4th IFSA Winter Conference
on Automation, Robotics & Communications
for Industry 4.0/5.0 (ARCI' 2024)

Conference Programme

7-9 February 2024

Innsbruck, Austria

Organized by:

Message from Chairman

On behalf of Organizing Committee, I would like to welcome you to the 4th IFSA Winter Conference on Automation, Robotics & Communications for Industry 4.0/5.0 (ARCI' 2024), 7-9 February 2024.

The Global Industry 4.0 Market is projected to reach a value of US $ 433.84 Billion by the year 2030 with a Compound Annual Growth Rate (CAGR) of 19.70 %.

The Industry 4.0 / 5.0 is an integrated system, which consists of an automation tool, robotic control, communications and big data analytics. The increased adoption of industrial robots is one of the main driving factors of this market, while the data risks associated with integration of advanced technologies are the restraining factors.

There are several conferences on automation, robotics, communications and data analysis, but they are not meet the Industry 5.0 challenges. The series of annual IFSA's Winter ARCI conferences have been launched to fill-in this gap and provide a forum for open discussion of state-of-the-art technologies related to all, mentioned above, components of Industry 5.0.

The ARCI' 2024 conference will incorporate main fields covering research and development in a broaden range in automation, robotics, communication and data analyses, and united by the Industry 5.0 challenges. However, it will be not a conference only about the future concepts and new visions. It will be also to discuss how to adopt the current R&D results for Industry 4.0/5.0 and to customize products under the conditions of highly flexible (mass-) production.

The ARCI' 2023 conference are covering research and development in a broaden range in automation, robotics and communication, and united by the Industry 5.0 challenges. The ARCI' 2024 conference is organized by the IFSA - one of the major professional, non-profit association serving for sensor industry and academy since 1999.

The purpose of ARCI' 2024 is bring together leading international researchers, developers and practitioners to attain synergetic exchanges of ideas and practices. We trust that you will find the ARCI 2024 conference professionally rewarding and stimulating as well as enjoyable. Welcome to ARCI' 2024 !

Prof., Dr. Sergey Y. Yurish
ARCI' 2024 Conference Chairman

Conference web site:

www.arci-conference.com

Conferences Venue

The ARCI' 2024 Conference will take place in the modern 4-star Austria Trend Hotel Congress Innsbruck, conference rooms Tyrol. The hotel is located on the banks of the Inn River, close to the Congress and Exhibition Centre of Innsbruck, and just a few steps away from the historic city centre. Parking in a garage is possible upon a surcharge. The hotel is situated in 5 km from the Airport and 3 km from the Railway Station. Address: Rennweg 12a, 6020 Innsbruck, Austria.

Registration

The Registration Desk is opened in the Austria Trend Hotel Congress Innsbruck:

- Tuesday, 6 February 2024, from 20:00-21:30
- Wednesday, 7 February 2024, from 8:45-18:00
- Thursday, 8 February 2024, from 8:45-18:00
- Friday, 9 February 2023, from 8:45-14:00.

Language

The official language of the Conferences is English. There will be no simultaneous interpretation.

Insurance and Liability

The conferences organizers do not accept responsibility for any individual, medical, travel or personal insurance policies as necessary.

Conference Identification Tag

The Organizing Committee request that you wear your identification tag (badge) at all times during the conference. Your conference identification tag will serve as your admission to all conference paper presentation sessions.

Welcome Cocktail

6 February 2024, Tuesday (20:00-21:30). The Welcome Cocktail will take place in the Austria Trend Hotel Congress Innsbruck. Do not miss this opportunity to say the first "hello" to attendees and committee members. The Registration will be opened at the Welcome Cocktail area.

Coffee/Tea Refreshment

Coffee/tea will be served at the times indicated in the programme near the lobby in front of the conference rooms Tyrol I, II and III.

Gala Dinner

Tyrolean Evening, Dinner & Show with the Gundolf Family - one of the best traditional shows in Europe including typical Tyrolean Shoe slapping dances and yodelling. Address: Kapuzinergasse 11 Eingang in der, Ing.-Etzel-Straße, 6020 Innsbruck (1 km, 14 min walking distance) from the event hotel. See the location map at the end of this brochure.

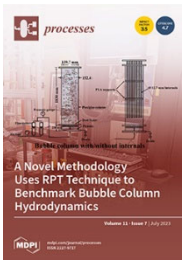
Local Time

The local time in Innsbruck is: GMT+1, Vienna.

