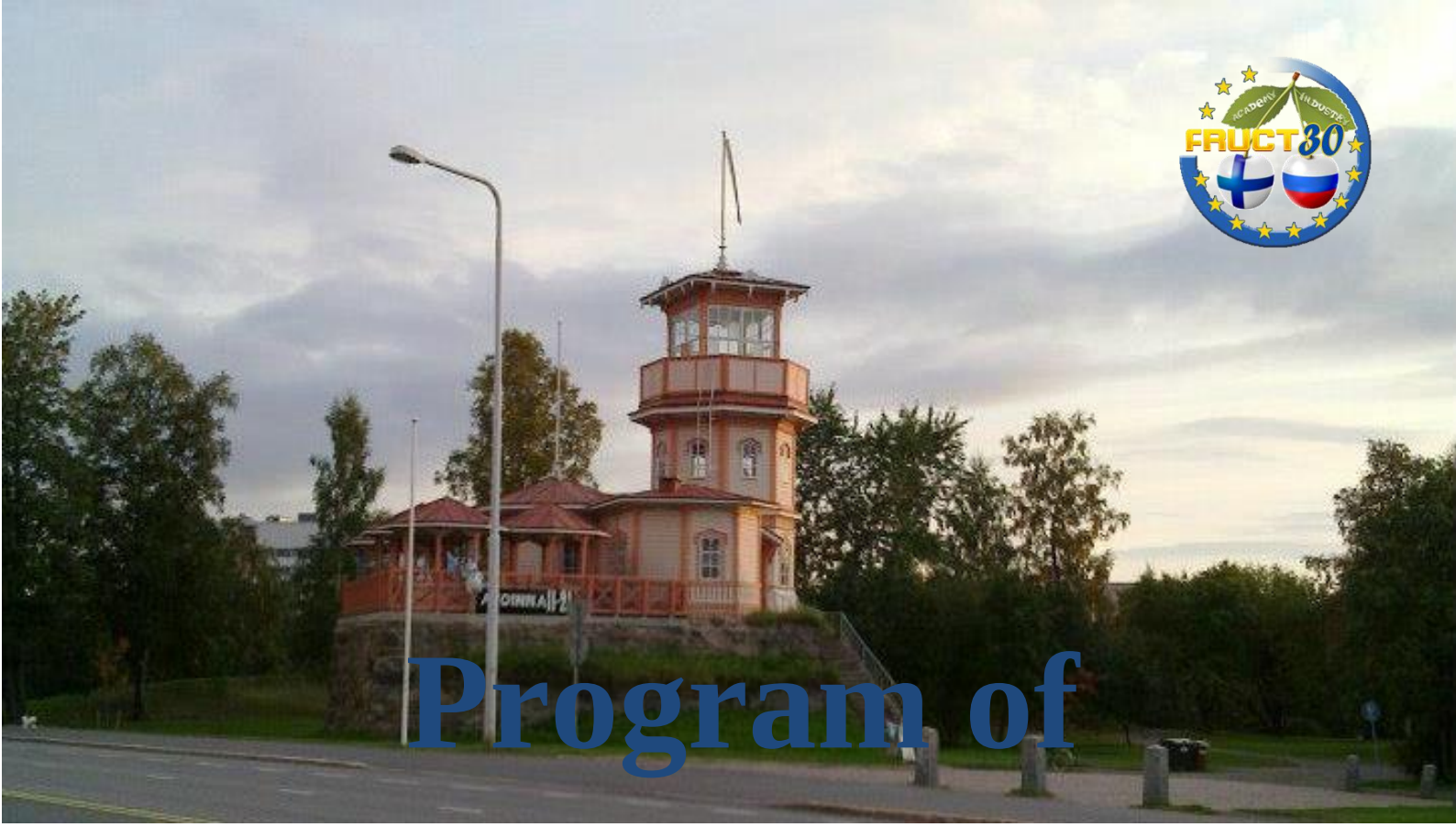

Program of

The 30th Conference of Open Innovations Association FRUCT

Oulu, Finland
27-29 October 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, the majority of the FRUCT30 conference participants prefer online participation. Correspondingly the 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 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 Zoom**. Zoom links are in the conference program. We recommend joining a Zoom 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 EEST (GMT+3), which corresponding to Finnish and Moscow time zones. The conference program consists of two parallel tracks. Each track uses its Zoom ID (the corresponding Zoom credentials are published in the conference program). The Q&A sessions are scheduled with minimal overlapping. So you can take part in most of the Q&A sessions of the parallel tracks. For that, please watch video presentations beforehand, and don't forget to change Zoom telcos for changing the sessions. Please note that all conference presentations (except for keynote talks and demos) will be available online starting from Monday, October 25, 2021. 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 **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.).

