

Lucian Blaga University of Sibiu, Romania
Faculty of Sciences
Research Center in Informatics and Information Technology

ICDD 2022

6th International Conference on Applied Informatics
Imagination, Creativity, Design, Development

Volume of Abstracts and Program

May 5-7, 2022

Sibiu, Romania

Lucian Blaga University Press

Sixth International Conference on Applied Informatics
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Volume of Abstracts and Program

6th International Conference on Applied Informatics

Imagination, Creativity, Design, Development

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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

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Imagination, Creativity, Design, Development
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- 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. Paper acceptance and publication will be judged on the basis of their relevance to the conference topics, clarity of presentation, originality and accuracy of the results and proposed solutions. The presentation has to include also a practical application. The conference will include regular presentations (20 min.), short IT Companies presentations, a session of multimedia posters and a round table.

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May 5-7, 2022, Sibiu, Romania

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Imagination, Creativity, Design, Development
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- Dana Vasiloaica - Institute of Technology Sligo, Ireland
- Sofia Visa - The College of Wooster, United States

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- Prof. PhD. 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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Imagination, Creativity, Design, Development
May 5-7, 2022, Sibiu, Romania

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- Stud. Teodora Popa - Lucian Blaga University of Sibiu, Romania
- Stud. Elisei Prala - Lucian Blaga University of Sibiu, Romania

OFFICIAL LANGUAGE

The official language of the conference is English.

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In alphabetical order:



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CodexWorks technologies



Complexul National Muzeal Astra



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Global Solutions for Development



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Nagarro

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NTT Data



PAN FOOD



Omeron Technologies, Romania



ProIT



ROPARDO



Top Tech



VISMA



WENGLOR

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 May 5-7, 2022, Sibiu, Romania

PROGRAM

THURSDAY, May 05, 2022

**Faculty of Sciences,
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 2nd Floor, Room A27**

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8³⁰ – 9⁰⁰	Registration
9⁰⁰ – 9³⁰	Opening ceremony
9³⁰ – 10⁵⁰	Papers presentation - Chair Prof. Dr. Dana Simian
9 ³⁰ – 9 ⁵⁰	<ul style="list-style-type: none"> • <i>Yet Another Focus Stacking Method</i>, Andreas Siebert, University of Applied Sciences Landshut, Germany
9 ⁵⁰ – 10 ¹⁰	<ul style="list-style-type: none"> • <i>Learning by Playing Video Games</i>, Valentin Rusanda, Adrian Gheorghită Neagu, Ștefania Adriana Podeanu, Petroleum-Gas University of Ploiesti, Romania
10 ¹⁰ – 10 ³⁰	<ul style="list-style-type: none"> • <i>Creation of the 3D graphics elements in game engines</i>, Andrei-Daniel Mihai, Ramona-Antonela Bondă, Lucian Blaga University of Sibiu, Romania
10 ³⁰ – 10 ⁵⁰	<ul style="list-style-type: none"> • <i>Voice Activated Control System for Autonomous Robots</i>, Mihaela Pașca, Gianina Ignat, Alexandra Ciobanu, Lucian Blaga University of Sibiu, Romania
10⁵⁰ – 11¹⁰	Coffee break
11¹⁰ – 12⁵⁰	Papers presentation - Chair Prof. Dr. Andreas Siebert
11 ¹⁰ – 11 ³⁰	<ul style="list-style-type: none"> • <i>Mobile application design for acquiring financial skills</i>, Daniela-Nicolia Patrut, Politehnica University of Timișoara, Romania
11 ³⁰ – 11 ⁵⁰	<ul style="list-style-type: none"> • <i>Using GANs to innovate creative industries: fashion and textile design</i>, Felix Husac, Lucian Blaga University of Sibiu, Romania
11 ⁵⁰ – 12 ¹⁰	<ul style="list-style-type: none"> • <i>Videos as Measure for Information Security Awareness at Fraunhofer Institute for Silicate Research</i>, Hakan Arda, Kristin Weber, University of Applied Sciences Wurzburg-Schweinfurt, Germany
12 ¹⁰ – 12 ³⁰	<ul style="list-style-type: none"> • <i>Reasoning about a concurrent-based functional programming approach for studying the Software Transactional Memory method</i>, Denis-Victor Cărăuș, Transilvania University of Brasov, Romania

