20-22 June 2023

Zilina - Slovakia

Program of

The International Conference on

Information and Digital Technologies 2023

IEEE · Visegrad Fund **ESRA**

Preface

We have the pleasure to present to you the Program of the International Conference on Information and Digital Technologies (IDT 2023). IDT 2023 provides a forum for the presentation and discussion of scientific contributions covering the theories and methods in the field of information and digital technologies, and their application to a wide range of industrial, civil, and social sectors and problem areas. IDT 2023 is also an opportunity for researchers, practitioners, academics, and engineers to meet, exchange ideas, and gain insights from each other. IDT 2023 offers a multidisciplinary platform to address information systems' technological, societal, and financial aspects.

The conference program includes several workshops that cover numerous trends, problems, and aspects of information and digital technologies:

- International Workshop on Reliability and Safety (RaS);
- International Workshop on Earth Observation for Early Warning of Land Degradation at European Frontier (EWALD);
- International Workshop of Advanced Centre for PhD Students and Young Researchers in Informatics (ACeSYRI);
- International Workshop on Biomedical Technologies (BT).

The International Workshop on Reliability and Safety is organized under the support of Visegrad Grant Programme of the International Visegrad Fund by the project "*Exchange Reliability and Safety Experience in the V4 region*" (ERaSEV4) with reg.no.: 21830194. Collaboration between academic staff, representatives of enterprises and young researchers in the areas of Reliability and Safety will be established at this event. The modern trends of teaching and research aspects of the RaS will be discussed at the workshop. The conception of the RaS network in V4 will be discussed and clarified. Together with the International Visegrad Fund, this workshop is supported by the Slovak Research and Development Agency by the project "*New methods development for reliability analysis of complex systems*" (reg.no. APVV-18-0027).

Land degradation is the world's greatest environmental challenge affecting the environment, agriculture, and human well-being. Intensified by natural disasters and desertification, land degradation may present potential risks and socioeconomic tension. IT is one of the perspective tools for observing and eliminating such effects. The workshop on Earth Observation for Early Warning of Land Degradation at European Frontier proposes a platform for the discussion of relevant trends in the Early Warning System, responses to land degradation, and innovative geo-informational frameworks and solutions.

The workshop EWALD is organized with the support of the project of the same name EWALD which has received funding from the European Union's Framework Programme for Research and Innovation Horizon Europe – the Framework Programme for Research and Innovation (2021-2027), Grant Agreement No. ID 101086250. And this workshop develops of ideas for the project "*Risk assessment of environmental disturbance using Earth observation data*" (reg.no. SK-UA-21-0037) of the Slovak Research and Development Agency.

This workshop ACeSYRI is organized as an event of the ERASMUS+ project "*Advanced Centre for PhD Students and Young Researchers in Informatics*" (ACeSYRI, reg.no. 610166-EPP-1-2019-1-SK-EPPKA2-CBHE-JP). Also, this Workshop is post-project event of the project "*Centers of Excellence for young RESearchers*" (CERES, 2014-2017) - 544137-TEMPUS-1-2013-1-SK-TEMPUS-JPHS.

This ACeSYRI workshop is intended for PhD students, young researchers, and educators. The main goal of the workshop is a presentation of ACeSYRI project results to representatives from the EU and other countries. The young researchers can present at the workshop with their lectures about own scientific research. The next aim is to establish and expand international contacts and co-operation of young researchers.

Initially, more than a hundred contributed papers were submitted for the review. Approximately half of these submissions have been recommended by reviewers for presentation at the Conference and publication in the proceedings. The review process was mainly organized by the Workshop chairs and the process was made by a large number of reviewers, which are gratefully acknowledged for their contributions to the improvement of quality of the accepted papers. Each paper was reviewed by at least two anonymous reviewers in order to ensure fair and high-quality reviews. Our organization team is grateful all reviewers who help us to select papers for the presentation at the Conference and publication in the proceedings.

In addition to regular sessions, IDT 2023 offers distinguished keynote lectures. At the conference will be presented lectures:

- *Self-sufficient electric energy supply at home* by prof. Marko Čepin (University of Ljubljana, Slovenia);
- *Benefits of Petri nets for systems modeling and probabilistic assessment in reliability engineering* by prof. Nicolae Brinzei (University of Lorraine, France);
- *Maintenance optimization of complex multi-component systems* by prof. Radim Briš (VSB—Technical University of Ostrava, Czech Republic);
- *Multi-Diagnosis Cough Classification Evaluation* by prof. Martin Lukač (Hiroshima City University / Nazarbayev University, Japan / Kazakhstan);
- *Data-driven decision making in practice: Experiences in academia and government* by Dr. Martin Komenda (Masaryk University, Czech Republic)*.*

We thank Keynote Speakers for offering their unique perspectives on information technologies at the Conference.

We gratefully acknowledge the Faculty of Management Science and Informatics of the University of Žilina, European Reliability and Safety Association (ESRA), the Czechoslovakia section of IEEE, and the Reliability Society Chapter of IEEE Czechoslovakia Section for the sponsoring, organizational and technical support.

We also thank all the contributed paper authors for their submissions and presentations.