electronics
an Open Access Journal by MDPI

Authors of the best papers of FRUCT conference can get invitation to publish extended version of the paper in the Electronics journal (ISSN 2079-9292, Q2, Scopus indexing, Impact Factor: 2.397 (2020), 5-Year Impact Factor: 2.408 (2020), etc.) with **discount of 20% or even more.**

In addition all conference authors have an opportunity to publish extended versions of their papers in the partner Special Issues:

- In the Special Issue on "Ambient Intelligence for Emerging Tactile Internet" of the Future Internet journal (Q2, Scopus indexing), www.mdpi.com/journal/futureinternet/special_issues/AI_ETI
- In the Special Issue on "Artificial Neural Networks for IoT-Enabled Smart Applications" of the Sensors journal (Q1, Scopus), www.mdpi.com/journal/sensors/special_issues/IoT_SmartApp

The proceedings of 30th FRUCT conference are available online:
Issue 1: https://fruct.org/publications/fruct30/
Issue 2: https://fruct.org/publications/acm30/

General Facts and Statistics for the 30th FRUCT Conference:

Total submissions: **89** Accepted Full Papers: **37** Acceptance rate: below **42%**

Total authors: **218** from **16** countries

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Taoufik Ben Rejeb (Moscow Technical University of Communications and Informatics, Russia)
Tarandeep Kaur Bhatia (Deakin University, Australia)
Tatiana Shatalova (SUAI, Russia)
Tatiana Sherstinova (HSE, Russia)
Thomas Mitchell (University of the West of England, UK)
Thomas Ohlson Timoudas (KTH Royal Institute of Technology, Sweden)
Tien-Fu Chen (National Chiao Tung University, Taiwan)
Timo Hämäläinen (University of Jyväskylä, Finland)
Timofey Turenko (MariaDB Corporation Ab, Finland)
Tommi Meskanen (University of Helsinki, Finland)
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Vadim Kramar (Oulu University of Applied Sciences, Finland)
Valentin Olenev (State University of Aerospace Instrumentation, Russia)
Valentin Onossovski (Saint-Petersburg State University, Russia)
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Valery Vyatkin (Aalto University, Finland)
Valtteri Niemi (University of Helsinki, Finland)
Vera Danilova (RPANEPA, Russia)
Victor Netes (MTUCI, Russia)
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Vladimir Khryashchev (Piclab LLC, Russia)
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William Steingartner (Technical University of Kosice, Slovakia)
Willy Ugarte (University of Applied Sciences, Peru)
Yahya Tashtoush (Jordan University of Science and Technology, Jordan)
Yunpeng Zhang (University of Houston, USA)

Program of the 30th IEEE FRUCT conference
October 27-29, 2021, Oulu, Finland

University of Oulu, Oulu, Finland / Online participation by Youtube + Zoom

NOTE: Conference time is in Finnish time (EEST, GMT+3) as conference is held in Oulu, Finland

DATE	TIME	PROGRAM	
27.10.21	13:30-15:00	**Opening of the 30th FRUCT conference** **Keynote talk:** The real estate classification by AI-enabled computer vision techniques: ImmoPixel use case, by Mario Döller, Fachhochschule Kufstein Tirol, Austria	
	15:00-15:15	**Break**	
	15:15-17:00	Networks and Applications	IDEA 2021 Workshop: Research track
28.10.21	09:00-09:30	**IDEA 2021 keynote:** What is CE marking? by Jukka Vuorinen, Intertek, Finland	
	09:30-11:00	Intelligence, Social Mining and Web	IDEA 2021 Workshop: Industrial track (FUAVE Stakeholders Event)
	11:00-12:00	Computer Vision, Image and Video Processing	
	12:00-12:30		**Lunch break**
	12:30-13:00	**Lunch break**	
	13:00-13:30	**Lunch break**	IDEA 2021 Workshop: Industrial track FUAVE Bootcamp Oulu at Tellus Backstage (**for onsite attendees only**)
	13:30-15:00	AMICT 2021: Social, Healthcare and Humanistic Computing	
	15:00-15:15	**Break**	Demonstrations at P8 Parking Area (**for onsite attendees only**)
	15:15-17:00	Software Design and Innovative Applications	
	17:00-18:00	**Demos & Posters Session**	
29.10.21	09:45-11:00	Natural Language Processing and Speech Technologies	UAS (Drone) University Collaboration Network, UCNDrone Workshop (by invitations only for onsite attendees)
	11:00-12:30	AMICT 2021: Digitalization: Industry, Construction, Robotics	
	12:30-13:30	**Lunch break**	
	13:30-15:00	The 3rd DataWorld Workshop	
	15:00-15:15	**Official closing of the 30th FRUCT conference**	