Sixth International Conference on Applied Informatics
Imagination, Creativity, Design, Development
 May 5-7, 2022, Sibiu, Romania

12 ³⁰ – 12 ⁵⁰	<ul style="list-style-type: none"> • <i>The Simulation of Natural Behavior in Games Using Artificial Intelligence. Image Processing and Smart Input</i>, Ramona-Antonela Bondă, Andrei-Daniel Mihai, Lucian Blaga University of Sibiu, Romania
13 ²⁰ – 14 ²⁰	Lunch
15 ⁰⁰ – 16 ²⁰	Papers presentation - Chair Assoc. Prof. Dr. Nicolae Constantinescu
15 ⁰⁰ – 15 ²⁰	<ul style="list-style-type: none"> • <i>Rating based system for optimizing the learning path</i>, Marin Eusebiu Șerban, Lucian Blaga University of Sibiu, Romania
15 ²⁰ – 15 ⁴⁰	<ul style="list-style-type: none"> • <i>Automated system for home greenhouses</i>, Sorin Ionut Conea, Vasile Alecsandri University of Bacău, Romania
15 ⁴⁰ – 16 ⁰⁰	<ul style="list-style-type: none"> • <i>Mirror's Mansion</i>, Alexandru Serban Moldovan, Transilvania University of Brasov, Romania
16 ⁰⁰ – 16 ²⁰	<ul style="list-style-type: none"> • <i>The EU Digital COVID Certificate: A technical standpoint review</i>, Vlad-Andrei Oleksik, Gheorghe Lazar National College, Sibiu, Romania
16 ²⁰ – 16 ⁴⁰	Coffee break
16 ⁴⁰ – 18 ⁰⁰	Papers presentation - Chair Assoc. Prof. Dr. Florin Stoica
16 ⁴⁰ – 17 ⁰⁰	<ul style="list-style-type: none"> • <i>Smart bicycle monitoring system</i>, Luca-Dumitru Drîndea Bogdan-Ioan Oprișiu Mircea-Alexandru Răuțoiu, "Samuel von Brukenthal" National College, Sibiu, Romania
17 ⁰⁰ – 17 ²⁰	<ul style="list-style-type: none"> • <i>Role of Python in game development</i>, Adrian Vulpeanu, Lucian Blaga University of Sibiu, Romania
17 ²⁰ – 17 ⁴⁰	<ul style="list-style-type: none"> • <i>Model-driven Software Development as the Key to RESTful Web Interfaces and Digitization</i>, Matthias J. Keckl, Patrick B. M. Müller, Peter Braun, University of Applied Sciences Würzburg-Schweinfurt, Germany
17 ⁴⁰ – 18 ⁰⁰	<ul style="list-style-type: none"> • <i>On Designing and Implementing a Tomato Shape App for Android</i>, Maxwell Hosler, Craig Akiri, Mircea Ionescu, Esther Van der Knaap, Sofia Visa, College of Wooster, College of Wooster, Assurant Labs, University of Georgia, College of Wooster, USA
18 ⁰⁰ – 19 ¹⁰	Dinner
19 ¹⁰ – 21 ⁰⁰	Sibiu by night (walking in the Sibiu downtown)

Sixth International Conference on Applied Informatics
Imagination, Creativity, Design, Development
 May 5-7, 2022, Sibiu, Romania

