

**“Lucian Blaga” University of Sibiu
Faculty of Sciences**

International Conference on Applied Informatics

**„IMAGINATION, CREATIVITY, DESIGN,
DEVELOPMENT”**

Program & Abstracts

**SIBIU, ROMANIA
May 16-18, 2019**

International Conference on Applied Informatics
„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”
Sibiu, May 16-18, 2019

Edited by - Asist. drd. Cristina Răulea

Motto:

“There are no limits, only your imagination”

TOPICS

- Algorithms and data structures
- Graph theory and applications
- Formal languages and compilers
- Cryptography
- Modeling and simulation
- Computer programming
- Computer vision
- Computer graphics
- Game design
- Data mining
- Distributed computing
- Artificial Intelligence
- Service oriented applications
- Networking
- Grid computing
- Mobile operating systems
- Scientific computing
- Software engineering
- Bioinformatics
- Robotics
- Computer Architecture
- Evolutionary Computing
- Multimedia Systems
- Internet Communication and Technologies
- Web Applications

OBJECTIVES

The conference is mainly addressed to young researchers from all over the world. The conference gives the participants the opportunity to discuss and present their research on informatics and related fields (like computational algebra, numerical calculus, bioinformatics, etc.). The conference welcomes submissions of original papers on all aspects of informatics and related fields ranging from new concepts and theoretical developments to advanced technologies and innovative applications. The presentation has to include also a practical application. The conference will include regular presentations (20 min.), short IT Companies presentations and a round table.

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CHAIR OF THE CONFERENCE

- Prof. Dr. Dana Simian- Director of the Research Center in Informatics and Information Technology, Faculty of Sciences, "Lucian Blaga" University of Sibiu, Romania
E-mail: dana.simian@ulbsibiu.ro, d_simian@yahoo.com

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Organized by:

Research Center in Informatics and Information Technology

Department of Mathematics and Informatics

Faculty of Sciences

"Lucian Blaga" University of Sibiu

Organized with support of Romanian Ministry of National Education



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NTT Data



PAN FOOD



Omeron Technologies, Romania



ProIT



ROPARDO



Top Tech



VISMA

P R O G R A M

THURSDAY, May 16, 2019

Faculty of Sciences,
 Sibiu, Dr. I. Rațiu st., No. 5-7
 1st Floor, Room A18

8 ³⁰ – 9 ¹⁰	Registration
9 ¹⁰ – 9 ⁴⁰	Opening ceremony
9 ⁴⁰ – 11 ⁰⁰	Papers presentation – Chair Dana Simian, Romania
	<ul style="list-style-type: none"> • <i>Bank Connect: How to Build a Fintech App</i>, Gheorghe-Catalin Crișan, "Lucian Blaga" University of Sibiu, Romania • <i>Applying Gamification to an Information Security Awareness E-Learning Platform</i>, Dominik G. Klopfer, University of Applied Sciences Wuerzburg-Schweinfurt, Germany • <i>Escape the Garden – 3D game for VR</i>, Iskren Ivanov, University of Ruse, Bulgaria • <i>Motion Transfer using Deep Learning</i>, Andrei-Timotei Ardelean, Transilvania University of Brașov, Romania
11 ⁰⁰ – 11 ²⁰	IT companies presentations (IQuest)
11 ²⁰ – 11 ⁴⁰	Coffee break
11 ⁴⁰ – 12 ⁰⁰	IT companies presentations (RoPardo)
12 ⁰⁰ – 13 ²⁰	Papers presentation – Chair Katalina Grigorova, Bulgaria
	<ul style="list-style-type: none"> • <i>Improving Camera-based Document Analysis with Deep Learning</i>, Nikolai Körber, University of Applied Sciences Landshut, Germany • <i>System for energy consumption minimization for buildings heating</i>, Valentin-Gabriel Crăciun, Paul Adrian Nistor, Mihai Eugen Miuta, Iuliana-Maria Buruiană, Matei Gaură, "Lucian Blaga" University of Sibiu, Romania • <i>Framework for digital image processing in frequency domain</i>, Una Tuba, Ira Tuba, Milan Tuba, Singidunum University, Serbia • <i>Online Platform for Agricultural Industry</i>, Ana Vesić, Sava Lakićević, Vuk Ignjatović, Bojan Gutić, Dušan Dotlić, Andrej Mićović, Singidunum University, Serbia