Thank you and looking forward to see you at the 31sh FRUCT in Helsinki, Finland on April 27-29, 2022! (The 31st FRUCT conference will still allow online participation, but as the COVID-19 situation is getting better, let's try to meet F2F. The conference dates are scheduled just before the long weekend of May 1 so it will be also a great opportunity to explore Helsinki and the whole region.)

Program of the 30th IEEE FRUCT conference

October 27 (Wednesday)
University of Oulu, Oulu, Finland / Online participation by Youtube + Zoom
NOTE: Conference time is in Finnish time (EEST, GMT+3) as conference is held in Oulu, Finland

Session: Opening and Plenary session of the 30th FRUCT conference Chairman: Sergey Balandin Playlist: https://www.youtube.com/watch?v=WStoojF1VHA&list=PLKlZJpq1JqdOP4RFExl1FN2goMUSf2B7s			
13:30	15m	Welcome words and practical information, by Juha Röning, University of Oulu, Finland	
13:45	50m	**Keynote talk:** The real estate classification by AI-enabled computer vision techniques: ImmoPixel use case, by Mario Döller, Fachhochschule Kufstein Tirol, Austria	
14:35	25m	Q&A for the **keynote** talk, Zoom 280-192-1973, passcode 535851	
15:00	15m	**Break**	
15:15		**Session:** Networks and Applications Chairman: Alexander Smirnov Playlist:https://www.youtube.com/watch?v=T7wueBujYz4&list=PLKlZJpq1JqdNGe3nlfJHu8xMX7XPBinhv	**Session:** IDEA 2021 Workshop: Research track Chairman: Vadim Kramar Playlist:https://www.youtube.com/watch?v=8niCNaL7ELQ&list=PLKlZJpq1JqdMWfgUGODPMqhcxIuD3dDup
15:15	75m	Low-Energy Authentication with Selective Privacy for Heterogeneous IoT Devices in Smart-Farms, by Steph Rudd, Hamish Cunningham Heads or Tails: A Framework to Model SupplyChain Heterogeneous Messages, by Sonya Leech, Jonathan Dunne, David Malone Design of a 3D Indoor Localization System Enabling Augmented Reality TV Applications, by Francesco Sottile, Shiva Ehsanibalajorshary, Luigi Coriasco, Claudio Pastrone, Roberto Iacoviello, Davide Zappia Improving the Mobile Edge Computing Architecture Using Fog Computing Environments, by Alexey Subbotin, Nataly Zhukova, Petr Glebovskiy Architecture of Cloud Telecommunication Network Monitoring Platform Based on Knowledge Graphs, by Kirill Krinkin, Igor Kulikov, Alexander Vodyaho, Nataly Zhukova AQMoT: Implementation of Special Queue Management Approach for Internet of Things, by Kerem Aytac, Omer Korcak, Malik Turkoglu, Harun Ozdemir, Muhammed Murat Dilmac	Architectural Software-Hardware Co-Modeling a Real-World CPS: Arduino-Based ArduPilot Case, by Sergey Staroletov Detection of Dangerous Goods With Cellular Sensor Network and Drone Based Deployment System, by Robert Kathrein, Krispin Raich, Mario Doller Air Navigation: Adaptive Filtration of Parameters of Motion of Manoeuvrable UAVs, by Igor Grishin, Rena Timirgaleeva, Ivan Linnik Overview of the Nordic Challenges for Unmanned Aircraft Systems, by Vadim Kramar, Juha Roning, Juha Erkkila, Henry Hinkula, Tanja Kolli, Anssi Rauhala Unmanned Aircraft Systems - Education Activities in Finland UCNDrone Perspective, by Vadim Kramar, Rajeev Kanth, Arto Toppinen, Mohammed Rabah, Eero Immonen, Marjut Koskela, Juha Erkkila, Tomi Westerlund, Hannu Tenhunen, Jouni Isoaho, Toomas Lybeck, Antti Perttula, Kalle Tammi, Maria Sjoholm, Ville Arffman, Laura Ruotsalainen, Antti Tikanmaki, Juha Roning Urban Air Mobility Overview the European Landscape, by Vadim Kramar, Juha Roning, George Nikolakopoulos, Filippo Tomasello
16:30	30m	Q&A in Zoom with authors of the **Networks and Applications** session, Zoom 974-238-2704, passcode 490571	Q&A in Zoom with authors of the **IDEA 2021 Workshop: Research** track , Zoom 280-192-1973, passcode 535851
17:00		**Closing of Day**	