FRIDAY, May 06, 2022

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9⁰⁰ – 11⁰⁰	Papers presentation - Chair Prof. Dr. Dana Simian
9 ⁰⁰ – 9 ²⁰	• <i>Technical presentation, Gabriela Candea, ROPARDO, Sibiu, Romania</i>
9 ²⁰ – 9 ⁴⁰	• <i>Tuning Convolutional Neural Networks Hyperparameters, Una Tuba, Ira Tuba, Singidunum University of Belgrade, Serbia</i>
9 ⁴⁰ – 10 ⁰⁰	• <i>System for optimizing data storage, Teodora Popa, Lucian Blaga University of Sibiu, Romania</i>
10 ⁰⁰ – 10 ²⁰	• <i>Refining Color Cue Selection for Deep Image Colorization in the Context of Image Compression, Daniel Ostertag, Daniel Habermayr, University of Applied Sciences Landshut, Germany</i>
10 ²⁰ – 10 ⁴⁰	• <i>Traveling Salesman Problem Solving Methods and Applications, Daniel Mariuta, Lucian Blaga University of Sibiu, Romania</i>
10 ⁴⁰ – 11 ⁰⁰	• <i>Kyberpunk - An Arcade Game, Mara Vosloban, Transilvania University of Brasov, Romania</i>
11⁰⁰ – 11²⁰	Coffee break
11²⁰ – 12¹⁰	Multimedia posters presentation (on site) - Chair Assoc. Prof. Dr. Laura Stoica
11 ²⁰ – 11 ³⁰	• <i>AirQualityNow, Bogdan Barna, "Samuel von Brukenthal" National College, Sibiu, Romania</i>
11 ³⁰ – 11 ⁴⁰	• <i>UP!, Matei Cristian Steavu, Radu Negru National College, Fagaras, Romania</i>
11 ⁴⁰ – 11 ⁵⁰	• <i>KeyUp, Matei Ioan Marin, Gheorghe Lazar National College, Sibiu, Romania</i>
11 ⁵⁰ – 12 ⁰⁰	• <i>Game of Life, Tudor Terian-Dan, Gheorghe Lazar National College, Sibiu, Romania</i>
12 ⁰⁰ – 12 ¹⁰	• <i>Game of Checkers, Deborah Ruxandra Maria Florea, "Samuel von Brukenthal" National College, Sibiu, Romania</i>

Sixth International Conference on Applied Informatics
Imagination, Creativity, Design, Development
May 5-7, 2022, Sibiu, Romania

12³⁰ – 13³⁰	Lunch
15⁰⁰ - 17³⁰	Closing ceremony Open Air Museum Astra (departure point at Faculty of Sciences)
18⁰⁰ - 20⁰⁰	Official dinner

SATURDAY, May 07, 2022

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8³⁰ – 19³⁰	Trip on the route Sibiu - Alba Iulia (The Citadel Alba-Carolina, Reunification Cathedral, downtown) - Hunedoara (Corvins' Castel) - Arboretum Simeria - Sibiu
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ABSTRACTS
Papers section

**Videos as Measure for Information Security Awareness at
Fraunhofer Institute for Silicate Research**

Hakan ARDA, Kristin WEBER

The Fraunhofer-Gesellschaft is the world's leading organization for application-oriented research. For such an organization, information and its supporting systems represent important assets. Appropriate measures must therefore be developed and deployed to protect these assets. For this reason, this work introduces videos as an information security awareness measure at Fraunhofer ISC. In this way, a new method of conveying information was tested and prepared for future measures. The paper does not address the change in security awareness among Fraunhofer ISC employees. This would require a beforeand-after study. Instead, a subjective opinion survey was conducted, which helped to record the interest in such media. Thanks to the numerous responses to the survey, a forecast for future video portfolios is presented that reflect the content desired by the employees.

The Simulation of Natural Behavior in Games Using Artificial Intelligence. Image Processing and Smart Input

Ramona-Antonela BONDĂ, Andrei-Daniel MIHAI

The article presents research in the game development area, a new input method for the 3D games based on facial recognition and movements, using image processing and artificial intelligence. It is meant to make the virtual world available to more individuals, taking the gaming experience to a whole new level.

