

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

**First International Students Conference on Informatics**

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

**Program & Abstracts**

**SIBIU, ROMANIA  
April 7-9, 2011**

**First International Students Conference on Informatics**  
„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”  
Sibiu, April 7-9 2011

**Motto:**

*“There are no limits, only your imagination”*

**TOPICS**

- Algorithms and data structures
- Graph theory and applications
- Formal languages and compilers
- Cryptography
- Modelling 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

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Sibiu, April 7-9 2011

## **OBJECTIVES**

The conference is addressed to bachelor and master level students. Conference aim is to bring together students from different universities from all over the world to discuss and present their researches on informatics and related fields (like computational algebra, numerical calculus, bioinformatics, etc) and their original results. The presentation should include also an informatics application. Pure theoretical results are accepted only if they introduce new concepts.

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- Lect. PhD. Mihaela Ciortea - "1 December 1918" University of Alba Iulia, Romania
- Lect. PhD. Daniel Hunyadi - "Lucian Blaga" University of Sibiu, Romania
- Lect. PhD. Gabriela Moise - Petroleum-Gas University of Ploiesti, Romania

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- Lect. PhD. Mircea Neamtu - "Lucian Blaga" University of Sibiu, Romania
- Lect. PhD. Corina Rotar - "1 December 1918" University of Alba Iulia, Romania
- Lect. PhD. Florin Stoica - "Lucian Blaga" University of Sibiu, Romania
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- Lect. Ralf Fabian
- Assist. Laura Cacovean

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**P R O G R A M**

**THURSDAY, April 7, 2011**  
**Faculty of Sciences,**  
**Sibiu, Dr. I. Rațiu st., No. 5-7**  
**1<sup>st</sup> Floor, Room A18**

- 8<sup>30</sup> – 9<sup>30</sup> Registration (1<sup>st</sup> Floor, Room A18)  
9<sup>30</sup> – 10<sup>00</sup> Opening ceremony  
10<sup>00</sup> – 10<sup>45</sup> Company overview  
10<sup>45</sup> – 11<sup>15</sup> Coffee break  
11<sup>15</sup> – 13<sup>00</sup> Papers presentation  
13<sup>00</sup> – 15<sup>00</sup> Lunch  
15<sup>00</sup> – 16<sup>30</sup> Papers presentation  
16<sup>30</sup> – 17<sup>00</sup> Coffee break  
17<sup>00</sup> – 18<sup>30</sup> Papers presentation

**FRIDAY, April 8, 2011**  
**Faculty of Sciences,**  
**Sibiu, Dr. I. Rațiu st., No. 5-7**  
**1<sup>st</sup> Floor, Room A18**

- 9<sup>30</sup> – 11<sup>00</sup> Papers presentation  
11<sup>00</sup> – 11<sup>30</sup> Coffee break  
11<sup>30</sup> – 13<sup>00</sup> Papers presentation  
13<sup>00</sup> – 15<sup>00</sup> Lunch  
15<sup>00</sup> – 17<sup>00</sup> Papers presentation  
17<sup>00</sup> – 18<sup>00</sup> Coffee break  
18<sup>00</sup> – 18<sup>30</sup> Closing ceremony

**SATURDAY, April 9, 2011**

Social program (Visiting ASTRA Museum, historic center, other museums)

**First International Students Conference on Informatics**  
„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”  
Sibiu, April 7-9 2011

## PAPERS PRESENTATION

**THURSDAY, April 7, 2011**

**11<sup>15</sup> – 13<sup>00</sup>**

1. Alexe Iulian, Doda Gheorghe, Buha Radu, Mirea Felix, *Malware Analyzer*, “Lucian Blaga” University of Sibiu, Romania. Coordinator: Mircea Neamtu
2. Francesco Capuzzo, *CRM dedicated database architecture*, “Lucian Blaga” University of Sibiu, Romania. Coordinator: Dana Simian
3. Kaloyan Mironov, *Building and programming a robotic arm*, University of Ruse, Bulgaria. Coordinator: Katalina Grigorova
4. Vladimir Kotsev, *BPMN-EPC-BPMN Converter*, University of Ruse, Bulgaria. Coordinator: Ivan Stanev
5. Valentina Lazar, *E-marketing service oriented architecture*, “Lucian Blaga” University of Sibiu, Romania. Coordinators: Florin Stoica, Ralf Fabian
6. Ekaterina Avdeeva, *Modeling of risk assessment methods during the implementation of corporative information systems at the enterprises*, Vladimir State University, Russian Federation, Coordinator: Vladimir Chernov