October 28 (Thursday)
University of Oulu, Oulu, Finland / Online participation by Youtube + Zoom
NOTE: Conference time is in Finnish time (EEST, GMT+3) as conference is held in Oulu, Finland

<table>
<tr><td>09:00</td><td>30m</td><td colspan="2">IDEA 2021 keynote: What is CE marking? by Jukka Vuorinen, Intertek, Finland</td></tr>
<tr><td>09:30</td><td colspan="2">Session: Intelligence, Social Mining and Web (ISMW)
Chairman: Andrew Ponomarev
Playlist:https://www.youtube.com/watch?v=ZEgpSKMOI7Q&list=PLKlZJpq1JqdPokPYzK4UhsRtylBJe3Dpk</td><td>Session: IDEA 2021 Workshop: Industrial track
Chairman: Kimmo Paajanen
Playlist:https://oamk.zoom.us/j/65865023829?pwd=RkQwV3o4REVRQ1N4STlRRWIzNFVVQT09</td></tr>
<tr><td>09:30</td><td>1h</td><td>Application of Machine Learning Methods to Compare Disciplines Content Using Text Data, by Roman Kupriyanov, Dmitry Zvonarev, Ruslan Suleymanov
Intelligent Identification of Fake Accounts on Social Media, by Anastasia Stolbova, Rustam Ganeev, Anton Ivaschenko
Simulation of a Judicial Process Using Machine Learning and Text Mining to Analyze Administrative Prejudice and Indicate the Quality of Justice, by Oleg Metsker, David Paskoshev, Egor Trofimov, Georgy Kopanitsa
Impact of COVID-19 on Customer's Perception About Purchasing Digitizable Products, by Henning Dirk Richter, Nikolay Shilov
Detecting Fake News About Covid-19 on Small Datasets With Machine Learning Algorithms, by Elena Shushkevich, John Cardiff</td><td rowspan="3">5m FUAVE - Finnish UAV Ecosystem, by Eija Honkavaara, FGI

15m Europe and Finland in the Revolution of Unmanned Electrified Aviation, by Petri Mononen, VTT

15m UAV Projects: 5G!Drones, HiFlyer, Dronemaster, RoboMesh, FF2020, by Juha Röning, University of Oulu

15m UAV Projects: VED, UCNDrones, UAM Oulu, by Vadim Kramar, Oulu University of Applied Sciences

35m Break

15m AFDA Keynote, by Tuija Karanko, Association of Finnish Defence and Aerospace Industries

15m Drone Applications in Mineral Exploration, by Lauri Maalismaa, Radai Ltd

15m Geodrone6 in Professional Data Collecting and Surveying, by Eero Vihavainen, Geotrim Ltd

15m Nokia’s Recent Contribution to the Drone Ecosystem, by Juha Hannula, Nokia

5m Wrap Up, by Kimmo Paajanen, Oulu University of Applied Sciences</td></tr>
<tr><td>10:30</td><td>30m</td><td>Q&A in Zoom with authors of the Intelligence, Social Mining and Web session,
Zoom 280-192-1973, passcode 535851</td></tr>
<tr><td>11:00</td><td colspan="2">Session: Computer Vision, Image and Video Processing
Chairman: Nikolay Shilov
Playlist:https://www.youtube.com/watch?v=AsVim2FOAK4&list=PLKlZJpq1JqdOyV_8Wn5nnbwy2JP4io6QX</td></tr>
<tr><td>11:00</td><td>1h</td><td>Mobile Application for Controlling a Healthy Diet in Peru Using Image Recognition, by Leonardo Cornejo, Rosa Urbano, Willy Ugarte
Proxemics Toolkit for F-Formation Patterns Detection, by Alfredo Barrientos, Miguel Eduardo Cuadros Galvez, Mauricio Rivas, Paul Alvarez
Image-Based Fatigue Detection of Vehicle Driver: State-Of-The-Art and Reference Model, by Alexandr Bulygin, Alexey Kashevnik
FAUST: Fast Per-Scene Encoding Using Entropy-Based Scene Detection and Machine Learning, by Anatoliy Zabrovskiy, Prateek Agrawal, Christian Timmerer, Radu Prodan
Partially Connected Neural Networks for an Efficient Classification of Traffic Signs, by</td></tr>
</table>