Post-Conference Publications

Selected and extended papers presented at the conference will be published in one affiliated open access journals:

Sensors & Transducers
(ISSN 2306-8515,
e-ISSN 1726-5479)



MDPI Processes
(ISSN 2227-9717)

MDPI Machines
(ISSN 2075-1702)

Authors will be also invited to extend their articles into the book chapters for the open access Book Series *'Advances in Robotics and Automatic Control'*, Vol. 4, '*Advances in Networks, Security and Communications*', Vol. 3 or '*Advances in Intelligent Systems*', Vol. 3. These books will be published in 2024 and submitted for the indexing to the Book Citation Index by Clarivate Analytics.

Organizing Committee

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Prof., Dr. Sergey Y. Yurish
(IFSA, Spain)

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Keynote Speaker I

Prof., Dr. Matthias Scheutz
Karol Family Applied Technology Professor,
Director, Human-Robot Interaction Laboratory,
Department of Computer Science, Tufts University,
Medford, MA 02155, USA

Human-Robot Interaction for Co-Robots in Industry 5.0

Abstract: Industry 5.0 envisions humans and robots working side by side in partly open and less controlled environments. In this presentation, I will briefly motivate the kinds of capabilities robots will need to become genuine collaborators and demonstrate some of them with examples from our own work. I will conclude with an outlook of what technical developments are still need to make this vision feasible.

Short Biography: Matthias Scheutz is the Karol Family Applied Technology Professor of computer science in the Department of Computer Science at Tufts University in the School of Engineering, and Director of the Human- Robot Interaction (HRI) Laboratory and the HRI Masters and PhD programs. He is also President and CEO of Thinking Robots, Inc.

He has over 400 peer-reviewed publications in artificial intelligence, artificial life, agent-based computing, natural language understanding, cognitive modeling, robotics, human-robot interaction and foundations of cognitive science. His current research focuses on complex ethical AI-enabled robots with natural language interaction, problem-solving, and instruction-based learning capabilities in open worlds.

Keynote Speaker II

Dr. Xueli An
Head of 6G Network Architecture Research Group at Huawei Technologies Duesseldorf GmbH, Munich Research Center, Germany

6G Enabled Future Robotics

Abstract: 6G is the next-generation advanced mobile communications system. A future is envisioned where 6G technologies and solutions allow to unleash the potential of intelligent connectivity for a secure, resilient and sustainable development of our society. Robotic sector could be the new blue ocean that will be empowered by 6G. Robots with different appearances, optimized for different tasks, able to work in groups and able to interact with people in all areas of our life e.g. at home, in industrial environment, in hospital, etc. It is to be expected that even humanoid robots may reach market maturity when 6G will be rolled out. Robots are envisioned to be connected via 6G infrastructure. Moreover, 6G may also fundamentally change how robotics could be designed by leveraging its advanced technology features like native-AI, integrated communication and sensing, etc.

Short Biography:

Dr. Xueli An is the Head of 6G Network Architecture Research Group at Huawei Technologies Duesseldorf GmbH, Munich Research Center, Germany. Within Huawei, she leads the next generation mobile communication enabled vertical industry related research and corresponding industry development related activities. She has long experience in 5G research and deep engagement with the 5G enabled Industry 4.0 ecosystem. She serves as 5G Alliance for Connected Industries and Automation (5G-ACIA) working group 'Use cases and Requirements' vice chair since 2018. She is the vice chair of NetworldEurope Enabling Technologies for Future Vertical Ecosystem Transformation Working Group since 2020. Her current research focuses on 6G network architecture design and she also takes the role as working group 'Communication and Dissemination' chair position in one6G Association since 2021. She has many peer-reviewed international journal/conference publications and filed/granted patent applications in the field of wireless communication, networking, etc. She received her Master and Ph.D. degrees in Electrical Engineering from Delft University of Technology (TU Delft), The Netherlands.