**15<sup>00</sup> – 16<sup>30</sup>**

7. Oana Balan, Razvan Stanescu, Bogdan Ciorobea, *Face Recognition using the Eigenface Algorithm*, Petroleum-Gas University Ploiesti, Romania. Coordinator: Gabriela Moise
8. Adrian-George Bostan, *Coding Game - Programming based educational application*, "Dunarea de Jos" University Galati, Romania. Coordinator: Adina Cocu
9. Florentin Bota, *Image processing and interaction elements. OpenImage 0.9 Alpha*, “Lucian Blaga” University of Sibiu, Romania. Coordinators: Dana Simian, Ralf Fabian
10. Vasile Braileanu, *Disconnected recordsets and their implementation in Java*, "Dunarea de Jos" University Galati, Romania. Coordinator: Adina Cocu

## **First International Students Conference on Informatics**

„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”

Sibiu, April 7-9 2011

11. Bogdan Ion Bucur, *Securing stored passwords using cryptographic techniques*, Petroleum-Gas University Ploiesti, Romania. Coordinator: Gabriela Moise
12. Sorin Radu, Vasile-Nicusor Nechifor, *3D Interior Design*, “Lucian Blaga” University of Sibiu, Romania. Coordinator: Dana Simian, Ralf Fabian

**17<sup>00</sup> – 18<sup>30</sup>**

13. Ivan Danov, *Automated Number Plate Recognition in Android Mobile Devices*, Technical University of Sofia, Bulgaria. Coordinator: Milena Lazarova
14. Mihai Fieraru, Madalina Iordache, *A comparative study between AES and BlowFish encryption algorithms*, Petroleum-Gas University Ploiesti, Romania. Coordinator: Gabriela Moise
15. Magdalena Filcheva, *Motion detection with voice alarm*, Technical University of Sofia, Bulgaria. Coordinator: Milena Lazarova
16. Ivan Vasilov, *Designing and constructing a robotic arm*, Technical University of Sofia, Bulgaria. Coordinator: Milena Lazarova
17. Andrei Neagu, Stelian Morariu, *Case-based Reasoning software framework extension*, “Lucian Blaga” University of Sibiu, Romania. Coordinator: Ciprian Candea
18. Mykhaylo Dorokhov, *Simulation modeling of buyer’s service in retail pharmacies*, Kharkiv National University of Economics, Ukraine. Coordinator: Ludmila Malyaretz



**First International Students Conference on Informatics**  
„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”  
Sibiu, April 7-9 2011

**FRIDAY, April 8, 2011**

**9<sup>30</sup> – 11<sup>00</sup>**

19. Andrei Ivan, Ovidiu Radoi, *Simulating logic circuits*, Transilvania University of Brasov, Romania. Coordinator: Anca Vasilescu
20. Marko Milosevic, Jelena Tasic, *Image manipulation in frequency domain*, University of Belgrade, Serbia. Coordinator: Milan Tuba
21. Ana Tuba, Marko Milosevic, *Quantization in the JPEG image compression algorithm*, University of Belgrade, Serbia. Coordinator: Milan Tuba
22. Igor Valjevic, Ana Tuba, *Histogram manipulations as a pre-step to image recognition*, University of Belgrade, Serbia. Coordinator: Milan Tuba
23. Alin Manta, Madalin Ignisca, Ciprian Ciorogar, *Virtual PC – solution for virtual shops*, “Lucian Blaga” University of Sibiu, Romania. Coordinator: Dana Simian
24. Petar Marinov, *Parallel algorithms for snow mapping based on satellite remote sensing*, Technical University of Sofia, Bulgaria. Coordinator: Milena Lazarova