Organization team of IDT 2023

IDT 2023 Programme Committee

Chair   Cepin Marko, Slovenia

Co-Chairs: Zaitseva Elena, Slovakia

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IDT 2023 Organizing Committee

Chair: Sedlacek Peter, Slovakia

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Ilovska Anna, Slovakia   Rabcan Jan, Slovakia
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Mrena Michal, Slovakia   Vaclavkova Monika, Slovakia

IDT 2023. Time Schedule

Tuesday, June 20, 2023

09:20-10:45	Registration
10:45-11:00	Opening of the Conference ([room RC009](#))
11:00-12:30	**The Industrial Centre** ([room RC009](#))
12:30-13:20	Lunch
13:20-20:00	Tour of the Bojnice Castle and dinner

Wednesday, June 21, 2023

09:20-11:00	**Section EWALD1** [room RC001](#)	**Section RaS1** [room RC009](#)	ACeSYRI1 room RC006
11:00-11:30	Coffee/tea		
11:30-12:30	**The First Plenary Section** ([room RC009](#))		
12:30-13:20	Lunch		
13:20-15:00	**Section IDT1** [room RC001](#)	**Section RaS2** [room RC009](#)	
15:00-15:30	Coffee/tea		
16:00-18:00	**Section EWALD2** [room RC001](#)	**Section IDT2** [room RC009](#)	ACeSYRI2 room RC006
18:00-20:00	Reception		

Thursday, June 22, 2023

09:20-11:00	**Section EWALD3** [room RC001](#)	**Section RaS3** [room RC009](#)	
11:00-11:30	Coffee/tea		
11:30-12:30	**The Second Plenary Section** ([room RC009](#))		
12:30-13:20	Lunch		
13:20-15:00	**The Third Plenary Section** ([room RC009](#))		
15:00-15:30	Coffee/tea		
15:30-17:00	**Section BT** [room RC001](#)	ACeSYRI3 [room RC009](#)	
17:00-17:15	Closing ceremony ([room RC009](#))		

Detailed Schedule

Tuesday, June 20, 2023

Opening of the Conference   **10:15-10:30 (room RC009)**
[Click here to join.]

The Conference Opening	Prof. Elena Zaitseva
Welcome words of the Program Committee Chair	Prof. Marko Cepin
Welcome words of the Dean of the Faculty	Prof. Emil Kršák

The Industrial Centre   **11:30-12:30 (room RC009)**
[Click here to join.]

Moderators: **Prof. Elena Zaitseva, Slovakia**

Assistant: **Ing. Michal Mrena, Slovakia**

Dr. Martin Komenda (Faculty of Medicine, Masaryk University, Institute of Health Information and Statistics, Czech Republic)

Data-driven decision making in practice: Experiences in academia and government

Data-driven decision-making is nowadays one of the domains that have huge potential. This is mainly because data, information systems and user interactions on the Internet are constantly increasing. However, it is crucial to handle this phenomenon correctly. The use of proven methodologies, the choice of effective and secure technologies and the appropriate involvement of the human factor seem to be essential. The workshop will not only provide the theoretical background of the complex data mining process and its application in real life. Still it will also present selected domains from medical education and Czech healthcare, where data plays a key role, using real-life examples.

Team building   **13:30-20:00 Tour to Bojnice**

Wednesday,   June 21, 2023

Section EWALD1   09:20-11:00 (room RC001)

Chair: Dr. Anna Kozlova, Ukraine

Assistant: Dr. Peter Sedlacek, Slovakia

Jakub Jech and Pavel Jirava *A project management perspective on UAV data collection: water management case study Baroch*
Martin Kratky and Jitka Komarkova *Evaluating the Use of Very High-Resolution RGB Imagery from UAV for Vegetation Classification*
Mykhailo Popov, Sergey Stankevich, Anna Kozlova, Iryna Piestova, Anna Khyzhnyak, Elena Zaitseva, Vitaly Levashenko, Eugeny Seredinin, Sergii Maltsev, Yuliia Lypska, Alina Kukharuk, Vita Rashchuk and Anhelina Smitiukh *Earth observation based early warning of land degradation architecture*
Eugeny Seredinin, Sergii Maltsev, Yuliia Lypska, Alina Kukharuk, Vita Rashchuk and Anhelina Smitiukh *Scheme for providing Early Warning Process with ArcGIS Platform*
Aleksandr Konikov, Mikhail Tatur and Ilya Nosurev and Peter Sedlacek *Satellite navigation receivers. Accuracy measurements and principles of operation*

Section RaS1   09:20-11:00 (room RC009)

Chair: Dr. Stanislaw Czapp, Poland

Assistant: Ing. Michal Mrena, Slovakia

Zoltan Gal, Djamila Talbi and Mahmoud Tourky *On the Localization Properties of Swarm Intelligence Algorithms*
Yehor Zheliazkov, Larysa Globa and Iuliia Yamnenko *Intelligent lighting system for comfortable living of the older people*
Jozef Papan, Ivana Bridova, Slavomír Tatarka and Michal Hraska *Fault Tolerance Solutions in IoT and Smart City*
Lenka Přibylová, Radim Briš, Vojtěch Novák and Lubomír Martínek *An Application of Prospensity Score Matching on Colorectal Data*
Andriy Luntovskyy, Igor Melnyk and Alina Pochynok *5G and Beyond: Shannon's Channel Capacity*