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13 ⁴⁰ – 15 ⁰⁰	Lunch
15 ²⁰ – 16 ²⁰	Papers presentation – Chair Florin Stoica, Romania
	<ul style="list-style-type: none"> • <i>Enhancements in Human-Computer Interaction</i>, Adrian Pintilie, Transilvania University of Braşov, Romania • <i>Analysis of Prevention Methods for Cross Site Scripting</i>, Milan III Tuba, Stefan Ilic, Singidunum University, Serbia • <i>Agents for Predicting Prices in Stock Exchange Market</i>, Marko Milic, Toma Joksimovic, Danilo Jovanovic, Katarina Krivak, Sasa Cejic, Aleksandar Babic, Singidunum University, Serbia
16 ²⁰ – 16 ³⁰	Coffee break
16 ³⁰ – 17 ⁵⁰	Papers presentation – Chair Milan Tuba, Serbia
	<ul style="list-style-type: none"> • <i>An Open-Source Approach to Prepare Scanned Images for OCR</i>, Tiberiu Bujor, “Vasile Alecsandri” University of Bacău, Romania • <i>.NET Obfuscator</i>, Svetoslav Hadzhiivanov, University of Ruse, Bulgaria • <i>Face Recognition Framework Based on Features Template Matching</i>, Aleksa Cuk, Branivoj Miljkovic, Milos Todorovic, Aleksandar Ivanovic, Eva Tuba, Singidunum University, Serbia • <i>Cross-Platform Mobile Application for Remote-Controlling a PC via the Internet Coordinated by a RESTful API</i>, Adoris Elian Doran, "Lucian Blaga" University of Sibiu, Romania
17 ⁵⁰ – 18 ⁵⁰	Pizza break
19 ⁰⁰	Social program: <p style="text-align: center;">Sibiu by night. Visit of the old city center</p> <p style="text-align: center;">Sibiu Jazz Festival. Sibiu Big Square. https://sibiujazz.ro/ro/program-2019/</p>

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FRIDAY, May 17, 2019

Faculty of Sciences,
 Sibiu, Dr. I. Rațiu st., No. 5-7
 1st Floor, Room A18

$9^{00} - 9^{20}$	IT companies presentations (NTT)
$9^{20} - 10^{40}$	Papers presentation – Chair Arndt Balzer, Germany
	<ul style="list-style-type: none"> • <i>Detecting Structural Variants in Tomato Genomes</i>, Erika Goetz, Angelo Williams, Cooper Bodary, Sofia Visa, Esther van der Knaap, College of Wooster, USA • <i>Converting the Driver Card Data to Readable Format</i>, Claudia Cauca, Roland Meszaros, “Aurel Vlaicu” University of Arad, Romania • <i>Digital Image Analysis Based on Texture Features</i>, Ira Tuba, Una Tuba, Singidunum University, Serbia • <i>Bulk e-mail sender - the ultimate spammer experinece</i>, Vasile Angheluța, Eduard-Traian Ștefanescu, Felix Husac, "Lucian Blaga" University of Sibiu, Romania
$10^{40} - 11^{00}$	Coffee break
$11^{00} - 11^{20}$	IT companies presentations (ProIT)
$11^{20} - 12^{20}$	Papers presentation – Chair Dana Simian, Romania
	<ul style="list-style-type: none"> • <i>Cryptographic Solution with Poly-Alphabetic Cipher</i>, Victoria Sărăteanu, Paula Ioana Barna, Andrei Torok, Maria-Alexandra Bogdan, “Aurel Vlaicu” University of Arad, Romania • <i>Job Scheduling Optimizations in CloudSim by Monte Carlo Method</i>, Dejan Bulaja, Kristina Bozic, Nikola Penevski, Singidunum University, Serbia • <i>The Shortest Way Travelling</i>, Gros Bogdan-George, Lestyan Emanuel Andrei, Puț Ionel Alexandru, Groza Estera, “Aurel Vlaicu” University of Arad, Romania
$12^{20} - 12^{30}$	Coffee break
$12^{30} - 13^{30}$	Papers presentation – Chair Sofia Visa, USA
	<ul style="list-style-type: none"> • <i>Constructing a Trustles Medical Data System Using Blockchain Technology</i>, Alexandru Crăciun, Rebeca Pui, Oriana Presacan, "Iuliu Hațieganu" University of Medicine and Pharmacy, Cluj-Napoca, “Aurel Vlaicu” University of Arad, "Lucian Blaga" University of Sibiu, Romania