Reasoning about a concurrent-based functional programming approach for studying the Software Transactional Memory method

Denis-Victor CĂRĂUȘ

This research aims to explore and verify the advantages and disadvantages of Software Transactional Memory (STM) in Haskell compared to standard Haskell concurrency methods, using specific implementations of the Dining Philosophers Problem (DPP) solution algorithms. This classic concurrency example can be considered an appropriate model for simulating real scenarios such as multiple processes competing over a limited number of resources, such as files or memory locations. Moreover, it is supposed to showcase the deadlock-avoiding properties of STM along with its performance cost on modern machines. Haskell, as a representative pure functional programming language, is currently used in advanced domains such as machine learning [1], microservices [2] or education [3] due to its

features such as ease of writing safe code and better performance compared to other alternatives in terms of memory management and immutability. For example, Haskell is currently being used in projects like the Sigma system developed on Facebook to combat abuse [4] or in embedding Haskell-based Quantum programming [5].

Introduced in [6], the Software Transactional Memory (STM) comes as "a novel design that supports flexible transactional programming of synchronisation operations in software, with clear advantages in terms of applicability to today's machines, portability among machines, and resiliency in the face of timing anomalies and processor failures". Focused on optimising the synchronisation operations, solutions such as STM, to both simplify and increase the safety of writing concurrent code, are of great interest. For example, in [7], the authors state that "as other multithreaded programs, transactional memory (TM) programs are prone to race conditions". Consequently, they consider the case of a scalable TM system and propose a new precise race detection tool called TRADE for Transactional Memory. Our research will accomplish its intended goal by comparing two standard solutions of the classic concurrency problem, namely the alternate forks and the resource hierarchy methods and the STM-based algorithm, in terms of ease of writing and dimension of code, on the one hand, and performance analysis on the other hand.

Here, we consider the Dining Philosophers Problem (DPP) as a classical concurrency problem [8], [9] and apply the performance analysis on the criteria of code-related benefits, CPU usage statistics and time

measurements. These are for each of those three algorithms that run multiple times over a varied and increasing number representing the meals eaten by the philosophers and based on a parameter indicating how many meals should a philosopher consume. The purpose of the performance comparisons over an increasing number of meals is to properly analyse how STM's performance cost increases with a more significant load, relative to the other methods, in order to get the right perspective of the costs of writing easier and safer code for the given method. In addition, the analysis of the running time is also of interest as a research subject in [7], where the authors compare the execution time of multiple applications in order to show the overhead added by their TRADE solution compared to an equivalent custom race detection tool.

Considering the target comparison between the DPP solutions, even though the code length was not affected by the transition to an STM based approach, the principal benefit of this unconventional approach is the ease of coding. This code-related benefit comes from avoiding deadlock scenarios since, using STM, the two fork pick-up operations are combined into a single atomic operation. It follows that the two forks available to each philosopher are picked up either at the same time if both of them are available or not at all if any of them is not available. This approach successfully avoids the scenario in which each of the five philosophers has a single fork in their hands simultaneously, leading to none of them being able to eat.

The measurement tests have been run on a personal computer with the following specifications: CPU AMD Ryzen 5 2600 (6 cores, 12 threads,

3.40 GHz frequency), RAM 16 GB, GPU NVIDIA 1060 3GB, OS Windows 11. On the above-specified machine, the idle CPU usage, also known as the CPU usage, when no other applications are running as measured with Windows Task Manager, averaged 1%.

The tests were run using GHCi, which was also used to measure the time in which all the five philosophers finished eating. In order to accomplish this measurement, the main thread must wait for the other five threads, each corresponding to a philosopher, to finish. Therefore, for the purposes of testing, the application takes as a parameter the number of meals each philosopher must finish. After running the methods multiple times, the results ended up being consistently equal: around 10-11% CPU usage, which excluding the idle percentage results in a 9-10% usage for all three applications.

