

**12th International Conference on Information
Technologies and Information Society
ITIS 2021**

Book of Abstracts

**November 4-5, 2021
Dolenjske Toplice, Slovenia**

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PROGRAM

THURSDAY, 4.11.2021

9:15 – 10:00	Registration
10:00 – 10:15	Welcome addresses
10:15 – 11:00	Invited speaker: dr. Tomaž Savšek Digital transformation in the automotive industry
11:00 – 11:05	Break
11:05 – 11:50	Session 1
11:05 – 11:25	A System for Used Cars Fair Price Interval Prediction <i>Elizaveta Liliom, Stevan Ostrogonac and Vedran Rodić</i>
11:30 – 11:50	Digital transformation of monitoring customer behaviour in the cars sales <i>Ivan Radoš, Miljenko Hajnić and Ivona Radoš</i>
11:50 – 12:20	Coffee break
12:20 – 13:05	Session 2
12:20 – 12:40	Modelling the incidence of traffic accidents using System Dynamics <i>Matej Barbo and Blaž Rodič</i>
12:45 – 13:05	Digital Transformation for Smart Communities and 5G <i>Valerij Grasic</i>
13:10 – 15:00	Lunch
15:00 – 15:45	Invited speaker: dr. Alois A. Paulin Self-Governing the Smart City through Liquid Democracy and the Quantum Budget
15:45 – 15:50	Break
15:50 – 16:35	Session 3
15:50 – 16:10	Digital Entrepreneurial Nest and Industry 4.0 in Montenegro – DigNEST <i>Luka Lakovic, Ivana Ognjanovic, Ramo Sendelj, Cristoph Reich, Laszlo Bokor, John Mantas, Martina Golob, Natasa Simsic, Irena Orovic, Tanja Radusinovic, Jevto Erakovic, Natasa Zugic, Rahela Nisavic and Katarina Raicevic</i>
16:15 – 16:35	The role and challenges of humor in formal education <i>Juraj Petrović</i>
16:35 – 17:05	Coffee break
17:05 – 17:50	Session 4
17:05 – 17:25	Digital transformation in terms of ICT spending in times of crises <i>Nuša Erman and Katarina Rojko</i>
17:30 – 17:50	Predicting employee absence to support decision making in companies <i>Peter Zupančič and Pance Panov</i>
19:00	Dinner

FRIDAY, 5.11.2021

9:00 – 9:15	Registration and welcome
9:15 – 10:00	Invited speaker: dr. Sanda Martinčić Ipšić Multidimensional Knowledge Network: Modelling of Factual, Conceptual, Procedural and Metacognitive Knowledge
10:05 – 10:50	Session 1
10:05 – 10:25	A Code Generator for Microservices with a Higher-Level Language <i>Mohamed Abdel-Maksoud</i>
10:30 – 10:50	Circular Economy: Recent Debates in Research Trends <i>Erika Džajić Uršič, Urška Fric and Borut Rončević</i>
10:50 – 11:20	Coffee break
11:20 – 12:05	Session 2
11:20 – 11:40	Evaluating group degree centrality and centralization in networks <i>Mario Karlovcec, Matjaž Krnc and Riste Skrekovski</i>
11:45 – 12:05	Understanding the role of social networks in the digital transformation and technology transfer: case of academic HPC centres and SMEs in the Danube region <i>Tamara Besednjak Valič, Janez Kolar and Urša Lamut</i>
12:05 – 12:25	Safe use of the Internet and presentation of the Media Literacy project <i>Sabina Mešič</i>
12:30	Lunch

KEYNOTES

Digital transformation in the automotive industry

Presented by keynote speaker:

dr. Tomaž Savšek

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Self-Governing the Smart City through Liquid Democracy and the Quantum Budget

Presented by keynote speaker:

dr. Alois A. Paulin

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Multidimensional Knowledge Network: Modelling of Factual, Conceptual, Procedural and Metacognitive Knowledge

Presented by keynote speaker:

dr. Sanda Martinčić Ipšić

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ABSTRACTS

A System for Used Cars Fair Price Interval Prediction

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Abstract: Purchasing a car is one of the capital investments that often requires a significant amount of time for a buyer to obtain domain knowledge prior to deciding. This paper presents the main results of a project aimed to help the used car buyers in making the optimal choice. The goal of the project was to analyze available data and choose an adequate model to objectively estimate values of advertised vehicles. Data preparation process and a set of best practices that resulted from the project are presented in detail.

Keywords: fair price, interval prediction, used car

Digital transformation of monitoring customer behaviour in the cars sales

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Abstract: Monitoring customers' behaviour to improve the quality of services and goods is the daily routine of any successful company. Quality of firm services can be improved with effective planning, smart targeting potential customers and reducing operational expenses to the adequate level.

Digitalization of available data and analysing those data can bring new information and insights that are invisible on a first sight. This paper brings results of the quantitative research based on collected data from car buyers and car dealers in the Republic of Croatia during 5 years period. By correlating variables of the vehicle price, customer's gender, distance between customer's location, vehicle length and place where the vehicle was bought, we provided several answers that any marketing department may use for car sales market research and preparing customers targeting.