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	<ul style="list-style-type: none"> • <i>RUBIKon</i>, Horia Iuga, Andreas Coş, National College „Horea, Cloşca and Crişan”, Alba Iulia, Romania • <i>ChessEngine</i>, Filea Răzvan Gheorghe, “Samuel von Brukenthal” National College of Sibiu, Romania
13 ⁵⁰ -15 ⁰⁰	Lunch
16 ¹⁵ – 16 ⁴⁵	Audio-Video and Poster Session – Moderator Laura Stoica, Romania
	<ul style="list-style-type: none"> • <i>Jewelry design studio information system</i>, Yuliya Vlasova, Volga Region State University of Service, Togliatti, Russia • <i>Modeling of Economic Trade Processes of Enterprise by Means of MATLAB Simulation Tool</i>, Asaf Ali Khan, Mariia Khan, University of Siena, Italy • <i>The Formation of a Set of Signs for Modeling the Evaluation of Enterprise Activities</i>, Lyudmila Sabadash, Pavlo Grynko, Simon Kuznets Kharkiv National University of Economics, Ukraine • <i>The Most Popular Regional Booking Applications</i>, Violeta Safonova, Simon Kuznets Kharkiv National University of Economics, Ukraine
16 ⁴⁵ – 17 ¹⁵	Official closing and awards ceremony - Faculty of Sciences, Room A18
17 ⁴⁵	Official conference dinner
	<p>Social program:</p> <p style="text-align: center;">Sibiu Jazz Festival. Sibiu Big Square. https://sibiujazz.ro/ro/program-2019/</p> <p style="text-align: center;">VINO – Gastronomy Festival. Tineretului Park. https://cultura.sibiu.ro/index.php/cal_main/detaliu/5487/</p>

SATURDAY, May 18, 2019

9 ⁰⁰ - 18 ⁰⁰	Trip on the route Sibiu – Sighişoara – Mediaş – Sibiu
18 ⁰⁰	<p>Social program:</p> <p style="text-align: center;">Sibiu Jazz Festival. Sibiu Big Square. https://sibiujazz.ro/ro/program-2019/</p> <p style="text-align: center;">VINO – Gastronomy Festival. Tineretului Park. https://cultura.sibiu.ro/index.php/cal_main/detaliu/5487/</p> <p style="text-align: center;">Noaptea muzeelor https://capitalcultural.ro/noaptea-muzeelor-la-sibiu/</p>

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ABSTRACTS

Bulk e-mail sender - the ultimate spammer experience

Vasile ANGHELUȚĂ, Eduard-Traian ȘTEFĂNESCU, Felix HUSAC

The aim of this article is to propose a solution to improve the current way of sending e-commerce related e-mails and possibly help de-clutter the end-user`s inbox. A problem of interest for all companies and providers of services and products is to keep a large group of people up to date with their products or services. We propose a bulk e-mail sender, so that businesses can find it easier to send out sales ads, special promos or promo codes to selected customers or just keep everyone up to date. Our application has a simple, clean and very user-friendly interface.