The time measurements are synthetised in the following table as a third comparison criterion.

No.	STM				Alternate Forks				Resource Hierarchy			
	10 k	100 k	1 mil	10 mil	10 k	100 k	1 mil	10 mil	10 k	100 k	1 mil	10 mil
Average	0.2124	2.224	22.4964	223.7928	0.1532	1.5558	15.3654	152.6244	0.154	1.5576	15.0444	148.4402
Min	0.2	2.17	22.17	222.33	0.14	1.47	15.07	150.57	0.14	1.48	14.68	146.25
Max	0.23	2.27	23.91	226.22	0.19	1.67	16.28	154.77	0.18	1.65	15.53	151.69

These results showcase the average, minimum and maximum times in seconds for each of the three methods, namely STM, alternate fork and resource hierarchy, over a sample of 10 000, 100 000, 1 000 000 and 10 000 000 meals per philosopher, found after running each algorithm 50 times.

Values of 1000 meals and under were not considered, as the functions finished too quickly to be able to measure any time differences. This data shows that the STM method has a high cost compared to both of the two other ways of solving the dining philosophers' deadlock problem.

Whereas recent similar research into the topic of STM performance in Haskell focused on concurrent hash tables or new methods such as Persistent Software Transactional Memory (PSTM) [10], this research focuses on the use of simple STM solutions versus other classic methods for achieving concurrent programming in Haskell. This exploration could be continued by analysing other classic concurrency problems similarly, such as the producer-consumer problem or the readers and writers' problem [9]. Alternatively, this analysis could be expanded by comparing the Haskell STM solution with other programming languages such as Python support for STM [11] and/or other methods of solving the Dining Philosophers Problem.

Automated system for home greenhouses

Sorin Ionut Conea

The greenhouse is the structure that helps to increase the growth of crops, plants, fruits, vegetables, etc. Naturally, the plants can be grown only in a certain region, being necessary to meet certain conditions, such as weather, humidity, temperature, and season. The greenhouse helps the accelerated and safe growth of the plants by controlling some parameters.

Conventionally, the cultivation of plants using greenhouses is difficult as it requires changing the parameters of plant growth with the help of human intervention. These methods are less effective because the constant and continuous involvement of humans leads to an increase in the workforce need and can often cause errors. This paper proposes an autonomous greenhouse model with remote control using an Arduino microcontroller. This project monitors and controls the climate, without the need for human intervention. For this, we use different sensors to be able to measure the environmental parameters according to the needs of the plant.

By connecting this system to the Internet and the Blynk Cloud, we can access data remotely, eliminating the need for physical plant monitoring. The Cloud server allows data processing and application of actions in the remote greenhouse

Smart bicycle monitoring system

*Luca-Dumitru DRÎNDEA, Bogdan-Ioan OPRÎȘIU,
Mircea-Alexandru RĂUȚOIU*

The article presents the process of developing and prototyping a smart monitoring system for parking spaces on any rack. The final product is based on a hardware and a software component. Physically, the system consists of several Arduino development boards (slaves) that send information about vacancies through sensors and an Arduino board with a Wi-Fi module (master) that receives the information and transmits it further in a database. The software component consists in processing the information received by

the sensors from the environment. The information is taken by the mobile application from the database, an application where users can easily view the availability of parking spaces for personal bicycles.

On Designing and Implementing a Tomato Shape App for Android

*Maxwell HOSLER, Craig AKIRI, Mircea IONESCU,
Esther van der KNAAP, Sofia VISA*

The design and React Native implementation of an Android app for tomato shape classification is presented here. The app functionality includes taking pictures of tomato fruits, segmenting the fruit, classifying the fruit into one of the nine shape categories, and storing the fruit image and its classification into a Google Firebase database.