		Bousarhane Btissam, Bouzidi Driss	
12:00	30m	Q&A in Zoom with authors of the **Computer Vision, Image and Video Processing** session, Zoom 280-192-1973, passcode 535851	**Lunch break**
12:30	30m	**Lunch break**	
13:00	30m	**Lunch break**	**IDEA 2021 Workshop: Industrial track** **FUAVE Bootcamp Oulu at Tellus Backstage** This interactive session focuses on understanding the potential of the test areas for different types of trials, including city planning, deliveries, forestry, connectivity and sensors. ● Ritva Kuusisto, Asuntomessut Oulu ● Mikko Kauppinen, Stora Enso ● Simo Kekäläinen, MitaSolutions Ltd (host)
13:30	30m	**Session:** AMICT 2021: Social, Healthcare and Humanistic Computing Chairman: Dmitry Korzun Playlist:https://www.youtube.com/watch?v=HCbe3xkacNM&list=PLKlZJpq1JqdMiSS5TETl85lX9oGzZuBB7	
13:30	1h	An Approach to Behavior Modeling Based on Elements of Theories of Planned and Organizational Behavior, by Nikolay Shilov Motion Videocapture and Treadmill to Study Postural Reactivity and Transition: Application to the Condition of "Dry" Immersion in Parkinson's Disease, by Alexander Meigal, Olesya Tretjakova, Liudmila Gerasimova-Meigal, Kirill Prokhorov, Irina Sayenko Claim Status Prediction for OSIPTEL Using Neural Networks, by Hugo David Calderon Vilca, Kerly J. Quispe Quispe, Anthony B. Puitiza Lopez Anthony B. Puitiza Lopez, Miguel A. Zuniga Yamashita, Flor C. Cardenas-Marino, Reynaldo Sucari Leon Methods for Aggregating Crowdsourced Ontology-Based Item Annotations, by Andrew Ponomarev Iterative Search Algorithm for Selecting Web-Pages to Construct Persons Profile, by Artur Harkovchuk, Dmitry Korzun	
14:30	30m	Q&A in Zoom with authors of the **AMICT 2021: Social, Healthcare and Humanistic Computing** session, Zoom 280-192-1973, passcode 535851	
15:00	15m	**Break**	**Demonstrations at P8 Parking Area** ● Oamk Drone Swarm in action / Henry Hinkula, Oamk ● Walkera 5G & Industrial drones / Antti Lipasti,
15:15		**Session:** Software Design and Innovative Applications Chairman: Nikolay Teslya Playlist:https://www.youtube.com/watch?v=amLMkcxAq2c&list=PLKlZJpq1JqdOSDMGl4zOjo99fyJ_TqHFx	

15:15	75m	Digital Watermarking System for Hard Cover Objects Against Cloning Attacks, by Valery Korzhik, Vladimir Starostin, Victor Yakovlev, Dmitriy Flaksman, Ivan Bukshin, Boris Izotov Netflix Movie Recommendation Using Fuzzy Logic, by Hugo David Calderon Vilca, Valerie A. Namuche Zavala, Marco A. Herrera Vargas Evolution of Software Architecture Over Decades, by Rashmi R, Dr. Srinivasan G N, Shubha Raj K B Unus Terra: Developing a Serious Game to Foster Social Distancing During the Pandemic, by Sami Pohjolainen, Leena Arhippainen, Paula Alavesa, Juho Mattila, Jarkko Tuovinen Between Beats: Linking Player Engagement to Advertisement Frequency and Intrusiveness, by Markus Hirsimäki, Paula Alavesa, Leena Arhippainen Approaching Collaborative Flow in Collaborative Gaming, a Survey Study, by Jaakko Ohrankämmen, Paula Alavesa, Leena Arhippainen	Vertical Hobby
16:30	30m	Q&A in Zoom with authors of the **Software Design and Innovative Applications** session, Zoom 280-192-1973, passcode 535851	
17:00	20m	**Pecha Kucha pitches for posters and demos followed by show of demos and posters;** Playlist: https://www.youtube.com/watch?v=0WkPHJCYL0M&list=PLKlZJpq1JqdP9RTvmZ5JDQi5tJfOhgyEo	
17:20	40m	The conference meetup in Zoom: **discussion on demos and any other topics**, Zoom 280-192-1973, passcode 535851	