**11<sup>30</sup> – 13<sup>00</sup>**

25. Jovo Arezina, *A software implementation of a computer model and a corresponding symbolic assembler*, Megatrend University Belgrade, Serbia, Coordinator: Milan Tuba
26. Dragos Nicolescu, *Using Limited Influence Maps to Control Agents in Pac-Man*, University of Craiova, Romania. Coordinator: Catalin Stoean
27. Dragos Iulian Obancea, *MathCast - a universal prediction application*, Transilvania University of Brasov, Romania. Coordinator: Vlad Monescu
28. Dimitar Stoimenov, *System for voice control of car modules communicating through CAN*, Technical University of Sofia, Bulgaria. Coordinator: Philip Petrov
29. Alexe Iulian, Bogdan Volosincu, Morariu Stelian, *Security testing with advanced exploiting methods*, “Lucian Blaga” University of Sibiu, Romania. Coordinators: Dana Simian, Mircea Neamtu

## First International Students Conference on Informatics

„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”

Sibiu, April 7-9 2011

30. Lidiya Sivko, *Methodology for creating automated unit of organisation scientific conferences*, Kharkiv National University of Economics, Ukraine. Coordinator: Oleksandr Dorokhov

15<sup>00</sup> – 17<sup>00</sup>

31. Alexandra Elena Stan, Claudia Elena Pamfiloiu, *Cost effective funding method (CEFM software)*, “Lucian Blaga” University of Sibiu, Romania. Coordinator: Marian Cristescu, Laurentiu Ciovica

32. Stancu Mihai, *Zero-Client Computing*, “Lucian Blaga” University of Sibiu, Romania. Coordinator: Dana Simian

33. Adrian Tudor Panescu, *Companion – An intelligent agent architecture*, "Alexandru Ioan Cuza" University of Iasi, Romania. Coordinator: Dan Cristea

34. Tanase Carmen, Suroiu Bianca Maria, *Coding and decoding messages with HILL'S System*, “Lucian Blaga” University of Sibiu, Romania. Coordinator: Dana Simian

35. Jelena Tasic, Igor Valjevic, *Edge Detection in Spatial Domain*, University of Belgrade, Serbia. Coordinator: Milan Tuba

36. Gabriel Tudorica, Paul Stanea, *An applied steganography study on the "Least Significant Bit" method*, “Lucian Blaga” University of Sibiu, Romania. Coordinator: Daniel Hunyadi

37. Razvan Hulea, Mihai Morariu, *Computer Visualization in Differential Geometry*, University of Bucharest, Faculty of Mathematics and Computer Science, Romania. Coordinators: Iuliana Munteanu, Liviu Ornea

38. Ksenia Burykh, *Rational implementation of performance testing for sites*, Kharkiv National University of Economics, Ukraine. Coordinator: Oleksandr Dorokhov

## **ABSTRACTS**

### **Malware Analyzer**

**ALEXE Iulian, DODA Gheorghe, BUHA Radu, MIREA Felix**  
**Coordinator: Mircea Iosif Neamțu**

Nowadays in the technological era when the total amount of information is growing rapidly and the Internet has also become something common and insecure, most users on the web easily fall prey to viruses form accessing various links received form strangers or downloading unknown software from the Internet. Therefore we have developed a method to analyze the unknown applications, which the users run and install on their computer, and see the changes made in the computer.

### **Security testing with advanced exploiting methods**

**ALEXE Iulian, VOLOSINCU Bogdan, MORARIU Stelian**  
**Coordinators: Mircea Iosif Neamțu, Dana Simian**

The most important thing today is data security. That is why the first thing we take into consideration when we develop an application, especially when the application consists in confidential data of grave importance, security polices implementing. Our program takes care of those things by testing other applications vulnerabilities with advanced exploiting methods which find the flaws that where not programmed correctly.