Using GANs to innovate creative industries: fashion and textile design

Felix HUSAC

The fashion industry is a business worth over 180 billion dollars every year. Due to the Covid pandemic lockdowns, many people shifted focus from physical jobs to online related industries. New opportunities arose from online marketing, dropshipping, and work-from-home consultancy related businesses. People started creating wearable artworks in the form of print-on-demand textile products from providers like Teespring, or selling hand crafted art on platforms like Etsy, Facebook Marketplace etc. But imagining

and developing new fashion and artwork designs is a laborious, time consuming process. This paper aims to study the possibility and efficiency of integrating Artificial Intelligence in the process of creating new textile designs. The proposed application gathers large amounts of pictures from online shopping platforms via a web scraper and gives the end user the opportunity to sort through and choose the pictures they'd like to use as a base for their new creations. The selected pictures will then be used to train a GAN, expecting similar designs to be created effortlessly and automatically.

Model-driven Software Development as the Key to RESTful Web Interfaces and Digitization

Matthias J. KECKL, Patrick B. M. MÜLLER, Peter BRAUN

We propose a model-driven approach for the development of REST APIs. With this approach, higher education institutions with limited development resources are enabled to move forward with digitization through the development of web interfaces for their administrative processes and at the same time enforce the REST compliant implementation of these. We argue that the architectural style Representational State Transfer (REST) is the perfect fit for such web interfaces on the one hand and a model-driven approach on the other hand. With FIWIS, a real-life example is shown that proves our approach works. In this project, 88.4% of the backend, database layer and frontend were generated. The remaining 11.6% include specific business logic such as e-mail notifications and the integration of third-party

systems. This significant reduction in development costs is what makes digitization possible in the first place. The guaranteed REST compliance through the model-driven approach and its strict and correct usage of the web protocols (HTTP, URI) ensures longevity and independent extensibility of these web interfaces.

Traveling Salesman Problem Solving Methods and Applications

Daniel MARIUTA

The application aims to provide a clear view of the various methods of solving the Traveling Salesman Problem but also to provide a game through which the user can easily learn how to solve this well-known problem. It will consist of 2 parts. In the first part, the user will be able to simulate some solving methods and compare their execution time and the results. The second part represents a game where the player will be able to build it's own map trying to cover the optimal distce by going through every city.

Creation of the 3D graphics elements in game engines

Andrei-Daniel MIHAI, Ramona-Antonela BONDA

The article presents the concept and implementation of a program integratable in a game engine that allows the user to create 3D objects in the same environment where he can also develop the game.

Mirror's Mansion

Alexandru Serban MOLDOVAN

This game is for people that are able to think out of the box!

The idea behind this game is to embark the player into a decent looking, but very interesting and mysterious mansion. The goal of the game is to make your way out of this mansion alive, as you may encounter unusual characters and puzzles.

These puzzles are special because you will have to think different in order to finally solve them. While doing so, you will also have to avoid some hostile characters.

Mirror's Mansion is developed in Unity Engine and programmed in C#.

The EU Digital COVID Certificate: A technical standpoint review

Vlad-Andrei OLEKSIK

The ongoing pandemic situation has faced worldwide entities with the need for a digital, more robust and interoperable system for securely and privately storing medical information of the general population, ensuring that anyone has the ability, provided the consent of the holder, to check the validity of such data, while doing away with the need for a permanent Internet connection or centralised storage. Thus, the present paper aims to provide useful insight regarding the cryptographic, mathematical aspect of the EU Digital COVID Certificate functioning principle, as well as to apply this

information in an application developed in Python, serving as a proof-of-concept of the offline certificate verifying process, as well as of the signing process that takes place at the level of the issuing authorities. The program's interface, conceived as a website, has its design based on Bootstrap, and the local server managed using the Flask library of Python. The site also presents a webpage which briefs the user regarding the concept of digital signatures, the functional unit of the application.