October 29 (Friday)
University of Oulu, Oulu, Finland / Online participation by Youtube + Zoom
NOTE: Conference time is in Finnish time (EEST, GMT+3) as conference is held in Oulu, Finland

09:45		**Session:** Natural Language Processing and Speech Technologies Chairman: Ksenia Lagutina Playlist: https://www.youtube.com/watch?v=pl35tEYDtgw&list=PLKlZJpq1JqdNmrGEx77i6hUntN8oxQ7Wk
09:45	50m	Adaptation of Semantic Rule-Based Sentiment Analysis Approach for Russian Language, by Ilya Paramonov, Anatoliy Poletaev Machine Learning Methods in the Problem of Attribution of Publicistic Texts of the XIX Century, by Aleksandr Rogov, Nikolai Moskin, Kirill Kulakov, Roman Abramov Acoustic Classification of Cat Breed Based on Time and Frequency Domain Features, by William Raccagni, Stavros Ntalampiras Digital Transformation in the Russian Federation: Thematic Landscape of Online Communities, by Kirill Svetlov, Natalya Legostaeva
10:35	25m	Q&A in Zoom with authors of the **Natural Language Processing and Speech Technologies** session, Zoom 280-192-1973, passcode 535851
11:00		**Session:** AMICT 2021: Digitalization: Industry, Construction, Robotics Chairman: Valtteri Niemi Playlist: https://www.youtube.com/watch?v=eTsR2fGpRgc&list=PLKlZJpq1JqdPjEYn5je389d_cu6ube5s1
11:00	1h	Design and Performance Analysis of Commercial Reflectors Attached to Three Types of PV Module, by

		Ramy Ahmed, Ghada Amer Level of Vulnerability of Educational Institutions in Front of the El Nino Phenomenon and its Classification with the Neuronal Network, by Hugo David Calderon Vilca, Guillermo Moises Terrazas Garcia, Kevin Olivares Chuquiure, Carlos Ramirez Vera, Guido Raul Larico Uchamaco, Rene Alfredo Calderon Vilca Trajectory Construction for Autonomous Robot Movement Based on Physical Parameters and Video Data, by Grigorij Rego, Nikita Bazhenov, Dmitry Korzun Toward the Theory of Using Information for Actions in Systems: Prospects for Research and Reviews, by Alexander Geida NVMe Solid State Storage Performance Testing, by Vadim Ponomarev, Eugene Pitukhin
12:00	30m	Q&A in Zoom with authors of the **AMICT 2021: Digitalization: Industry, Construction, Robotics** session, Zoom 280-192-1973, passcode 535851
12:30	1h	**Lunch break**
13:30	**Session:** The 3rd DataWorld Workshop Chairman: Michal Kvet Playlist: https://www.youtube.com/watch?v=rphCUqUuPgA&list=PLKlZJpq1JqdNcsSX9x7FOi_--mJoWZr8-	
13:30	1h	Autonomous Temporal Transaction Database, by Michal Kvet Large Scale Multimodal Data Processing Middleware for ITS Applications, by Krispin Raich, Robert Kathrein, Mario Doller Dataset Selection for Attacker Group Identification Methods, by Artem Pavlov, Natalia Voloshina Method of Grouping Subjects and Objects in Information Systems, by Anastasiya Bondareva, Ilya Shilov Digital Threads via Knowledge-Based Engineering Systems, by Joe David, Eeva Jarvenpaa, Andrei Lobov Assessment Formation of Open Data Sources During Their Aggregation for Analyzing Road Accidents, by Sergey Savosin, Nikolay Teslya, Sergei Mikhailov
14:30	30m	Q&A in Zoom with authors of the **3rd DataWorld** workshop, Zoom 280-192-1973, passcode 535851
15:00	15m	**Official closing of the 30th FRUCT conference,** Zoom 280-192-1973, passcode 535851

Demos/Posters Session of the 30th 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 30th 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/demo30.