### **A software implementation of a computer model and a corresponding symbolic assembler**

**Jovo AREZINA**  
**Coordinator: Milan Tuba**

Models of hypothetical computers are used for experiments with computer architecture. In this paper a computer model called *MTU1*, its assembly language and a software implementation called *MTU1 Emulator* are described. The *MTU1* computer model is intended to be used as an educational tool for demonstrating computer architecture principles. It does so using a carefully selected instruction set which is both small and easy to comprehend, yet able to express real world historic and current computer architecture concepts. *MTU1 Emulator* is a program which can be used to write and

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

**Sibiu, April 7-9 2011**

execute *MTUI* code. It features a two pass assembler which supports the use of symbols. It also displays useful information about CPU and memory registers and instructions being executed, with support for several numerical systems and ASCII representation. Two code examples for the *MTUI* computer model are also presented.

## **Modeling of risk assessment methods during the implementation of corporative information systems at the enterprises**

**Ekaterina AVDEEVA**

**Coordinator: Vladimir Chernov**

A general description of corporate information systems and features of its implementation at the enterprises are considered. Major success factors of the implementation of corporate information systems and problems and difficulties of the implementation project are described. General methods of risk assessment are analyzed.

New fuzzy models of risk assessment during the implementation of corporate information systems are offered. Fuzzy model of SWOT-analysis of riskiness assessment of the implementation project is considered. Fuzzy model of an alternative choice of corporate information systems is described.

## **Face recognition using the Eigenface Algorithm**

**Oana BALAN, Razvan STANESCU, Bogdan CIOROBEA**

**Coordinator: Gabriela Moise**

The biometric concept of facial recognition makes human recognition a more automated, computerized process. Our purpose is to present an approach to the detection and identification of human faces and describe a working, real-time face recognition system which tracks a person's head and identifies the person by comparing characteristics of the face to those of known individuals grouped in a large database. Face recognition projects the images into a two-dimensional space, which is known as "faces space" or "feature space". The faces space is described by the "eigenfaces", which represents the eigenvectors (principal components) of a set of faces. Each face is characterized by a sum of eigenface features, and the recognition is based on the comparison of these weights to those of known individuals.

## **Coding Game**

### **Programming based educational application**

**Adrian George BOSTAN**  
**Coordinator: Adina Cocu**

In the present paper, I will introduce an educational application in the form of a computer puzzle game, which allows the user to test his programming aptitudes in a user-friendly graphical environment. The game can be used as a tool for better understanding a particular programming language. The versatility of the application stems from the ability to easily import the structures of any programming language in the game. As a result, the user has the power to choose from a wide range of programming languages. The application comes with levels for three predefined languages: C#, C++ and Java.

The **Coding Game** bundle consists of the game along with two tools for adding, removing and modifying the content of the game. The main application has three game modes, each mode targeting a different aspect of learning a programming language. The three game modes are: *Puzzle*, *Order* and *Test*, and together, they can make the process of learning a programming language more pleasant and more fun.

The goal of this application is not to replace IDE's or programming books, but to serve as an additional tool for the user, allowing him to improve his skills and knowledge through playing a game, thus making the whole experience more enjoyable.

## **Image processing and interaction elements**

### **OpenImage 0.9 Alpha**

**Florentin BOTA**  
**Coordinator: Dana Simian, Ralf Fabian**

The purpose of this project is to design and develop a robust application in an effort to better understand image processing and computer vision, while keeping a simple and user-friendly interface. Eclipse SDK was used as the programming environment, proving to be a real asset, but all was created using the open-source principle of Java.

OpenImage, the main application, evolved from a simple Java Panel to a uniquely shaped Image Viewer with processing tools, original interface and feedback, motivated by the will to discover and learn the high end capabilities of computers, with applications in everyday life, health-impaired, IT and even robotics.

## **Disconnected Recordsets and their Implementation in Java**

**Vasile BRAILEANU**  
**Coordinator: Adina Cocu**

This paper describes the disconnected recordset approach for database access. Also, it describes a Java library written by author from scratch, who implements some of the interfaces needed for disconnected recordsets in Java. Similar technology is available for almost all databases. Although a database is designed to be connected all time with the user, producing the data which user needs to consume, sometimes is most efficient to disconnect temporarily the user data from database and use data disconnected from database. Later on, data changes can be reflected in database implementing specific synchronization schemas in database server part.