Section ACeSYRI1   09:20-11:00 (room RC006)

Chair: **Prof. Nicolae Brinzei, France**

Assistant: **Dr. Jan Rabcan, Slovakia**

Kurmasheva Liliya   *Analysis of educational data using Data-mining tools*
Augerim Yerimbetova   *Models and methods of semantic analysis and representation of the meaning of text in computational linguistics*
Bek Bazatbekov   *Machine Learning-Based Object Recognition and Monitoring in Geoinformation Systems*
Kirill Korkin   *Introduction to the capabilities of neural network technologies in the field of industrial production*
Botagoz Zharmenova   *The most effective method of teaching programming languages (on the example of Python)*
Orazaly Yerkin   *Assessing the Hazards of Falling Rocket Debris in Kazakhstan: A Python-based Approach*

The First Plenary Section   11:30-12:30 (room RC009)
Click here to join.

Moderators: **Prof. Elena Zaitseva, Slovakia**

Assistant: **Ing. Michal Mrena, Slovakia**

  Prof. Marko Čepin (University of Ljubljana, Slovenia)

Self-sufficient electric energy supply at home

Electric energy supply at home is an issue, which offers more solutions than years ago. The objective is to present an evaluation of self-sufficient electric energy supply at home. The method bases on the solar power plant as the primary source of power generation. The storage of electric energy with direct current electric battery is considered as the secondary power source, knowing that night hours are without the primary power generation. The real case time dependent home consumption is determined and the real case of solar power plant generation is considered. The size of solar power plant and the size of the battery are optimised based on the consumption and based on 100 % self-sufficient power system. One parameter optimisation bases on minimisation of costs for such a system. The model includes realistic yearly time dependent home consumption curve, realistic yearly time dependent solar power plant generation curve and realistic yearly time dependent curve of state of charge of battery, which is a function of solar power and home consumption. The time resolution of this model can vary based on density of data points of solar power generation and density of points of determined power consumption. Results include comparison of costs related with different size of solar power plant and with different size of battery. The most important result is a combination of the size of solar power plant and the size of battery, which are both related with the smallest overall costs. Consideration of different years gives different results due to different sun irradiation through the hours of the year due to weather changes. Consideration of different locations gives different results due to the same reason. Results show relatively large cost of all cases, which exceeds the cost of buying electrical energy from actual provider at the current conditions.

Section IDT1   13:20-15:00 (room RC001)

Chair: Dr. Michal Kvet, Slovakia

Assistant: Dr. Peter Sedlacek, Slovakia

Irena Drofova, Milan Adamek and Pavel Wanecki *Forensics Science and Using a Color Model Digital Twin Artwork to Identify a Counterfeit*
Pavel Wanecki, Roman Jasek and Irena Drofova *The contribution of the European NIS2 directive to the design of the cyber security model*
Michal Kvet *Using Boolean Data Type in Oracle Database - Performance Study*
Martina Hrínová Durneková and Michal Kvet *Optimization of the SELECT Statement Containing Window Functions*
Terézia Sliacka, Michal Varga and Norbert Adamko *Modeling of hybrid reasoning of dynamic agent in ABAsim architecture*

Section RaS2   13:20-15:00 (room RC009)

Chair: Prof. Radim Briš, Czech Republic

Assistant: Ing. Michal Mrena, Slovakia

Stanislaw Czapp, Filip Ratkowski, Seweryn Szultka, Krzysztof Szuchnik and Michał Kołtun *Study of Soil Temperature and Moisture Changes in a Physical Model of an Underground Cable Line*
Radim Briš and Pavel Jahoda *Maintenance Optimization of Dormant Systems Submitted to Failure Based PM and Imperfect CM*
Andrea Galadíková and Norbert Adamko *Usage of Proximal Policy Optimization Algorithm for Personnel Assignment in Railway Nodes*
Djamila Talbi, Zoltan Gal and Janos Sztrik *Low Latency &High Speed Communication Service on LEO Satellite Constellation*
Hanan Tariq, Stanislaw Czapp and Vitaly Levashenko *RCDs Tripping in the Range from DC to AC 50 kHz for Slowly Rising Residual Current*
Igor Melnyk, Serhii Tuhai, Mykhailo Skrypka, Alina Pochynok, Dmytro Kovalchuk *Approximation of Boundary Trajectory of Short-Focus Electron Beam using Third Order Root-Polynomial Functions and Recurrent Matrixes Approach*

Section EWALD2   16:00-18:00 (room RC001)

Chair: **Dr. Miroslav Kvassay, Slovakia**

Assistant: **Dr. Peter Sedlacek, Slovakia**

Sergey Stankevich, Anna Kozlova, Elena Zaitseva and Vitaly Levashenko   *Multivariate risk assessment of land degradation by remotely sensed data*
Jakub Jech and Jitka Komárková   *Comparison of creating 3D models from UAV: Case study windmill Černilov*
Ricardo J. G. Mateus, João Antunes Rodrigues, and Francisco Silva Pinto   *A Multicriteria Decision Analysis Framework for Monitoring and Forecasting Land Degradation Risk in Ecosystems with Multiple Assets*
Pavel Lukashevich, Alexei Belotserkovsky, Hayk Grigoryan, Rita Abrahamyan, Hrachya Astsatryan and Aliaksei Sasnovich   *LST Quality Evaluation Service for Heterogeneous Earth Observation Data*
Mykola Lubskyi   *Role of remote sensing data in environmental research. Desertification and its exploration using remote sensing methods*
Tetiana Orlenko, Mykola Lubskyi, Artur Lysenko and Artem Andreiev   *Landsat satellite data time series processing for desertification mapping*