Keynote Speaker III

Prof., Dr. Dmitry A. Zaitsev
Senior Member of ACM and IEEE,
Darmstadt University of Technology,
Germany

Infinite Petri Nets for Cybersecurity of Intelligent Networks, Grid, and Clouds

Abstract: Correctness of networking protocols represents the principal requirement of cybersecurity. Correctness of protocols is established via the procedures of their verification. A classical communication system includes a pair of interacting systems. Recent developments of computing and communication grids for radio broadcasting, cellular networks, communication subsystems of supercomputers, specialized grids for numerical methods, and networks on chips require verification of protocols for any number of devices. A new class of infinite Petri nets has been introduced and studied for more than 10 years for modeling modern networks, clusters, computing grids, and clouds that also concerns automated manufacture, cellular automata, and biological systems.

A finite specification of infinite nets has been offered in the form of a parametric multiset rewriting system that takes into consideration spatial structure on plane and in multidimensional lattices. A composition and analysis technique has been developed for investigation of infinite Petri nets. A case study of a square grid structure composition and analysis is presented. Parametric description of Petri nets, parametric representation of infinite systems for the calculation of place/transition invariants, and solving them in parametric form allowed the invariance proof for infinite Petri net models. Some additional analysis techniques based on graphs of transmissions and blockings are presented. Complex deadlocks have been revealed and classifies as: a loop of blockings a chain of blockings ended on an already blocked vertex because of isolation by neighboring blocked devices. Further generalization on multidimensional structures such as hypercube and hypertorus implemented. Torus structures play a key role in communication subsystems of super computers, clusters, and networks on chip. Generators of Petri net models developed and put on GitHub for public use. As a result of complex deadlocks disclosure, a possibility of network blocking via ill-intentioned traffic has been revealed. Prospects for further development of infinite Petri net theory are outlined.

Short Biography: Dmitry A. Zaitsev received the Eng. degree in Applied Mathematics from Donetsk Polytechnic Institute, Donetsk, Ukraine, in 1986, the Ph.D. degree in Automated Control from the Kiev Institute of Cybernetics, Kiev, Ukraine, in 1991, and the Dr. Sc. degree in Telecommunications from the Odessa National Academy of Telecommunications, Odessa, Ukraine, in 2006. He is a Professor of Information Technology at Odessa State Environmental University, Ukraine since 2019 and a visiting professor at University Cote D'Azur, I3S, CNRS, since 2023. He developed the analysis of infinite Petri nets with regular structure, the decomposition of Petri nets in clans, generalized neighborhood for cellular automata, and the method of synthesis of fuzzy logic function given by tables. He developed Opera-Topaz software for manufacture operative planning and control a new stack of networking protocols E6 and its implementation within Linux kernel Petri net analysis software Deborah, Adriana, and ParAd models of TCP, BGP, IOTP protocols, Ethernet, IP, MPLS, PBB, and Bluetooth networks.

His current research interests include Petri net theory and its application in networking, computing and automated manufacture. Recently he started working in the area of exascale computing applying his theory of clans to speed-up solving sparse linear systems on parallel and distributed architectures. He was a co-director of joint projects with China and Austria. Recently he has been a visiting professor to Technical University of Dortmund, Germany on DAAD scholarship, to University of Tennessee Knoxville, USA on Fulbright scholarship and to Eindhoven University of Technology, Netherlands. He published a monograph, 3 book chapters and more than a hundred of papers including issues listed in JCR. He is a senior member of ACM and IEEE.

Programme at Glance

Date / Time (GMT+1)	7.02.2024 Wednesday	8.02.2024 Thursday	9.02.2024 Friday
	Conference Room: *Tyrol II*		
8:45-9:00	Registration	Registration	Registration
9:00-9:15	* Opening Session (Sergey Y. Yurish, Chairman)	* Daily Notifications	* Daily Notifications
9:15-10:00	Keynote Speaker I	Keynote Speaker II	Keynote Speaker III
10:00-10:30	*Coffee Break*	*Coffee Break*	*Coffee Break*
10:30-12:30	Regular Session: Robotics I	Regular Session: Communications and Networks	Virtual Session (Live Streams in Zoom):
12:30-13:30	*Lunch on your own*	*Lunch on your own*	*Lunch on your own*
13:30-15:30	Regular Session: Robotics II	Special Session: Wireless Communication Security	Regular Session: Industry 4.0/5.0 and Artificial Intelligence
15:30-16:00	*Coffee Break*	*Coffee Break*	*Farewell Cocktail* & *Poster Session* * Closing Session (Sergey Y. Yurish, Chairman)
16:00-18:00	Regular Session: Smart Manufacturing and Process Control	Regular Session: Automation Control, AI and Operation Management	
18:00-19:00	-	Regular Session: Sensors for Robots and Automation Control	-
19:00-20:00	Gala Dinner		
20:00-22:00		-	-

* - must attend sessions.