Knowing customers, their behaviour and needs makes it easier for firms to predict future trends. Since the data itself was provided by one large car sales company, the paper will focus on the car sales. In this paper, we analysed available data using computer programs and concluded that the relations between correlating variables give useful information for all participant in the car sales market and that information can lead to reducing firm expenses on car sales marketing campaigns, reaching more potential customers and increasing firm income.

Keywords: big data, digitalization, predictions

Modelling the incidence of traffic accidents using System Dynamics

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Abstract: Despite the high risks associated with motorcycle use, relatively little research on motorcycle safety design has been carried out, and safety features that are standard in automobiles such as ABS, EBS, or even fog lights are not offered for most motorcycle models. As a tool for assessing the potential impact of introduction of safety features in motorcycles in the EU, we have developed a simulation model using the System Dynamics methodology (SD). The model is based on the publicly available data on the annual number of road accidents in the EU. The model runs at a high abstraction level and allows testing the impact and variation of individual parameters such as the influence of safety mechanisms on driver reaction time, weather conditions, technical condition of vehicles, etc. on the incidence of traffic accidents. The model has been developed as a part of research within a doctoral dissertation. Its final, calibrated version will be used to calculate the probability of an accident and the consequences of the accident in individual traffic situations and will serve a didactic function as a presentation of the mutual influence of various factors on the occurrence of traffic accidents, e.g., visibility, level of vehicle maintenance, weather conditions, maintenance of individual road sections, etc.

Keywords: traffic safety, simulation modelling, System Dynamics, Motorcycle Emergency Braking Warning System

Digital Transformation for Smart Communities and 5G

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Abstract: As we move into the future and talk about digital transformation, there are two important challenges, which are smart communities and 5G. Both covers many aspects in different areas of life. IoT, cloud and 5G are designed not only to better interconnect people, but also to interconnect and control machines, objects, and devices. They will deliver new levels of performance and efficiency. 5G is not just about speed and low latency, but of a new way of life. The SHAPE is a platform for building modern applications using different sources, different aspects of life, using machine learning techniques and AI. It is a platform for connecting a wide range of various data sources, covering many use cases, with the aim of the digital transformation of communities, supporting 5G.

Keywords: Smart City, 5G, IoT, Digital Transformation

Digital Entrepreneurial Nest and Industry 4.0 in Montenegro – DigNEST

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Abstract: Lead by modern development of information and communication technologies, the entire economy at the global level is in the process of transition to the digital age, so we can say that the 4th industrial revolution is unfolding worldwide, opening up new horizons driven by new-generation digital technologies. Digital research centres and universities have a key leading role in the process of integrating digital innovations into economic entities, strengthening cooperation between national and international economies, capable to provide expert knowledge and support to their local industries, as

well as to help them to cooperate with innovators, investors, and customers all across Europe and globally.

The DigN€st project is focused on modernizing higher education institutions in Montenegro, through strengthening its own capacities, improving and enhancing cooperation with the business sector in order to more effectively integrate digital technologies and innovative services with special focus on priority areas of food safety and health, as well as increasing visibility, internationalization and efficient digitalization of Montenegrin economic capacities.

Keywords: Digitalization, Entrepreneurship, Project, Industry 4.0, University

The role and challenges of humor in formal education

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Abstract: Humor can play an important role in formal education. It can facilitate interest in a topic, help establishing bonds between the lecturer and his audience and support students in achieving desired learning outcomes. It can also be distractive and hurtful if used inappropriately. As live lectures, which still prevail as a teaching method in formal education, have abruptly been shifted to a digital environment due to COVID-19 pandemics, it is necessary to keep in mind what impact this will have on their different aspects including humor. This lecture will give an overview of the current research results related to use of humor in formal education, as well as describe the issues and challenges in the digital transformation of live lectures.

Keywords: formal education, humor, lecture, lecture capture

Digital transformation in terms of ICT spending in times of crises

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Abstract: The paper presents the study on digital transformation, measured in terms of traditional, new and total ICT spending evolution, and its relation with economic growth, measured in terms of gross GDP and labour productivity. The aim of the study is to compare two severe global crises, i.e., the 2008-2009 economic crisis and the 2020 pandemic crisis, where the data and relation between ICT spending and economic growth are presented for the 2006-2021 period, as well as for the six sub-periods: 1) pre-economic crisis period, 2) economic crisis recession, 3) economic crisis recovery, 4) pre-pandemic period, 5) pandemic recession, and 6) pandemic recovery.