Section IDT2   16:00-18:00 (room RC009)

Chair: **Dr. Jozef Kostolny, Slovakia**

Assistant: **Ing. Michal Mrena, Slovakia**

Mária Bajúzová, Roman Hrmo, Nika Kvaššayová and Miroslav Kvaššay   *The Rate of Use of Digital Tools in Relation to Teachers' Creativity*
Marek Klimo, Eugen Antal and Miroslav Kvassay   *Education Tools for Teaching Classical Ciphers*
David Arie, Yuriy Bunyak, Olga Sofina, Roman Kvyetnyy and Oleg Bisikalo   *The Model to Simulate Grades of Team-Play Learning on the UnispherTM platform*
Tamila Kolomoiets, Olena Bielikova, Anna Kurienkova and Viktoriia Vorokh   *Experimental Verification of Using Augmented Reality Technology for Teaching Global Reading to Preschoolers with Autism Spectrum Disorders*
Oleh Ilkiv, Olha Krasovska, Yuliia Pereguda, Lidiya Zavatska, Andrii Yasinskyi   *The efficiency of Distance Learning in Ukrainian Higher Education Institutions During Martial Law Period*
Linda Blahova, Jozef Kostolny and Veronika Karcolova   *Enhancing Learning Outcomes with Interactive Courses*
Jakub Horecny and Jozef Kostolny   *Segmentation of MRI images using clustering algorithms*

Chair:　　　**Prof. Nicolae Brinzei, France**

Assistant:　Dr. Jan Rabcan, Slovakia

A.Bekenova, S.Bekenova, Zh.Abuova, L. Diyarova, and Zh. Aliakhmet 　　*Analysis of gamification models in education*
Margarita Pipiya 　　*Improving the efficiency of hybrid and distance forms of organizing the educational process based on the development of university infrastructure in the context of digital transformation*
Asselkhan Adranova 　　*Development of robotobionic prostheses using digital technologies*
Zhumaniyaz Mamatnabiyev 　　*Investigating the effectiveness of robotics in computer science education*
Bayangali Abdygalym 　　*Object recognition in solving precision farming problems*
Zhuldyz Zhumagali 　　*A computational method for solving the synthesis problem for a control system based on a genetic algorithm*
Orman Indira 　　*The Importance of Cybersecurity Policies in Today's Society*

Thursday,   June 22, 2023

Section EWALD3   9:20-11:00 (room RC001)

Chair: **Dr. Iryna Piestova, Ukraine**

Assistant: **Dr. Peter Sedlacek, Slovakia**

Miroslav Tomšů *Information Ecology, Problems and Negative Impacts in the Context of Information Technologies*
Abdellatif Rafik, Hassan Ibouh, Daoud Mezzane, Mikhail Popov, Igor Lukyanchuk and Mohammed Aboufirass *Addressing land degradation in an oasis domain: a remote sensing and modeling approach for prediction and monitoring of salinity and siltation*
Mykhailo Popov, Sergey Stankevich, Anna Kozlova, Iryna Piestova, Mykola Lubskyi and Anna Khyzhniak *EWS prototype design: conceptual framework, subtasks and interaction with the partners*
Artem Andreiev, Anna Kozlova and Olga Titarenko *Land cover classification enhancement by training samples separation: a case study for land degradation indication*
Farid el Wahidi, Hassan Ibouh, Abdellatif Rafik, Daoud Mezzane, Pierre Defourny, Mohamed Kourdi and Abdelilalh Targui *Land degradation assessment in Skoura Oasis: towards a blended spatially explicit warning system*
Patrik Hrkut *ACeSYRI portal as an attractive tool for young researchers support*
Tetiana Orlenko, Lesya Yelistratova, Alexander Apostolov, Artur Hodorovsky *Using of remote sensing data for drought assessment*

Chair: **Dr. Zoltan Gal, Hungary**

Assistant: **Ing. Michal Mrena, Slovakia**

Jörg Kammermann, Igor Bolvashenkov, Gabriel Romero, Hans-Georg Herzog   *Reliability Statistics of Traction Electric Drive Components: Overview and Analysis*
Agata Szultka, Seweryn Szultka, Stanislaw Czapp, Kamil Makowski, Peter Sedlacek   *Estimation of the Maximum Permissible PV Power to be Connected to the MV Grid*
David Matis and Peter Tarabek   *Reinforcement learning for weighted p-median problem*
Ihor Kliushnikov, Vyacheslav Kharchenko, Herman Fesenko, Vitaly Levashenko   *Reliability Models of Multi-state UAV-based Monitoring Systems: Mission Efficiency Degradation Issues*
Martin Lukac and Michitaka Kameyama   *Verification Based Algorithm Selection*
Oleksandr Zhukov and Vitalii Horbenko   *A Comparative Study of Deep Convolutional Neural Network Architectures to Identify Full Bee Body in Images*
Viktoria Sorokina and Sergey Ablameyko   *2D Cast Shadow Generation in E-commerce Using Transformer*

The Second Plenary Section   11:30-12:30 (room RC009)
Click here to join.