Refining Color Cue Selection for Deep Image Colorization in the Context of Image Compression

Daniel OSTERTAG, Daniel HABERMAYR

Colorizing a grayscale image is no longer a task reserved merely for artists or children. As with many other aspects of day to day life, algorithms based on Artificial Intelligence (AI) have elbowed their way in and offer alternatives to conventional ways of undertaking certain endeavours, just as they recently did with putting paint into black and white images. Considering the skyrocketing amount of pictures and videos being sent across the world, a promising application for such colorful algorithms lies in their combination with image compression of grayscale pictures, since those consist of three times less pixel values than their RGB counterparts. This method relies on choosing appropriate color cues from the original image for correct recolorization after decompression. Based on recent work, we present some refined approaches to extract those cues, given an existing deep neural network to colorize grayscale images. Apart from that, we

combine this model with a state of the art AI-based image compression algorithm to investigate the possibility of an improved compression.

Voice Activated Control System for Autonomous Robots

Mihaela PAȘCA, Gianina IGNAT, Alexandra CIOBANU

The purpose of the current paper is to present the implementation of a dedicated voice controlled system for autonomous robots that grants an alternative method to navigate the device.

Using automatic speech recognition and natural language processing techniques the device has the ability to identify the intent in unstructured human language and respond accordingly, it aims to create a novel interface which aids special needs users in interacting with the device in an effortless manner, facilitating human-robot interaction in order to increase home and workplace security and improve the users quality of life.

Mobile application design for acquiring financial skills

Daniela-Nicolia PATRUT

The COVID-19 pandemic brought a forced change of the educational system through a immediate transition to a full-online learning process. The aim of this paper is to provide an overview on how mobile applications have taken advantage of the pandemic and been integrated into the online education process. This analysis uses specific queries for the identification

of relevant scientific papers indexed in Clarivate Analytics (ISI Web of Science – ISI WoS). Then, the focus is on reviewing publications based on experiments that show the need for people to access financial services, which is regarded to be one of the most pressing issues confronting communities worldwide sequel to the COVID-19 pandemic. The outcome provided by this research is a set of functionalities that can provide the theoretical basis in the financial domain for students and the appropriate mechanisms to keep them engaged through this learning process. Moreover, this paper defines the use cases for future work consisting of a mobile application that aims to create a more dynamic environment that will facilitate the educational process in the financial field for the students of the Politehnica University of Timișoara.

System for optimizing data storage

Teodora POPA

The goal of this paper is to present a Windows application for optimizing data storage in a directory hierarchy. The proposed application identifies duplicate files by comparing checksums. Two files are duplicates if they have exactly the same content. The user is allowed to customize the search for duplicate files and to delete them.

Learning by Playing Video Games

*Valentin RUSANDA, Adrian Gheorghiu NEAGU,
Ștefania Adriana PODEANU*

This paper describes the efficiency of learning real-life concepts by playing simple educational video games. It highlights this concept through a game about electrical safety that aims to show how easy it is to comprehend new information when we are actively involved in experiencing it. The game puts you in a scenario in which you must eliminate the electrical hazards as fast as possible, which adds a sense of urgency and helps cement the information for the player.

Yet Another Focus Stacking Method

Andreas SIEBERT

Focus stacking, also known as multi-focus image fusion, combines several images of the same scene taken from the same viewpoint but with different focus in order to assemble an all-in-focus image.

Several methods to perform focus stacking have already been proposed. This work adds a method that is conceptually simple but principled and efficient. Its main tool is the summed area table that allows the computation of both the block-based features and the pixel-based fusion in constant time per pixel. The variation of the block size addresses the scaling issue and controls the fusion process.

Rating based system for optimizing the learning path

Marin-Eusebiu ȘERBAN

The purpose of this article is to present a rating system that provides potential students with information that will help them choose their future learning path.

The application provides a place for all students to share their opinions on various topics related to university life. Students must log in using their institutional accounts to make the platform more trustworthy. We employ both artificial intelligence tools and human decision-making (moderator of the platform) to approve the post for publishing.

Our app also allows you to chat with other users. The ability for users to customize the UI is one of our application's strengths.