The time in the table and in the technical programme below is the local time in Innsbruck: GMT+1, Vienna.

Technical Conference Programme

Day 1
7 February 2024, Wednesday

Regular Session: Robotics I

Chairman: Prof., Dr. Matthias Scheutz
Tufts University, USA

1. **Curriculum-organized Reinforcement Learning for Robotic Dual-Arm Assembly**
   Konstantin Wrede, Oliver Donath, Tommy Wohlfahrt and Ute Feldmann (Germany)

2. **Combined FE-based Modelling and Experimental Verification of the Dynamic Behaviour of an Industrial 6-axis Robot**
   Pascal Krutz, Haiko Klause, Jens Hamann, Holger Schlegel, Matthias Rehm, Peter Binde and Martin Dix (Germany)

3. **Optimizing Welding Efficiency: A first Approach for an Automated Mobile Welding Robot**
   Robin Schmidt, Stefan Schütz, Christian Henke and Ansgar Trächtler (Germany)

4. **A Novel Method for Improving Robot Life Span**
   Sasha Stanceski and Jingxin Zhang (Austria)

5. **Autonomous Mobile Forest Machine Control** (Pre-recorded video)
   Tiago Gameiro, Tiago Pereira, Carlos Viegas and Nuno Ferreira (Portugal)

6. **Highly Flexible and Scalable Software Architectures for Robotic Applications** (Pre-recorded video)
   Rene Hexel, Callum McColl, Morgan McColl and Gervase Tuxworth (Australia)

7. **Design and Modelling of a Transfemoral Prosthesis and Stress, Elongation Analyses of it in ANSYS** (Pre-recorded video)
   Semiha Bulut and Burak Duman (Turkey)

Regular Session: Robotics II

Chairman: Prof., Dr. Mi-Young Kang
Honam University, Republic of Korea

1. **Dialogue-Based Task Instructions and Modifications for Industrial Robots**
   Matthias Scheutz, Bradley Oosterveld, John Peterson and Eric Wyss (USA)

2. **AI and Robotics on Small and Medium Enterprises (SMEs) in Western Balkans: Psychological Adaptation and Economic Outcomes**
   Mimoza Maloku Kuqi, Delvina Beka, Filloreta Brahimi, (Kosovo)

3. **Virtually Guided Telemanipulation using Neural RRT-Based Planning**
   Stephan Schwarz, Carl Gaebert, Benedikt Nieberle and Ulrike Thomas (Germany)

4. **CoHEXist - Introducing a New Test Setup for Coexistent Interactions with Mobile Robots in Open Space Encounters**
   Nicolas Niessen and Klaus Bengler (Germany)

5. **Optimal Tracking Control of Catamaran Sailboat Model in a Smart City** (Pre-recorded video)
   Igor Astrov (Estonia)

6. **Hill Muscle Method-Enhanced Algorithm for Arm Muscle Deformation Kinetics Development** (Pre-recorded video)
   Ayda Okan, Ulviye Bunyatova and Mustafa Dogan (Turkey)

7. **Advanced Modeling Approach for Arm Muscle Deformation Kinetics** (Pre-recorded video)
   Merve Cansu Akarca, Ulviye Bunyatova and Mustafa Dogan (Turkey)

Regular Session: Smart Manufacturing and Process Control

Chairman: Mr. Nicolas Niessen
Technical University of Munich, Germany

1. **Advancing Industry 5.0: Smart Manufacturing Utilizing High Impedance Intelligent Reflecting Surfaces (HIIRS)**
   Solomon Mingle (UK)

2. **Requirements for a Quality Control System for Bent Sheet Metal Parts**
   Florian Taurer, Bernhard Girsule, Christian Jandl and Gernot Rottermanner (Austria)

3. **Recent Development and Results in Smart Food Industry in Hungary**
   Zoltán Gillay, Attila Gere, Katalin Badak-Kerti, Mátyás Lukács, Zoltán Kovács and László Baranyai (Hungary)

4. **Big Data-Based Prediction of Renewable Energy Supply in Press Equipment**
   Mi-Young Kang (South Korea)