Moderators: **Prof. Nicolae Brinzei, France**

Assistant: **Ing. Michal Mrena, Slovakia**

Prof. Radim Briš (VSB—Technical University of Ostrava, Czech Republic)

Maintenance optimization of complex multi-component systems

A complex multi-component system consists of a finite number of non-identical components that can be realized as maintained components with different maintenance modes, for example non-repairable components, repairable components with corrective maintenance, repairable components with latent failures that are identified by means of preventive maintenance, component with preventive maintenance policy in which the component is restored (either repaired or renewed), etc. Arbitrary components are considered without any restrictions on the form of the probability distribution assigned to time to failure and repair duration, i.e. ageing components are allowed.

Any optimization problem can be formulated in terms of an objective function f(x) for a given scope, where the optimizer is intended to find the solution constrained by a number of restrictions imposed on the decision variables. Different formulations of the maintenance optimization problem will be presented and solved in the lecture, starting from an one-objective to multi-objective optimization problem. Effective methods to find optimal maintenance strategy of a complex system respecting a given reliability constraint will be described. For example, cost-optimization problem is demonstrated and solved where decision

variables are changeable maintenance parameters that are optimally selected from a set of possible realistic maintenance modes. In most cases, a discrete maintenance model is considered, where each maintained component can be operated in one or few discrete maintenance modes. The optimization methods will be demonstrated on real systems.

The Third Plenary Section   13:20-15:00 (room RC009)

Moderators: Prof. Radim Bris, Czech Republic

Assistant: Ing. Michal Mrena, Slovakia

Prof. Nicolae Brinzei (University of Lorraine, France)

Benefits of Petri nets for systems modeling and probabilistic assessment in reliability engineering

Assessment of systems dependability belongs to important tasks in many engineering fields. Such an assessment can be done using various mathematical methodologies depending on the mathematical representation of the system. In this lecture, we will focus on Petri nets and especially in Stochastic Petri nets which are one of the most common representations of functional and dysfunctional behaviour of system and its components. They are able to take into account stochastic processes of failures and maintenance, reconfiguration of dynamic systems due to failures, redundancy. We will present the dynamic behavior of Stochastic Petri nets, their performance measures from which dependability measures can be obtained. To assess these measures, two approaches can be considered: an analytical approach based on Markov chain theory, or an approach based on Monte-Carlo simulation. Both approaches are discussed and compared. Some applications to real industrial systems will also be presented.

Prof. Martin Lukac (Hiroshima City University, Japan)

Multi-Diagnosis Cough Classification Evaluation

The sound classification is an open problem when it comes to classification. In particular and with the recent outbreak of COVID-19 a large amount of research has been invested in cough classification as a method of early detection and subsequent prevention. However usually the methodologies available are considering specific approaches such as very large datasets, data augmentation or even combination of breathing with coughs in order to increase the classification accuracy. In this work we study the classification of coughs into several diagnostic categories as a function of volume of the dataset and size of the data samples. For this purpose we use a dataset collected using our developed mobile application, prepare several datasets and evaluate different classifiers. First we assume that we do not have enough data for an end-to-end deep learning approach. Second we also consider that the variety might be low. Finally we also assume that the data is unbalanced. In order to deal with these problems we propose a study on using fast and shallow classifiers, data manipulation such as sample adaptive length and sample overlapping. As a result we determine that while it is overall the most accurate to process the sounds as whole, sampling them into samples with overlapping segments allows to recover most of the information from the whole samples and obtains similar accuracy.

Chair: Dr. Patrik Rusnak, Slovakia

Assistant: Dr. Peter Sedlacek, Slovakia

Ainura Gumarova, Gaukhar Kamalova, Aigul Kubegenova and Jan Rabcan *Building a Model and Assessing the Level of Morbidity During the Epidemic*
Olha Shaposhnyk, Vitalii Babenko, Maksym Chernykh, Svetlana Yanushkevich and Ievgen Nastenko *Inferring Cognitive Load Level from Physiological and Personality Traits*
Pavol Galcik, Michal Mrena and Lucia Piatrikova *Advanced Priority Queues in the OPTICS Clustering Algorithm*
Behnaz Jafari, Kenneth Lai and Svetlana Yanushkevich *Investigating Association and Causal Relationships between Physiological Signals and Affective State*
Hajah Sueno, Fritz Tuazon, Francis Michael Solmayor, Gil Jason Tuna, Joeny Germo *CheckApp: A Web-based Multipurpose Telemedicine System for E-checkups and Face-to-Face Consultations*
Sergii Tukaiev, Svitlana Fedorchuk, Mykola Makarchuk, Borys Palamar and João Miguel Alves Ferreira *Facial electrodermal potentials at rest state as objective criteria of emotional burnout severity*

Section ACeSYRI3   15:30-17:00 (room RC009)