Motion Transfer using Deep Learning

Andrei-Timotei ARDELEAN

Motion Transfer refers to the transfer of observed actions, motion, dynamics of a particular subject unto another entity. It's aim is to replicate and adjust the behavior to the target object which could have different characteristics. This makes the task challenging as the source movement must be represented in such a way that it can be adapted and reproduced on the target. Nowadays, this topic plays an important role in animations found in cartoons or video games. In this paper the issue is addressed by looking for an automated way of transferring the movement of a human body to another by learning the dynamics of the target body using deep neural networks. A detailed analysis of different existing methods and results on the specific topic is presented along with the improvements and original contributions in my implementation of the technique.

An Open-Source Approach To Prepare Scanned Images For OCR

Tiberiu Cosmin BUJOR

The progress made by the big companies in the artificial intelligence domain is often shared with the public as open source or by allowing free use of software programs over the internet. Google drive OCR removes the burden of having to obtain data needed to feed a classifier by using its huge dataset. The greatest results are always obtained when the correct information is provided and, using

Google's OCR is no different because image repair is a resource costly process and should be done separately if one is to obtain the best results. This paper describes methods and algorithms developed for document image enhancement and retrieval that could be used before the optical character recognition process.

Job scheduling optimizations in CloudSim by Monte Carlo method

Dejan BULAJA, Kristina BOZIC, Nikola PENEVSKI

Cloud computing is a subscription-based service where networked storage space as well as other computer resources can be acquired. Cloud computing is highly desirable in the rapidly growing world of computer technology and because of that the Cloud Computing and Distributed Systems (CLOUDS) Laboratory built the CloudSim framework. It is a very popular open source cloud simulator among the researchers and students. CloudSim represents a customizable framework that allows for uninterrupted modeling and simulation of cloud computing infrastructure. Its usefulness is, however, that it opened up the possibilities of evaluating the hypothesis in a controlled environment. In this environment, experimental results can be achieved easily with all the available customisations that framework has to offer. In this paper, CloudSim's default job scheduling algorithm is modified with the Monte Carlo method with the purpose of increasing the efficiency and utilization of the cloud making the user submitted jobs execute faster producing cost and time savings.

Converting the Driver Card Data to Readable Format

Claudia CAUCA, Roland MESZAROS

The open borders of the European Union developed road transportation of goods is a thriving and exponential expanding field. It is so important that it has been decided to standardize the regulations applicable in this regard. For the carriers, it is very good news. When getting to know current national regulations, they are also becoming familiar with provisions which are applicable throughout the entire Community. As a result, the drivers' duties with respect to recording their working time are always the same, irrespectively of location. In this project we propose a solution that aims to simplify the process of reading in a human friendly way the data from the driver's card and from the tachograph vehicle unit. The available software on the market which converts the data from the driver's card are really expensive, this being the main reason for developing a software accessible for everyone: authorities, companies and drivers. One of the challenges of the project is to make an easy to use software by having a friendly user interface.

Constructing a Trustless Medical Data System Using Blockchain Technology

Alexandru CRĂCIUN, Rebeca PUI, Oriana PRESACAN

As technology evolves, the prospect of a world in which all text, audio and video formats are easily modifiable becomes an ever more pressing issue. This article proposes to take a deeper look at the available technologies used to deal with data modification, by describing and underlining the importance of blockchain technology in this field, while also providing a concrete example to how this specific technology can be implemented, by constructing a program aimed as a medical database, and describing its possible usefulness in regards to safe storage of sensitive information.