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 October 25, 2021*)

1. ***Demo:*** The Concept of Trend Build Module, by Polina Tkachenko, Vladislav Ermakov and Kirill Kulakov, Petrozavodsk State University
   The industrial Internet of Things (IIoT) applies to monitor 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. Around the sensed data monitoring system could be build to process these data. The module decomposition approach for the monitoring system could be applied. In this work, we describe one of the possible modules of that system — the trend building module. We focus on the concept of the trend building module, its input and output parameters, and possible features.
2. ***Poster:*** Savonia's Teaching, Research and Development Activities on Unmanned Aircraft Systems, by Rajeev Kanth, Patryk Wójtowicz, Arto Toppinen, Asmo Jakorinne, Juhani Rouvali and Teemu Räsänen, Savonia UAS
   In this article, we have presented the teaching, research, and development-related activities on unmanned aircraft systems (UAS) carried out at the Savonia University of Applied Sciences. We aim to demonstrate a few applications such as snow-depth measurement, mapping of gas leaks and operation of bio-waste composting pits, and the feasibility study for installing bird warning balls on the power grids. Also, we have highlighted the major ongoing UAS project activities, education, and future directions.
3. ***Demo:*** Demo Mobile Application Interacting with BLE Beacons, by Vladimir Betelev, Anna Seneva, Polina Osipova and Daria Zhitova, Petrozavodsk State University
   Application for university users for easy navigation inside the building during events.
4. ***Poster:*** Utilizing Private Mobile Network for UAV Communication in Logistics, by Juha Erkkilä, Marjut Koskela and Marjo Heikkilä, Centria University of Applied Sciences
   Unmanned Aerial Vehicle (UAV) technology is evolving each year at a rapid pace and new innovative ways of utilizing UAV's are constantly emerging. Manufacturers are launching new solutions to the market almost each year. These technological solutions are making the use of UAVs safer and more versatile thus making them a potential technology to many business use cases and applications. There are still some challenges, such as the limitations to the UAV's connectivity that are limiting the use of UAV's in extreme operations. UAVs demand two different communication links for their operation, (1) a command and control link to control the drone and (2) a data link for the payloads higher throughput rate. A reliable data link is an essential part of UAV-based applications. It allows data transfer from payload devices such as sensors, cameras, to edge and cloud enabling real-time data gather for analysis and decision making. Although, UAVs are still mainly controlled by ISM band short-range radio controllers, for years there has been a discussion ongoing that the mobile network technology could bring a new way to control the UAV's in long-range operations. This paper studies the use of a mobile network for UAV communications in business applications. The focus of this paper is on logistics use cases in which the UAVs can enable more useful, faster and more efficient ways of delivering small packages. The paper also introduces UAV platforms which are designed and build on specific logistic use cases challenges related to their communications.
5. ***Demo:*** The digital twin of a robotic arm, by Anastasia Taritsyna, Grigorij Rego and Lyudmila Schegoleva, Petrozavodsk State University
   The demo talks about the use of digital twins. The process of creating a digital model of a real robotic arm is shown. The demo also contains a video of an experiment with a real robot and a simulation.
6. ***Demo:*** Development of Real-Time Control System based on Deep Learning for UAV's Object Detection, Tracking and Safe-Landing, by Mohamed Rabah and Eero Immonen, Turku University of Applied Sciences
   In the current work, an approach to implement AI-based techniques in real-time focusing mainly on the detection, tracking, and landing on the target object is presented. For object detection, CNN algorithm is utilized. For object tracking and stabilizing, a novel algorithm is developed that can execute along with object detection via sequential stream data. For landing, a vision-based algorithm is used to estimate the distance between the UAV and the detected object. For UAV control, a Fuzzy-PID controller is designed to steer the UAV by a continuously manipulation of the actuators based on the stream data from the tracking unit and dynamics of the UAV. For UAV landing, a new type of fuzzy logic controller is developed to compensate for the nonlinear ground effect that affects the safe landing of the UAV. All the developed algorithms are executed on an NVIDIA Jetson TX2 embedded artificial intelligence device, and an ARM Cortex M4. Experimental results show that the tracking algorithm responds faster than conventionally used approaches, and the safe landing algorithm minimized the landing time of the UAV and provided the safety assurance as compared to conventional controllers. Furthermore, a farming monitoring and automated wireless charging is considered as an application example.
7. ***Poster:*** Drones in Arctic Road Weather Research, by Kari Mäenpää, Finnish Meteorological Institute

The poster introduces some of the use cases/pilots developed in two drone projects in Sodankylä, by Finnish Meteorological Institute. The use cases focus on drones being used in Intelligent Traffic Systems to improve the accuracy/validity of road weather observations with different onboard equipment. The instruments used include RGB-cameras, lidars, hyperspectral cameras and vehicle radars. The use cases also had an automatically operating UAV measuring the road weather conditions in a test area. Some results of these will be shown for example related to the road weather environment.