Chair: **Dr. Jan Rabcan, Slovakia**

Assistant: **Michal Mrena, Slovakia**

Kamila Abdiyeva and Martin Lukac   *Techniques for enhancing understanding of CNNs*
Yauhen Stankevich, Aliaksei Beliakou, Vladislav Shemenkov and Mikhail Tatur   *Comprehensive Approach to Problem Solution on Installation of Electrical Engine to Mini-Tractor*
Viktor Pokusov, Kaldybek Makhambetov and Marat Kozhamkulov   *Protection of Information Using Trusted Loader for Hardware Platforms*
Mikita Ihnatsiuk and Mikhail Tatur   *Model for Calculating the Coordinates of the Vehicle Movement Along a Curvilinear Trajectory*
Aidana Irmanova and Martin Lukac   *Classification of AES 128 Encrypted Images on Memristor Crossbars*
Veronika Minayeva and Olena Vashchilina   *Internet shop for trade in handmade goods*
Oleksij Zakabula   *Modeling the level of dissatisfaction with the needs of residents of small towns in the supply of drinking water in extreme cases*
Dzmitry Oskin and Alexander Kovaliou   *JEL classification: I21, I23, C88 Learning analytics as advanced tools for improving remote education*
Lidia Gavrylyan and Valentina Pleskach   *Program system of electronic trade of ecogoods*
Veronika Minayeva and Olena Vashchilina   *Internet shop for trade in handmade goods*
Shemyakin Anton and Bilyy Roman   *Internet store of computer equipment*
Ekaterina Derii   *Modeling and use of models in medicine*

Welcome to the metropolis of Northwest Slovakia

Žilina is a natural centre of north-western Slovakia and with a population of 81 940 inhabitants (as per 2021) it ranks among the largest cities in Slovakia. Žilina is situated around 200 km from Bratislava, the capital of Slovakia.

Žilina is located in the valley of the Váh river, in the Žilina Basin, at the confluence of the Váh river with its tributaries Kysuca and Rajčanka. The Žilina Basin is surrounded by the mountain ranges of Malá Fatra (Lesser Fatra), Strážovské vrchy (Strážov Hills), Súľovské vrchy (Súľov Hills), Javorníky and Kysucká vrchovina (Kysuce Highlands).

Žilina is a centre of significant political, cultural, sport and public health care institutions. The city of Žilina is the seat of the Žilina Region. Together with the Region, it keeps a stable position of the second or third place in gross domestic product per inhabitant. Its economic potential can be proven by the fact that Žilina has the biggest number of traders per thousand inhabitants. As for the number of joint stock companies and limited companies, Žilina keeps third position in Slovakia. The Slovak Commercial and Industrial Chamber in Žilina is the second biggest in Slovakia.

Nowadays, the city of Žilina represents a dynamic development accelerated by KIA Motors Slovakia investments. However, the City is not only a centre of car production, but together with the Upper Váh River Region (Horné Považie), it is an interesting tourist destination.

Interesting events held in the city of Žilina and its surroundings during the year (Carnival Slovakia, Central European Festival of Concert Art, Old Town Festival, Folklore Festival in Terchová, Medieval Day, Rajec Marathon etc.) make the development of the City tourism more dynamic.

The city of Žilina is a centre of theatres, museums, galleries, parks and sports facilities. Its historical centre is crossed by one of the longest and the most beautiful pedestrian zones in Slovakia.

Bojnice Castle

Bojnice Castle is a medieval castle in Bojnice, Slovakia. It is a Romantic castle with some original Gothic and Renaissance elements ntury. Bojnice Castle is one of the most visited castles in Slovakia, receiving hundreds of thousands of visitors every year and also being a popular filming stage for fantasy and fairy-tale movies. The castle is renowned for its attractions, including the popular Castle Fairytale, the International Festival of Ghosts and Spirits and the Summer Music Festival. The romantic castle is also a popular location for filming fairy tale movies, such as Fantaghirò.

Bojnice Castle was first mentioned in written records in 1113, in a document held at the Zobor Abbey. Originally built as a wooden fort, it was gradually replaced by stone, with the outer walls being shaped according to the uneven rocky terrain. Its first owner was Matthew III Csák, who received it in 1302 from the King Ladislaus V of Hungary. Later, in the 15th century, it was owned by King Matthias Corvinus, who gave it to his illegitimate son John Corvinus in 1489. Matthias liked to visit Bojnice and it was here that he worked on his royal decrees. He used to dictate them under his beloved linden tree, which is now known as the "Linden tree of King Matthias". After his death the castle became the property of the Zápolya family (see John Zápolya). The Thurzós, the richest family in the northern Kingdom of Hungary, acquired the castle in 1528 and undertook its major reconstruction. The former fortress was turned into a Renaissance castle. From 1646 on, the castle's owners were the Pálffys, who continued to rebuild the castle.

Finally, the last famous castle owner from the Pálffy family, Count János Ferenc Pálffy (1829-1908), made a complex romantic reconstruction from 1888 to 1910 and created today's beautiful imitation of French castles of the Loire valley. He not only had the castle built, but also was the architect and graphic designer. He utilized his fine artistic taste and love for collecting pieces of art. He was one of the greatest collectors of antiques, tapestries, drawings, paintings and sculptures of his time. After his death and long quarrels, his heirs sold many precious pieces of art from the castle and then, on 25 February 1939, sold the castle, the health spa, and the surrounding land to Ján Baťa.