We use single-page application technology, and there are numerous ranking factors that may be used at the same time.

Tuning Convolutional Neural Networks Hyperparameters

Una TUBA, Ira TUBA

Convolutional neural networks have become a widely used tool for digital image classification. They outperform other classifiers while no initial pre-processing is needed. The classification accuracy highly depends on the hyperparameters and network architecture. The problem is the high number of hyperparameters where each one of them has a large number of possible

values, so grid search or deterministic optimization algorithms cannot be used for tuning. In this paper, we tested the influence of some hyperparameters on classification accuracy.

Kyberpunk - An Arcade Game

Mara VOSLOBAN

Computer gaming is a key component of the rapidly growing entertainment industry. While building computer games has typically been a commercial endeavor, I believe that designing and constructing a computer game is also a useful activity for self education about geometric modeling and computer graphic.

The game that I designed has simple rules and is meant to be played by a single player. It is a computer game and has 2D graphics with animated components, accompanied by chill music on the background.

Role of Python in game development

Adrian Marian VULPEANU

Main point's of the article are to show the role of Python in building games (mainly 2D and 3D low level games), the advantages and disadvantage's compared to the industry standards (C#).

The pro's of the language such as is easy to learn and use and it may be a great language to start the game development, in order to learn for example 2D game logic, movement etc.

Also the article will explore a new python game framework (Ursina).

Multimedia posters section

AirQualityNow

Bogdan BARNA, Delilah FLOREA

This paper describes the app named AirQualityNow developed to check the quality of the air and deliver this information through a database to the user. The database is using the Google Firebase services and is being updated in real-time. The app is composed of a Raspberry Pi 4, an LCD, a series of sensors, and a mobile app, developed in Android Studio with the programming language Kotlin. It is meant to offer statistical data to the user extracted from the sensors and interpretations of the data.

Joc de dame

Deborah Ruxandra Maria FLOREA, Delilah FLOREA

This paper describes the implementation of a checkers game as a mobile app for Android using the programming language Kotlin and the graphics library Jetpack Compose. The algorithm of the game consists of an efficient representation of the game pieces using bits. With their help it can calculate the player's possible moves and generate their opponent's moves.

KeyUp

Matei-Ioan MARIN, Monica OANCEA, Adina Stanculescu

KeyUp is an educational software that allows its users to learn how to create responsive web pages in an interactive way. Structured on several levels of difficulty and covering several areas of this field, it includes basic knowledge of HTML5 and CSS3. The platform consists of several sections that ensure the assimilation of information by the user, providing him with documentation for each level, a real-time editor for the implementation of the theory in a real-life project and an evaluator which verifies the gained knowledge. Thus, a score is obtained that indicates the success rate and performance of the users. Their progress is saved locally, and they can continue wherever they left off. KeyUp focuses on Web Design and responsive, mobile-friendly web pages, because these features are important nowadays, where mobile traffic is constantly growing. The platform itself is built on HTML5, CSS3, Bootstrap4, JavaScript and jQuery and meets the mobile-friendly requirements.

UP!

Matei Cristian STEAVU

„UP!” is a project funded by the Ştiintescu endowment that has the purpose of constructing and programming five Arduino quadcopters as well as teach some students the whole process. The quadcopters are split in multiple

categories, a receiver-controlled quadcopter with a camera, two receiver-controlled quadcopters without a camera, a quadcopter controlled by an ultrasonic sensor and a line-follower quadcopter. The code was written in Arduino IDE, and the programming language is C++.

Game of life

Tudor TERIAN-DAN, Adina STANCULESCU

Inspired by the mathematical concept developed by John Conway called „The game of life”, in this paper I will attempt to explain the intricacies of this concept, alongside how it can be applied to real life or just how fun playing with a few cells can be. Seeing how the cells move, how they are born and then die is mesmerizing, but also really informative since it can grant us an insight into how populations tend to develop over time depending on their resources.

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