8. ***Demo:*** Drone Swarm, The Finnish UAV Ecosystem Trial, by Kristian Ratia, Henry Hinkula and Vadim Kramar, Oulu University of Applied Sciences
   Proof of concept of swarm flying. In this research, one drone was controlled by a person and three drones were controlled by a server. The server knows every drone's location and controlled the drones based on other drones' locations. Flight code was tested on a simulator and a closed secured area. Automatic drones had only two commands which could be commanded: takeoff and land. Everything else was controlled by the server.
9. ***Poster:*** Automated Intelligent UAS-based Surveillance System for Urban Security Needs, by Antti Perttula, Pekka Pöyry and Esa Kujansuu, Tampere University of Applied Sciences
   In order to improve the usage of data from UAV mounted surveillance cameras we created an autonomous intelligent picture analyzing and forwarding system. UAV sends automatically real time pictures down to server to be analyzed. After analyzing the pictures can be be shared with relevant recipients like Police and Search & Rescue. We compared several analyzing algorithms in terms of accuracy, speed, and overall functionality in our environment. We found that Yolo v4 was the most suitable compromise. We were able to demonstrate that after training the algorithm with over thousand pictures system achieves over 90% accuracy in categorizing and counting objects right.
10. ***Poster:*** Robotic Inspection of Oil and Gas Plants by Hybrid Unmanned Vehicle and Mobile Ground Support Platform, by Juha Röning and Ulrico Celentano, University of Oulu
    Safety risks and high costs of human inspection of oil and gas plants drive towards the adoption of robotic inspection. The challenging cluttered inspection environment and the constraints dictated by legislation on potentially explosive atmospheres implying energy-efficient solutions suggest the use of an inspection-tool-equipped hybrid rolling-flying unmanned vehicle and of a mobile ground platform supporting the connected inspection robot. These two design choices together with their development are described in this article.

FOR NOTES

The 30th IEEE Conference of Open Innovations Association FRUCT

Program

Oulu, Finland
27-29 October 2021

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CALL FOR PARTICIPATION

31st Conference of Open Innovations Association FRUCT

Helsinki, Finland, 27-29 April 2022

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., Finland, Italy, Russia, 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 30th FRUCT conference **allows both onsite and online 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/cfp31.

List of conference topics

- ✓ Artificial Intelligence, Robotics and Automation Systems
- ✓ Location Based Services: Navigation, Logistics, e-Tourism
- ✓ Big Data and Data Mining, Data Storage and Management
- ✓ Open Source Mobile OS: Architectures and Applications
- ✓ Cloud Computing Systems, Networks and Applications
- ✓ Wearable-Computing Novel Architectures and Solutions
- ✓ Security and Privacy: Applications and Coding Theory
- ✓ Relational databases, Spatial databases, SQL tuning
- ✓ Natural Language Processing, Speech Technologies
- ✓ Internet of Things and Enabling Technologies
- ✓ Network Technologies, Next Generation Networks, Emerging Wireless Technologies, 5G
- ✓ Bioinformatics, e-Health and Wellbeing
- ✓ Smart Spaces, Linked Data and Semantic Web
- ✓ Knowledge and Data Managements Systems
- ✓ Context Awareness and Proactive Services
- ✓ Sensor Design, Ad-hoc and Sensor Networking
- ✓ Software Design, Innovative Applications
- ✓ Smart Systems and Embedded Networks
- ✓ Computer Vision, Image and Video Processing
- ✓ Crowdsourcing and Collective Intelligence
- ✓ Intelligence, Social Mining and Web
- ✓ Simulation platforms for Drone Applications
- ✓ Drones and IoT convergence

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: 28 February 2022 **Early-bird deadline: 31 January 2022**

Notification of acceptance: **25 March 2022** Camera-ready deadline: **1 April 2022**

3. **Poster / Demo proposal:** submission deadline: **15 April 2022**

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/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 **AMiner**, **CORE**, and **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/conference31. If you get some questions that are not covered at the conference web page, feel free to send email to info@fruct.org.