After 1945, when Bata's property was confiscated by the Czechoslovak government, the castle became the seat of several state institutions. On 9 May 1950, a huge fire broke out in the castle, but it was rebuilt at government expense. After this reconstruction, a museum specializing in the documentation and presentation of the era of architectural neo-styles was opened here. Bojnice Museum is now part of the Slovak National Museum today.

Map of Žilina
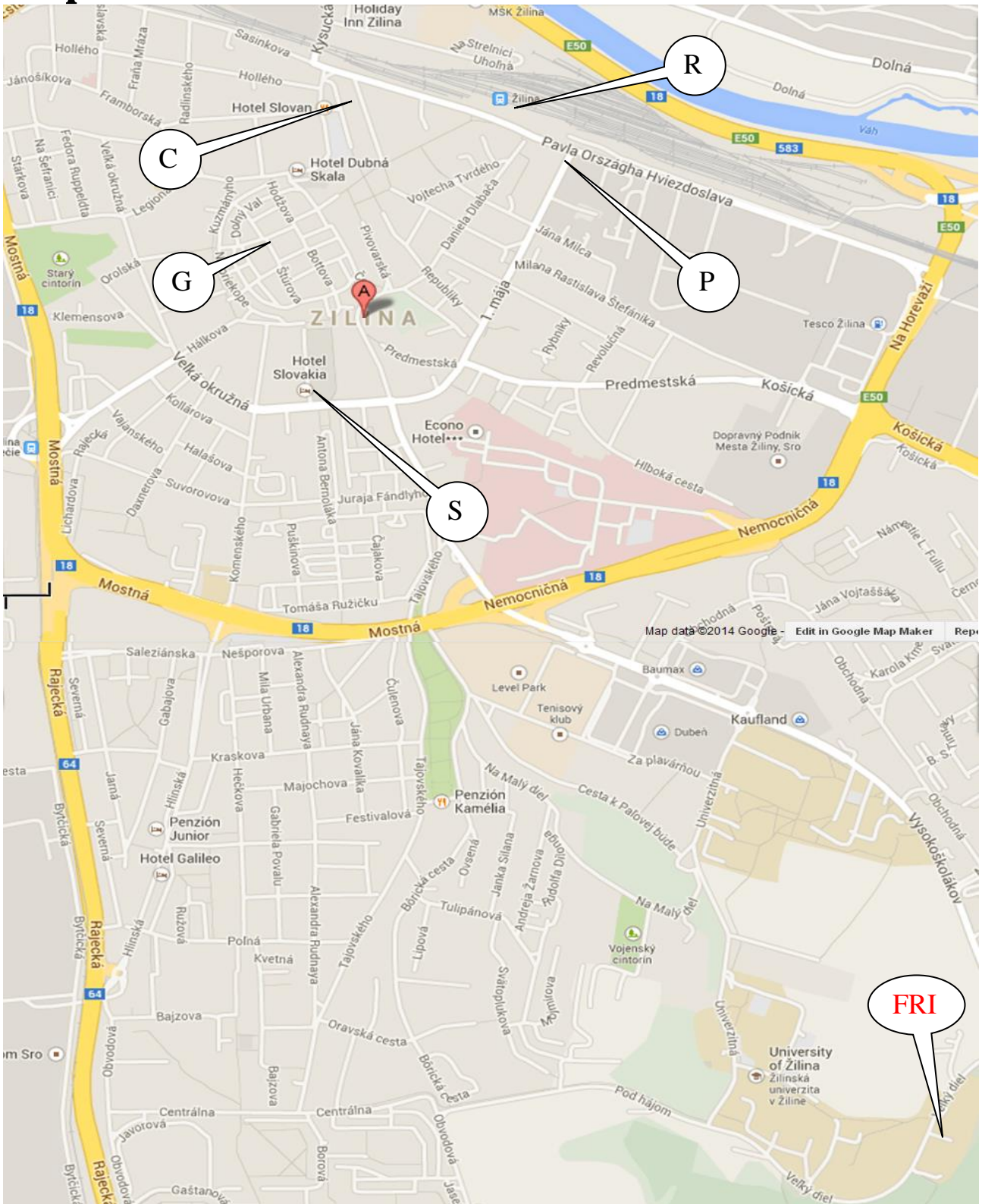
C – Hotel Center Park   A – Historical centrum of the city
G – Grand Hotel;
P – Penzion Pars   R – Railway station (near auto station)
S – Slovakia Hotel   FRI – Faculty of Information Sciences and Management

Distance between A and R is near 10 minutes by foot.
Distance between S and FRI is near 25-30 minutes by foot.