## **Securing stored passwords using cryptographic techniques**

**Bogdan Ion BUCUR**  
**Coordinator: Gabriela Moise**

The necessity of information encryption exists almost since the beginning of human kind. People always felt the need of protecting important information from falling into the wrong hands and this need has increased in these modern times more than ever.

The technique of cryptography is used in various areas of computer science and in Internet applications. One of its uses is successfully storing a password in such a way that even if the site is hacked and the information in the database is leaked, the hacker will not obtain a clean list of passwords and it would be extremely difficult, if not close to impossible, for him to obtain the original password of a user. The methods used have their advantages and ways of discouraging hacking, but they also have their flaws.

In this paper these methods will be presented, as well as why some of them are not completely safe, and a way to increase their efficiency will be suggested and thoroughly explained.

## **Rational implementation of performance testing for sites**

**Ksenia BURYKH**  
**Coordinator: Oleksandr Dorokhov**

Any program product can not be released without executing performance testing. This kind of testing is quite difficult, but its importance very high. We can suggest, which load pattern a local application will stand. But speaking about web sites (e.g. sites of scientific journals), it is difficult to imagine what load will withstand the web application, because it is in free access in the Internet. In

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Sibiu, April 7-9 2011

such situations performance testing becomes imperative. As usual, performance testing executes on databases, which contain a lot of data (for example, 1 million of different kinds of objects with complicated indexing). So the test engineer faces at least two problems: First - how to generate so much data to fill in tested database in the short term. And second (the main one) – how to reset database to initial state after executing each load test, because there is a great probability, that the results, received from each subsequent test will be worse, then the previous. In this article I'll show, how to solve this problem with the smallest loss of resources and time using Microsoft Visual Studio for testing ASP.NET web application with deployed on MS SQL Server database.

## **CRM dedicated database architecture**

**Francesco CAPUZZO**  
**Coordinator: Dana Simian**

A CRM (Customer Relationship Management) software keeps trace of people, companies, events, actions in time and much more. Using a classic database approach, the information would be dispersed in dozens of tables. The present work shows how to take a smarter approach that needs less tables and that provides a flexible tracing system for all elements of the application developed on it, and much more. The ideas shoed in this paper are completely original.

## **Automated Number Plate Recognition in Android Mobile Devices**

**Ivan DANOV**  
**Coordinator: Milena Lazarova**

The paper presents an automated number plate recognition software for Android operating system mobile devices. The architecture of the software consists of two modules and is presented as well as the information processing that is divided into several steps. Each step relies on the results from the previous one so the final result is dependent on the work of all the steps in the process.

## **Simulation modeling of buyer's service in retail pharmacies**

**Mykhaylo DOROKHOV**  
**Coordinator: Ludmila Malyaretz**

In the article processes of organization of drugs and goods of medical purpose sale in a pharmacies are described and analyzed. On the basis of field research and their elaboration in Statistica environment types and parameters of statistic timeframes of customers' visits, duration of their

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Sibiu, April 7-9 2011

service by assistants, probability of appearance of certain types of clients are determined. The existent possibilities of the organization of retail sale of medicine in drugstores are determined and structurized. A number of computer models of the system of mass service of customers in the drugstores by means of a package of discrete simulation modelling ExtendSim 7 LT are developed. However the possibility of taking into account the different number of counters at the drugstore, the number of consultants and doctors, possibility of appearance of priority clients and breaks are ensured. A number of calculative experiments are conducted, their results are processed and presented e.g. the appropriate quantity of staff according to characteristics of the concrete drugstore. The practical implementation assured that the model is adequate and it's ability to be used.

## **A comparative study between AES and BlowFish encryption algorithms**

**Mihai FIERARU, Madalina IORDACHE**  
**Coordinator: Gabriela Moise**

The encryption represents the process of confidential information's codification so they can not be read by unauthorized persons. This vast area has been investigated by many scientists, the challenge of the researches being to discover a more reliable encryption algorithm. An ideal encryption algorithm is an algorithm that can withstand any attack by unauthorized persons and relieved that can be implemented at lower cost, but this represents a challenge for the researchers in this area. In this paper there are presented two of the most used information encryption algorithms: AES and Blowfish. The algorithms were implemented in C programming language and were tested with different types of input data, and a comparison is presented taking into account the algorithms characteristics: response time, complexity and security offered.