System for energy consumption minimization for buildings heating

**Valentin-Gabriel CRĂCIUN, Paul Adrian NISTOR, Mihai Eugen MIUȚĂ,
Iuliana-Maria BURUIANĂ, Matei GRAURĂ**

The aim of this article is to propose a solution for minimization the energy consumption for buildings heating. With this respect we designed and implemented a system that works like an“intelligent thermostat”. The way that most heating systems work nowadays is by using natural gas to heat water which is then pumped through the installation in order to radiate that heat at the desired places. Although this is generally an efficient solution, it has its drawbacks. Simply installing a heating system fails to take into account the losses generated by thermic energy leaking from the building. This leak is caused by the Second Law of Thermodynamics, which states that energy tends to spread out. This can be mathematically stated by the Clausius theorem. Colloquially, the above formula states that any heat transfer tends to return the corpus that is being heated to its original state. Therefore, the higher an object’s temperature is, the more of that heat will be transferred to the environment. As such, an efficient way of reducing that loss is to keep the object’s temperature as close as possible to the environment’s one for as long as possible. This can be achieved by a self-taught algorithm, which monitors the period of usage any building has and adjust its temperature to minimize losses. Our system uses a learning algorithm. The initial data input is given by the user, which, through a mobile app, gives the system his/her timetable and desired temperature. In time, the system learns the user’s habits and makes changes accordingly. The hardware necessary for implementing this solution is cheap and readily available. In contrast to most similar systems, the afore mentioned algorithm requires a small computing unit (like the ever more popular Raspberry Pi) and a number of sensors to be installed both inside and outside of the respective location.

Bank Connect: How To Build A Fintech App

Gheorghe-Cătălin CRIȘAN

The goal of this article is to present how to create an application that aims to aggregate user information from the banks where the user has an account. Using this approach, the user can view the balance and transaction history of his accounts in a single application or even make transactions between banks directly from the app. This is also useful when we have to pay invoices, but some providers work only with few banks. Thus, we can pay the invoices directly from the app using other of our bank account. We included also the possibility of helping customers in splitting their outgoings into categories like food, invoices, sports, etc. In this way, the user can check how he spends his money and how he can save some money. The article also presents details regarding the implementation of the application and solutions for handling the session between the client application and banks services. Besides the backend, we'll describe the technologies used for the client app and the motivation for their choice. Our proposed solution is compared with other alternatives for the client app. The comparison revealed that our application has substantial advantages.

Face recognition framework based on features template matching

Aleksa CUK, Branivoj MILJKOVIC, Milos TODOROVIC, Aleksandar IVANOVIC, Eva TUBA

Facial recognition represents an automatic way of identifying or profiling a person using their digitalized portrait. It consists of many algorithms used to identify the person, but in its core it still consists of the comparison of the offered sample picture obtained through a camera and their predefined picture in the database. It finds application in systems where security is crucial, concretely in two ways: recognition and verification. When considering recognition, it is based on obtaining the facial characteristics of a person using the acquired sample picture. As for the verification the gathered parameters are compared with the already existing picture of the same user in the database. Both of these steps are needed to ensure that the individual who is requesting access is in fact someone with allowed permission. Facial recognition might be less precise compared to iris or fingerprint scanning, nonetheless it is accepted for its simple and convenient way of use.

Cross-platform mobile application for remote-controlling a PC via the Internet coordinated by a RESTful API

Adoris Elian DORAN

With the advent of the Internet of Things (IOT), devices have become increasingly inter-connected but PCs have remained remarkably stagnant. This paper explores increasing the grade of inter-

connectivity between mobile phones and PCs/laptops by allowing a mobile user to control their PCs remotely via the Internet or by using a local wireless network. Multiple facets are presented and integrated into a unified application, including: multimedia controls, system information and control, virtual mouse and a proposal for Wake-On-LAN via the Internet.

ChessEngine

Răzvan Gheorghe FILEA

This work describes the implementation of a cross-platform algorithm for the chess game and its ongoing optimization after a careful analysis of the workflow and also due to the desire of continuously improving it. The game is developed as an Android application used to improve the chess knowledge of the players. It allows the player to play with the black and also with the white pieces. The application is simple to use, because it has a friendly user interface and it also permits settings regarding the used algorithm. It contains a statistical analysis regarding the used and improved algorithms during the development of the application.

Detecting Structural Variants in Tomato Genomes

**Erika GOETZ, Angelo WILLIAMS, Cooper BODARY, Sofia VISA,
Esther VAN DER KNAAP**

This work illustrates the computational steps for discovering structural variants (such as deletions, inversions, duplications) in tomato genomes. Our approach is validated by the phylogenetic tree built from the structural variants. The main contribution of the authors is the design and implementation of filters and the use of a new and large genomic data set provided by our collaborators. This bioinformatics work is interdisciplinary and illustrates the applied side of computer science in genomics.