Keywords: digital transformation, ICT spending, economic growth, economic crisis, pandemics

Predicting employee absence to support decision making in companies

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Abstract: Employers in various organizations nowadays want to use novel technologies to support their day to day operations. The main objective is to improve and optimize their human resources management's productivity and expenditures. Our research focuses on predicting employee absence (such as sick leave and vacation) from timesheet data collected by the MojeUre time tracking system. First, we consider the employees' demographic characteristics and timesheet profiles that give us information about presence/absence from work on a specific day. Then, we use different feature engineering techniques to transform the source data into a dataset suitable for machine learning. Our main goal is to check how well we can predict different types of absence based on historical data for shorter and longer periods. To achieve this goal, we compare the predictive performance of different state-of-the-art tree-based machine learning methods. In this talk, we provide an overview of the current work and discuss the preliminary results.

Keywords: attendance, prediction, absence

A Code Generator for Microservices with a Higher-Level Language

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Abstract: This paper presents a code generator which facilitates the task of implementing microservices. The generator operates on a high-level specification of the entities which comprise the system and the rules to be enforced on accessing them. Because writing such a specification does not require a detailed knowledge of any programming language or database system, the code generator is accessible to non-technical people such as domain experts, product designers and founders. Additionally, the high-level nature of the specification language enables complete decoupling with the underlying realization technology. Finally, specifying the system in such a high-level manner allows for implementing optimizations in the realization which, in the current practice, would otherwise be avoided for the sake of maintainability.

Keywords: code generator, compile, micro-services, low-code, programming languages

Circular Economy: Recent Debates in Research Trends

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Abstract: Circular economy opens new business opportunities, gives rise to new business models, and develops new markets – especially at EU level. Increased efforts are going to be needed in this field to implement the revised waste legislation and develop markets for secondary raw materials. Also, the work started at EU level on some issues needs to be accelerated if the EU wants to reap the full benefit of a transition from the linear to the circular economy.

Firstly, we present an overview of the legislative and legal framework which brought about a new approach to waste management through the concept of circular economy, and its drivers. We use the concept of Ellen MacArthur Foundation to characterize the model of circular economy as a response to the pressures of growing economy, consumption of limited resources, and overall capacity of the environment, hence we focus on the impact of ambitious EU environmental policy and its financial support from the European Commission which helped social actors recognize not only the ecological, but also the economic and social benefits of the circular economy.

Secondly, our research programme is continued in the collection of the data that have been extracted from different multidisciplinary databases. Mainly records scientific texts where a dozen of those texts has been examined considering the basic aspect of the “conceptualization, methodology and its research” which was recovered from sustainability issues, where the distinction is the research approaches to review structural dimensions and analytical concepts of the CE. We divide them in existing parts are treated as or in the form of: (1) the origin and its evolution; (2) a new sustainable paradigm; (3) challenge – really new paradigm, or just a new designation and/or renaming? (4) analysis of 114 definitions; (5) industrial and economic model for the sustainable society; (6) concepts and practices; (7) transformation of business models and their integration into practice; (8) positive and negative impacts on the economy; (9) effects on the economy and (10) restrictions.

Keywords: Circular Economy, CE Concepts, Manufacturing

Understanding the role of social networks in the digital transformation and technology transfer: case of academic HPC centres and SMEs in the Danube region

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Abstract: Both digital transformation and technology transfer are, in the past years, topics drawing much attention when it comes to organisational studies. When entering the fields of innovation, SMEs must be ready to collaborate with actors with world-class technologies. Therefore, digital transformation is a prerequisite to participate in the processes of technology transfer. The present discussion will draw attention to an important social aspect of both processes – networking and network creation. Nested in the sociological theory of 'social capital', the research conducted in 14 countries of the Danube region will reveal the typical patterns of collaboration between academia based HPC centres and SMEs working in automotive or electronic sectors. It is the collaboration that contributes towards firstly digital transformation and later to technology transfer. The main research questions the contribution addresses is a) how the networks of collaboration and trust are built, and b) what the characteristics of such networks are. We will discuss both research questions through the prism of country development. The extended qualitative research was conducted with the support of the Danube transnational programme project InnoHPC.

Keywords: social networks, digital transformation, technology transfer, academic HPC centres, SMEs

Safe use of the Internet and presentation of the Media Literacy project

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Abstract: Knowledge of media literacy is crucial in today's digital world, in order to identify fake news online as well as ensure the security of personal information. The Media Literacy project at the Faculty of Media has been dealing with the literacy of various social groups, both children and vulnerable social groups, for 7 years. Media literacy is therefore defined as "skills, knowledge and understanding that enable consumers to use the media in a safe and effective way (according to Article 47 of the AVMS introduction). Media literate people are informed and as such can make decisions." Media literacy is sometimes used as a synonym for digital literacy, but these competencies are not the same. I will introduce you to the difference between media and digital literacy and the importance of security on the internet in the context of digital literacy. Covid epidemic has increased the usage of social networks between individuals, as well as online communication in a working environment, so it is important to acquire "security tools" to communicate online. We will look at the instructions on The Centre for Safer Internet (Safe.si) and discuss practical cases where our personal data may be exposed.

Keywords: media literacy, digital literacy, internet security, fake news, social networks