5. **Mathematical Modeling of Thermal Behavior of PCBs in a Modular Magazine Convection Oven**
   Mohammed Ateeq, Roland Feuser, Heinrich Ratjen, Frank Ziegler, Loui Al-Shrouf and Mohieddine Jelali (Germany)

6. **Artificial Intelligence in Manufacturing: A Lightweight Framework for Online Anomaly Detection at the Edge**
   Andrea Bonci, Renat Kermenov, Lorenzo Longarini, Sauro Longhi, Geremia Pompei, Mariorosario Prist and Carlo Verdini (Italy)

Day 2
8 February 2024, Thursday

Regular Session:
Communications and Networks I

Chairman: Dr. Xueli An
Huawei Technologies Duesseldorf GmbH, Munich Research Center, Germany

1. **Entropy Based Interdependence Analysis of the B5G/6G THz Network**
   Djamila Talbi and Zoltan Gal (Hungary)

2. **Power Consumption of 5G Device Depending on the Network Configuration**
   Hyunseo Ha, Julian Wurm and Stefan Kunze (Germany)

3. **Communication-aware Motion Control for Mobile Robot Applications**
   Daniel Gordon, Yiqun Wu and Xueli An (Germany)

4. **Design and Implementation of a Human Computer Interface for the Use of Instant Messaging Applications While Driving Safely**
   Cándido Caballero-Gil (Spain)

5. **Elliptical Patch Antenna for 5G Mobile Applications** (Pre-recorded video)
   Rachel House and Solomon Mingle (UK)

6. **A Simulation Framework for Multi-Robot Cooperation Over Wireless Networks** (Pre-recorded video)
   Jan Reitz and Jürgen Roßmann (Germany)

7. **Q-Learning-Enhanced Random Channel Access for Efficient Energy Harvesting in IoT Networks** (Pre-recorded video)
   El Miloud Ar-Reyouchi, Ayoub Haj Sadek and Kamal Ghoumid (Morocco)

Special Session:
Wireless Communication Security

Chairman: Dr. Ali Kara
Department of Electrical and Electronics Engineering, Gazi University, Turkey

1. **Practical Implications of the use of Radio Frequency Fingerprinting (RFF) in Cybersecurity of Smart Grids**
   Ali Kara (Turkey)

2. **Proxy Re-encryption Protocol in FANET**
   Hyun-A Park (South Korea)

3. **Securing Industrial Control Systems: Enhancing Data Preservation in IoT with Streamlined IOTA Integration**
   I.C. Lin, P.C. Tseng, P.H. Chen and S. J. Chiou (Taiwan)

4. **Energy Consumption Based Analysis of the Swarm Intelligence Routing Mechanisms in Wireless Sensor Networks**
   Levente Filep, Peter Polgar and Zoltan Gal (Hungary)

5. **Exploring Communication in Marine Multi-Robot Systems Using an Adaptive Response Threshold Model**
   Antoni Martorell-Torres, José Guerrero-Sastre and Gabriel Oliver-Codina (Spain)

6. **A Communication Observer for Monitoring the Safety Integrity Level in Real-time**
   Michael Schwarz (Germany)

7. **Traffic Anomaly Detection Based on Dilated Convolution and Channel Attention** (Pre-recorded video)
   Changpeng Ji, Haofeng Yu and Wei Dai (China)

Regular Session: Automation Control and Operation Management

Chairman: Prof., Dr. Takayoshi Yokota
Tokyo Information Design Professional University, Japan

1. **Numerical Optimization on a Class of Integro-Differential Equations with Weakly Singular Kernels and Possible Control Delays**
   Shihchung Chiang (Taiwan)

2. **A Leader-Follower Consensus Control Based on Piecewise Lyapunov Functions for Multi-Agent Systems with Unknown Parameters**
   Takuya Nakagawa, Daiki Asada, Syunya Nagai, Yoshikatsu Hoshi and Hidetoshi Oya (Japan)

3. **Prediction of the Effect of Electrical Defibrillation Giving Consideration to New Feature Parameters**
   Yuta Yoshikawa, Takayuki Okai, Hidetoshi Oya, Minoru Yoshida and Md.Masudur Rahman (Japan, Bangladesh)

4. **Assessing the Influence of Human Factors on Overall Labor Effectiveness in Manufacturing: A Comprehensive Literature Review**
   Dominic Vadeboncoeur, Robert Pellerin and Christophe Danjou (Canada)