The Shortest Way Travelling

Bogdan-George GROS, Emanuel Andrei LESTYAN, Ionel Alexandru PUȚ, Estera GROZA

The goal of this project is to present a new way of unique mapping and derationing for various businesses and ordinary people alike, using different shortest way algorithms. This project took birth from our curiosity in discovering if usual shortest way algorithms could be used to compete with large scale busines's algorithms in shortest path finding. The application we realized is similar in usability with google platform, only its functionality was altered by with our own algorithms. The mobility of this app is somewhat limited at the moment as it's restricted by the Google Play Store on certain devices. The distance between two points it's computed with conventional Google Maps

algorithm, although the shortest distance between multiple such points it's computed with an algorithm with our own implementation. Examples of such algorithms include conventional methods including Bellman Kalaba, Ford, Dijkstra and Nearest Neighbor. We predict that such applications will be used on large scales in the future as mobility and speed are paramount in our everyday lives.

.NET Obfuscator

Svetoslav HADZHIVANOV

This paper examines the importance of .NET Obfuscators in our digital society, the techniques used to protect our applications and compares existing obfuscation solutions. The author of the paper is proposing a new obfuscation tool which is better than others because its features are made in a different way.

RUBIKon

Horia IUGA, Andreas COȘ

The "RUBIKon" project aims to build a robot to solve the Rubik cube as soon as possible, combining robotic knowledge with software engineering. Cube analysis is done using a video camera attached to a Raspberry Pi 3 card, which will then take the images and process them, extract the colors with the recognition software, and build a virtual image of the mixed cube. It will calculate the possible solutions for 3x3x3 cube solving and the information of the 3 engines will be transmitted, which will move the physical mechanism made of parts of the Lego Technic sets.

Escape the garden – 3D game for VR

Iskren IVANOV

Nowadays, Virtual Reality (VR) is becoming more and more popular and it is often used for various purposes in science. Escape the garden is an Android application that uses VR glasses and VR controller. The current paper discusses various technologies, used in the application as well as some of its main features. Some of the aspects of the virtual reality technology have also been addressed.

Modeling of economic trade processes of enterprise by means of MATLAB simulation tool

Asaf Ali KHAN, Mariia KHAN

In this work economic trade processes of an enterprise were studied and analyzed. The main trade processes were described in details: purchasing goods, employees' payments, ERU, VAT, taxes. The method of the graphoanalytical representation of a mathematical model was successfully applied to modeling of the economic trade processes of an enterprise. The modeling was made with the help of MATLAB simulation tool.

Applying Gamification to an Information Security Awareness E-Learning Platform

Dominik KLOPFER

This paper describes the design and the development of an E-Learning platform with gamification approaches for security awareness training. The platform can be used to provide content within a serious context, which gets communicated to the user with playful game design elements. The methods used are illustrated by examples and explanations. The special feature of this E-Learning platform is the simple and intuitive design, as well as the usability on different devices through the responsive presentation of the platform.

Improving Camera-based Document Analysis with Deep Learning

Nikolai KÖRBER

Capturing document images with a smartphone provides a convenient way to digitize physical documents and to facilitate the automation of document processing and information retrieval. In contrast to flatbed scans, camera-captured documents require a more sophisticated preprocessing pipeline, because of perspective distortion, uncontrolled lighting and physical deformation. The goal of this work is to solve one major challenge in the domain of camera-based document analysis, namely perspective correction, by means of a Deep Neural Network. We investigate different neural network architectures on a large-scale synthetic dataset in order to estimate the document's corner points from a single input image. The distorted image is then mapped to its canonical position by using the 4-point homography parameterization. The best result is achieved by a modified Xception-network, with a mean displacement error of 3.38px. Finally, the correction component is integrated into Tesseract 4.0 and evaluated on the SmartDoc 2015 challenge 2 test set.