Key points in Žilina

The Faculty of Management Science and Informatics of University of Žilina (UNIZA). The address is (in Slovak):
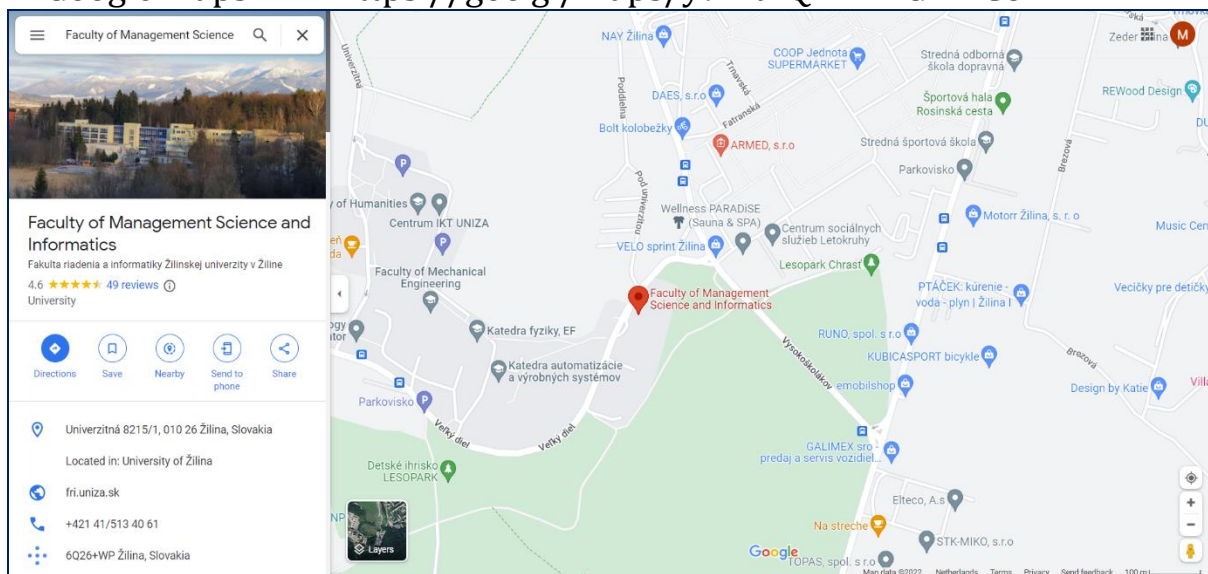
Fakulta riadenia a informatiky

Velky diel 3323

010 26 Žilina

Slovakia

Google maps link: https://goo.gl/maps/y92itPQYrrF4GPWC6

Hotel "Penzion Central Park" in situated the center of Žilina. The address is:

Penzion Central Park, s.r.o.

Sad SNP 663 / 18,

010 01 Žilina

Slovakia

Google maps link: https://goo.gl/maps/E4rKeWyYbrw5yMg6A
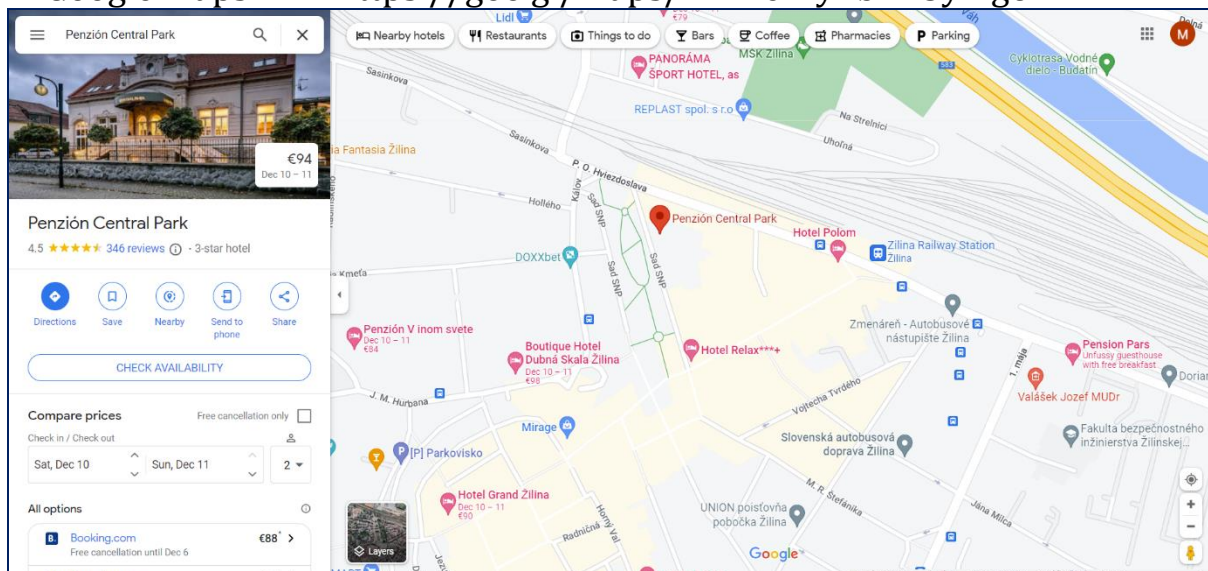
Recommendations for Accommodation

The most of the hotels are near the center of Žilina. Based on our previous experiences, we can recommend some of the following accommodations:

- Hotel Grand

- Hotel Boss

- Penzion Central Park: https://www.booking.com/Share-VxFczw

- Penzion Pars: https://www.booking.com/Share-sGLbT59

- Penzion Kamelia: https://www.booking.com/Share-03gQJ7m

- Hotel Dubná Skala: https://www.booking.com/Share-JlQCRGU

- CLAY Apartment Borik: https://www.booking.com/Share-DOH0y4

Žilina has a good public transport and a bus stop (named "Fatranska") is 4 minutes from the faculty (https://goo.gl/maps/RPhEXsRAVo7t3Yg97).