5. **Enhancing Operator Engagement During AI-assisted Manufacturing Work Using Optimal State Deviation Feedback System**
   Loïc Couture, Mario Passalacqua, Laurent Joblot, Florian Magnani, Robert Pellerin and Pierre-Majorique Léger (Canada, France)

6. **Flowshop Scheduling Problem with Learning and Physical Fatigue Effect**
   Yenny Alexandra Paredes-Astudillo, Valerie Botta-Genoulaz and Jairo Rafael Montoya-Torres (France, Colombia)

Regular Session: Sensors for Robots and Automation Control

Chairman: Prof., Dr. Shihchung Chiang
Chung Hua University, Taiwan

1. **Novel THz Sensors**
   Janez Trontelj, Andrej Svigelj and Janez Ml.Trontelj (Slovenia)

2. **Network-wide Vehicle Localization Algorithm Based on MEMS Sensor Data**
   Takayoshi Yokota (Japan)

3. **Analysis of Biological Data of Cows for Development of Detection Systems for Calving Phase**
   Hiroto Noma, Tatsuya Komatsu, Ryota Kobana, Hidetoshi Oya, Ryotaro Miura and Koji Yoshioka (Japan)

4. **Comparison of Multiple NIR Spectrometers for Detecting Low-Concentration Nitrogen-based Adulteration in Protein Powders Using Chemometric Tools**
   Matyas Lukacs, László Baranyai, Zoltán Gillay, Zoltan Kovacs, John-Lewis Zinia Zaukuu, George Bazar and Marietta Fodor (Hungary)

5. **Sensor System for an Autonomous Forestry Mobile Robot** (Pre-recorded video)
   Tiago Pereira, Tiago Gameiro, Carlos Viegas and Nuno Ferreira (Portugal)

6. **Image Measurement Method for Navigating an AGF to a Pallet** (Pre-recorded video)
   Nobuyuki Kita, Yasuyo Kita and Takuro Kato (Japan)

7. **3D Prototyping of Medical Devices for Non-invasive Glucose Monitoring** (Pre-recorded video)
   Elias Janout and Jasmina Lozanovic (Austria)

Day 3

9 February 2024, Friday

Virtual Session
(Live Streams in Zoom):

Chairman: Prof., Dr. Sergey Y. Yurish
IFSA, Barcelona, Spain

1. **Advanced Information Technology for Production Sites with Private 5G**
   Keishi Matsuda (Japan)

2. **Model Based Energy Efficiency Characterization and Diagnostic in a Process Plant**
   Pousga Kaboré (Burkina Faso)

3. **Plasma Blade Propeller: Unmanned Aerial Vehicles**
   Ryan Nadar (India)

4. **Classification of Hand-Drawn Images in Frequency Domain Through Deep Learning in Support of Electronic Circuits Design**
   Malinka Ivanova (Bulgaria)

5. **Creation of Hybrid Technical Objects in the Context of Industry 4.0 Challenges and the Approaching Industry 5.0**
   Oleksii Solntsev and Yurii Kuznetsov (Ukraine)

Regular Session:
Industry 4.0/5.0 and Artificial Intelligence

Chairman: Prof., Dr. Thierry Warin
HEC Montréal, Canada

1. **Incorporating Design Principles in Industry 4.0 Systems Architecture using Reference Architectures**
   Sarah Riedmann, Christoph Binder and Christian Neureiter (Austria)

2. **An Industry 4.0 Ontology-based Architecture for Interoperability at the Field Level**
   Victor Chavez and Jörg Wollert (Germany)

3. **AI-based Quality Control for Sanding Ceramics**
   Marco Schneider, Attique Bashir and Rainer Müller (Germany)

4. **AI-Powered Energy Optimization: Advancing Industry 4.0 with Smart Forecasting for 3D Printing and Solar Panels**
   Khalil Moussi, Cherifa Nakkach and Yvan Picaud (Tunisia, France)

5. **Adaptive PI Tuning with Nonlinear Regression Based Steam Source Pressure Normalization for Temperature Control in Textile Dyeing Processes**
   Mustafa Çom and Sencer Sultanoglu (Turkey)

6. **Enhancing Maintenance Spare Parts Inventory Management with Data-Driven Demand Forecasting**
   Lucas Adam, Robert Pellerin and Bruno Agard (Canada)