Our experiments show that the correction component improves the character accuracy results by more than 15 percentage points (93.11%), in comparison to Tesseract by itself (77.27%)

Agents for Predicting Prices in Stock Exchange Market

Marko MILIC, Toma JOKSIMOVIC, Danilo JOVANOVIC, Katarina KRIVAK, Sasa CEJIC, Aleksandar BABIC

The software comes from a family of business software, which has built-in business intelligence. It presents a new version of the specific type of software used for stock trading. The software communicates through a public API with already existing applications for analyzing and trading. The software has a private API, where organized information, which is taken from the base, is passed to an intelligent agent for training. The user interface includes filling out a form, trading on the stock market, visual inspection of price movements, statistical overviews by admin (for the stock market and customers) and customers (for stock market trading and personal trading), the dialogue between users and admins regarding ticket dismissal.

Enhancements in Human-Computer Interaction

Adrian PINTILIE

Despite the fact that we witness more and more breakthroughs in technology each year, the interaction between humans and computers is still limited to pushing buttons or moving the mouse, as even the most advanced virtual assistants available (e.g. Siri, Cortana) are able to perform only very basic tasks. The current work outlines an interface that aims to make the human-computer interaction more humanlike, using only video and audio input. Powered by state-of-the-art technologies, the interface provides control over a variety of functions, from basic tasks like moving the cursor or changing the sound volume, to more complex tasks such as playing video games or browsing the internet.

The formation of a set of signs for modeling the evaluation of enterprise activities

Lyudmila SABADASH, Pavlo GRYNKO

The article presents the results of solving the problem of formation of a sign space for the development of models of enterprise performance evaluation. This problem is complicated. Actuality of the solution of this problem is conditioned by the need to increase the statistical quality of the developed models of enterprise performance evaluation. In the mathematical literature there

are no recommendations for constructing such a space of signs using mathematical methods. The purpose of this article is to describe the results of solving the problem of formation of a representative modeling space for evaluating the enterprise. The effectiveness of the mathematical model depends on the correct conceptual model of the enterprise. The authors recommend the simulation of the evaluation of the enterprise to carry out in its sign space, which consists of elementary, complex and latent signs of activity, which are obtained using mathematical methods and models. To determine causation relationships that reflect latent factors and form mechanisms in the economy, it is advisable to use factor and canonical analysis that are implemented in the software environments MatLab, Statgraphics, Statistica. The authors recommend that the hallmark of the model of enterprise performance evaluation be used as information for the development of managerial decisions.

The most popular regional booking applications

Violeta SAFONOVA

Nowadays, health care, manufacturing, art, culture and other areas of life are not complete without the use of information technology. Tourism and hospitality business is not an exception. Modern information technologies make a significant contribution to the development of the tourism sector. The relevance of this study is due to the fact that without the use of information technology cannot do any one of the spheres of life, as each region, and in particular tourist areas in need of processing large amounts of data and information services. Therefore, information technology is continuously progressing regularly offer the latest products, for example, software, or support processes for the tourism sector. Most studies in the field of tourism and hospitality industry have only focused on technologies which provide the tourist information on the national scale, promoting national brand of the country. In contrast, this article investigates the development of regional informational technologies, in particular booking applications from the perspective of its effective usage, information component and awareness among tourists and local people. Due to this precise reason, the present article confirms the previous findings and contributes additional evidence to this point. Young people from 21 to 30 were asked the following questions: does regional booking application encourage tourists to choose some particular region or they prefer standard applications? Could regional booking application promote some particular region? Surveys showed that respondents drift toward regional booking application, noticing its advantages. The main goal of the study is to identify information service technologies that provide the activities of the tourism sector in the region.

Cryptographic Solution with Poly-Alphabetic Cipher

Victoria SĂRĂȚEANU, Paula Ioana BARNA, Andrei TOROK, Maria-Alexandra BOGDAN

This article aims to establish a prime contact for first year students in computer science with cryptography research field and to familiarize themselves with terms and methods from the field.

