobile Application for Assessing the Strength Exercises on Sports Training Equipment](#), by Konstantin Smirnov, Evgeniy Topchiy, Vladislav Ermakov, and Dmitry Korzun (Petrozavodsk State University)
Abstract: The progress in mobile technologies of Internet of Things (IoT) effectively supports the digitalization of sports training equipment. In this demo, we show an assistant mobile application (digital arbiter) to track the quality of exercise performance by the user. We experiment with sports training equipment produced by the MB Barbell company. The exercise is bench press from the chest or similar. The equipment has a mechanism to attach user’s smartphone. The problem is to estimate the lower and upper bounds for each round of execution. The measurement is based on data coming in real-time from the smartphone accelerometer. First, the mobile application can check the correctness as reaching the bounds. Second, the distance and time are estimated that the user has overcome during the exercise rounds. Since each user has own characteristics (e.g., arm length, grip method), individual calibration of the sensor system is needed before exercise performance on a given sports training equipment. Our experiments show that the mobile application has good accuracy and real-time performance, so the digital arbiter can be used as in individual daily physical activity or in mass sports events.



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The 33rd Conference of Open Innovations Association FRUCT

Program

Žilina, Slovakia
24-26 May 2023

A special word of thanks goes to the
***University of Žilina, Oracle Inc., IEEE ComSoc, Electronics MDPI
journal, and Inventions MDPI journal for sponsoring the conference;
and to certifyme.online as an e-Badge partner of the conference.***

CALL FOR PARTICIPATION

The 34th Conference of Open Innovations Association FRUCT

Riga, Latvia, 15-17 November 2023



Overview

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 from academia and industry. The average **acceptance rate is 40%**. Traditionally the conference attracts most active and talented students to present their R&D projects, meet interesting colleagues, 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 submitting papers and take part in the conference, present your research results. The FRUCT conference **allows both onsite and online participation**. The conference offers low registration fee. FRUCT doesn't offer deadline extension, but **we offer the Early-bird submission** with the additional review cycle. For further details please refer to <http://www.fruct.org/cfp34>.

List of conference topics

- ✓ Artificial Intelligence in Text Analysis and Generation
- ✓ Artificial Intelligence, Robotics and Automation
- ✓ Big Data, Knowledge Management, Data Mining Systems
- ✓ Cloud, Fog and Edge Computing and Engineering, HPC
- ✓ Coding Theory, DevOps and DevSecOps Technologies
- ✓ Commercialization of Technologies and Digital Economy
- ✓ Emerging Wireless Technologies, 5G and beyond
- ✓ Gamification, E-learning and Smart Data in Education
- ✓ Internet of Things: Apps and Enabling Technologies
- ✓ Location Based Services: Navigation, Logistics, Tourism
- ✓ Natural Language Processing and Speech Technologies
- ✓ Predictive Analytics, Probability and Statistics
- ✓ Wearable Electronics: Novel Architectures and Solutions
- ✓ Workshop: Investigating and Mitigating Climate Changes
- ✓ Algorithms and Modeling
- ✓ Artificial Intelligence Applications
- ✓ Audio Pattern Recognition, Semantic Audio
- ✓ Blockchain Technology and Applications
- ✓ Computer Vision, Image & Video Processing
- ✓ Crowdsourcing and Collective Intelligence
- ✓ e-Health and Wellbeing
- ✓ Intelligence, Social Mining and Web
- ✓ Networks and Applications
- ✓ Security and Privacy
- ✓ Smart Systems and Embedded Networks
- ✓ Software Design, Innovative Applications
- ✓ Workshop: The DataWorld

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: 15 September 2023 **Early-bird deadline: 14 August 2023**

Notification of acceptance: **13 October 2023** Camera-ready deadline: **20 October 2023**

3. **Poster / Demo proposal**: submission deadline: **6 November 2023**

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 (application is pending)** and **DOAJ**, indexed by **Scopus**, **ACM**, **Web of Science**, **RSCI (VAK list)**, **DBLP**, etc. The conference proceedings are included in **AMiner**, **CORE**, and **Scimago Journal Rank (SJR)** <http://scimagojr.com/journalsearch.php?q=21100305223&tip=sid>. The selected papers get invitations to publish extended versions of the papers in the partner journals, e.g., **IJERTCS**. FRUCT is **rated by many national 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/conference34>. If you get some questions that are not covered at the conference web page, feel free to send email to info@fruct.org.