7. **Enhancing Error Report Analysis in Industry: Evaluating Large Language Models and Traditional NLP for Effective Clustering**
   Arthur Grigorjan, Lennard Sielaff and Hayk Amirkhanian Namagerdi (Germany)

Poster Session:

1. **Drone Based 5G Standalone Network for Remote Areas**
   Julian Wurm, Hyunseo Ha and Stefan Kunze (Germany)

2. **Comparative Analysis of SNOW-V, SNOW-Vi, and Rocca Encryption Algorithms for Network Communications**
   Jezabel Molina-Gil and Gianmarco Corbo (Spain)

3. **Balancing Speed and Stability: A Digital Twin-Driven Efficiency Frontier Approach in Pulp and Paper Industry Operations**
   Pierre-Michel d'Anglade and Thierry Warin (France, Canada)

4. **Prototypical Design and Implementation of a 5G Torque Wrench**
   Frantisek Kobzik (Germany)

5. **CAD2GraspMonitor: Vision-Based Robotic Grasp Monitoring for Industrial Kitting Application**
   Merwan Birem and Corentin Domken (Belgium)

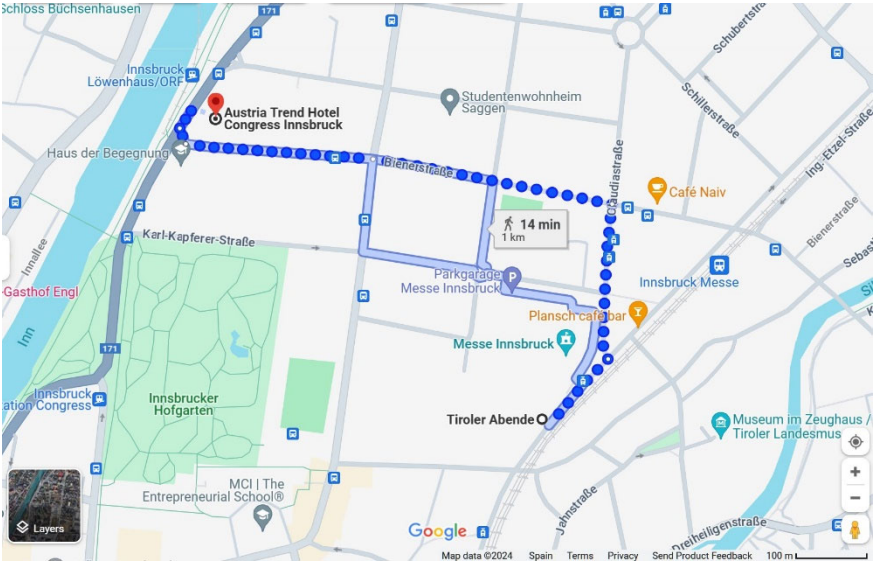
6. **Bench Marking of Industrial Object Pose Estimation Algorithm based on Vision & Deep Learning**
   Cyril Ruosch and Merwan Birem (Belgium)

7. **Painted Surfaces' Defect Detection on Hydrogen Combustion Boilers**
   Angela Semitela, António Completo, Nuno Lau and José Paulo Santos (Portugal)

8. **Exponential Stabilization of a Flexible Structure Via a Delayed Boundary Control**
   Nejib Smaoui and Boumediene Chentouf (Kuwait)

Gala Dinner Location:

From the conference hotel *Austria Trend Hotel Congress Innsbruk,* Rennweg 12a, 6020 Innsbruck, Austria:

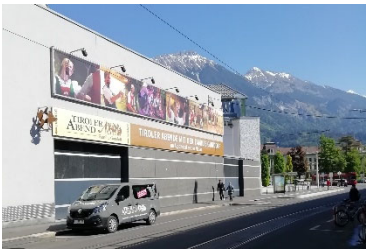


1. Head southwest on Rennweg/B171, 30 m
2. Turn left toward Tschurtschenthalerstraße, 24 m
3. Turn left onto Tschurtschenthalerstraße, 270 m
4. Continue onto Bienerstraße, 350 m
5. Turn right onto Claudiastraße, 220 m
6. Turn right onto Ing.-Etzel-Straße/Viaduktbögen

Destination will be on the right., 130 m

Address: Tiroler Abende, Kapuzinergasse 11 Eingang in der, Ing.-Etzel-Straße, 6020 Innsbruck, Austria

GPS: 47.270788, 11.403726 (47°16'14.8"N, 011°24'13.4"E)



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