For this purpose in this project we approached two widely spread cryptographic techniques, namely: Caesar's Cypher and Pseudorandom Number Generator. We have successfully implemented the tasks by using C++, C#, Net Framework and Windows Form App.

Digital Image Analysis Based on Texture Features

Ira Tuba, Una Tuba

In recent years analogue images have been completely out of use due to the great expansion of digital images. Cheap and affordable equipment for creating and processing digital images has contributed significantly to their widespread. One of the common tasks in applications that include digital images is image segmentation. Segmentation can be done in numerous ways and one of them is based on the texture features. In this paper we present software framework for texture analysis. As texture descriptor we used different local binary pattern variations. We analyzed differences and compare the quality of them. We used different benchmark images for texture description.

Analysis of prevention methods for cross site scripting

Milan III TUBA, Stefan ILIC

Internet became unavoidable part of our lives. We are relying on Internet and Web application and we are finishing numerous jobs by using Web applications (Net Banking, Shopping, etc.). Thus, the interest and motivation of the attackers for the search and exploitation of vulnerability are growing. Certainly, one of the most popular and the most used vulnerabilities of web applications is cross side scripting or XSS. Cross side scripting allows attacker to execute a script on user browser and steals valuable information in that way (passwords, credit card number, personal information, etc.). Hijacking malicious script in trusted web source, the user is most often unaware that he is a victim of an attack. This type of attacks is very hard to detect and yet easy to use. That is why it is very important to pay special attention during programming web application to be sure there is no such vulnerability. It becomes more difficult to protect web application from this vulnerability if application have to allow user to use HTML tags (forums, emails, etc.). Unfortunately, many web sites still have this vulnerability. In this paper we will analyse few different prevention systems, their efficiency, pros and cons. Also, we will demonstrate Cross Site Scripting on act and how to prevent it on practical example.

Framework for digital image processing in frequency domain

Una TUBA, Ira TUBA, Milan TUBA

Digital images are widely used in numerous areas such as medicine, agriculture, astronomy, etc. The need for various digital image processing algorithms is high and many of them were proposed in the last decades. In general, these algorithms can be divided into two major group, digital image processing in spatial and frequency domain. Image processing methods in spatial domain deals with pixel values while in frequency domain, image is analysed by looking the rate at which the pixel values are changed in spatial domain. Numerous image characteristics can be better detected in frequency domain than in spatial. Since this represents an important problem, we proposed a framework for digital image processing in frequency domain where several standard algorithms were implemented.

Online Platform for Agricultural Industry

**Ana VESIĆ, Sava LAKIĆEVIĆ, Vuk IGNJATOVIĆ, Bojan GUTIĆ, Dušan DOTLIĆ,
Andrej MIĆOVIĆ**

This project has the goal of filling a massive gap in the market of agriculture in Serbia, which is a large branch of the country's economy. The low state of popularity and the problems often associated with the industry is what this application intends to resolve. The project will help people put themselves on the map and place their products on the market, while creating a healthy environment for business development, event promotion and cooperation. The application follows current trends and needs for organic food and sustainable production, while steering away from animal abuse and corporations taking advantage of farmers. Furthermore, this project intends to reward people doing honest work and adapt to new demands from consumers, as well as facilitate interconnectedness of farmers, associations, companies and the government. This document contains the idea, functionalities, user interface, architecture, the group's motivation for this project, and the current progress.

Jewelry design studio information system

Yuliya VLASOVA

This article discusses some aspects of jewelry design studio information system. The article relevance is due to the apparent contradiction between the perspectivity of such a direction as jewelry design for individual orders and the shortage of software for automating the design studios activities, taking into account the peculiarities of jewelry design creative process. According to the results of the review of ready-made software solutions, it was concluded that it was necessary to develop an original information system. The author investigated the specificity of the subject area - jewelry

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design, analyzed the features of the jewelry designer's search activity during the work on an individual order. As a result, a data model was developed and a software application was created.

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