## **Motion detection with voice alarm**

**Magdalena FILCHEVA**  
**Coordinator: Milena Lazarova**

The paper presents a software system for motion detection with a voice alarm. It allows movement in specific zones to be detected automatically without the need for operator intervention and spoken voice warnings – alarms, to be issued. The aim is voice notification for a specified monitoring area for a specific object to be promptly issued once an unauthorized motion is detected. The system allows usage of user defined monitoring areas with different forms. The system allows specific phrases for certain areas to be set and different generated voices to be used. An important ability of the system is saving image frames in case the user was not present at the time the alarm is activated. Thus the frame can be monitored later or deleted.



## **Computer Visualization in Differential Geometry**

**Razvan HULEA, Mihai MORARIU**  
**Coordinator: Iuliana Munteanu, Liviu Ornea**

With the aid of modern technology, scientific simulations are now more easily made than they were in the past. One of the branches of Mathematics for which applications can be created for a better understanding of the theoretical facts is Differential Geometry. Differential Geometry itself integrates techniques of differential and integral calculus, as well as linear and multilinear algebra, for studying the properties and the behaviour of surfaces and curves. The behaviour and properties of these entities are most of the time very difficult to comprehend without a visual representation. Moreover, there are problems in fields such as Differential Geometry or Mechanics that involve the resolution of differential equations with initial values (also known as Cauchy problems). Explicit solutions are, in most cases, difficult to achieve, yet good approximations of the solutions can be yielded.

This is where computers become extremely useful. Using specialized software such as MATLAB, one can visually represent the desired surfaces and curves or obtain fairly good approximations of the solutions of problems imposed by the theory of differential geometry. In this paper, our goal is to present some of the applications we have created for some such problems and see why they are useful for a student who is willing to gain a better insight of the phenomenon.

## **Simulating logic circuits**

**Andrei IVAN, Rădoi OVIDIU**  
**Coordinator: Anca Vasilescu**

Simulation is a key part in understanding any system. Advances in computer science have allowed us to reproduce many aspects of a system including how it works and problems that may come up in implementing it in a working environment. Logic circuits are the key part of any computational system.

We have created a tool that can be used to design a logic circuit and simulate its functionality. This allows the users to better understand the workings of such circuits and prevent certain problems before actually building it. This tool can enable its users to design circuits faster and also understand the topic of Computer Architecture.

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## **BPMN-EPC-BPMN Converter**

**Vladimir KOTSEV**  
**Coordinator: Ivan Stanev**

Creating business process models is a major task of enterprise architecture. There are good tools for it available. World standards change rapidly, but some of the old tools are still good and many people are used to them.

In this paper we introduce our point of view about business process modeling notations, their advantages and disadvantages. We share the results of our discussions and researches about creating a converter between tools that are using different notations.

## **E-Marketing Service Oriented Architecture**

**Valentina LAZAR**  
**Coordinators: Florin Stoica, Ralf Fabian**

Internet marketing is considered to be broad in scope because it not only refers to marketing on the Internet, but also includes marketing done via e-mail and wireless media. Digital customer data and electronic customer relationship management systems are also often grouped together under internet marketing.

Internet marketing ties together the creative and technical aspects of the Internet, including design, development, advertising, and sales. Internet marketing also refers to the placement of media along many different stages of the *customer engagement* cycle through *search engine marketing* (SEM), *search engine optimization* (SEO), *banner ads* on specific websites.

System architecture is known as marketing analysis and it is based on customers and building on the data submitted to the appropriate strategies.

## **Virtual PC – solution for virtual shops**

**Alin MANTA, Madalin IGNISCA, Ciprian CIOROGAR**  
**Coordinator: Dana Simian**

The purpose of the article is to present an application used for an online shop specialized in computer hardware, its most important feature being the promotion of the application used to run the website and not the product commercialization. This application can be successfully used for any product category. HTML, CSS, PHP, MySQL, AJAX, are open source web 2.0 technologies that have been used to build our application.

## **Parallel algorithms for snow mapping based on satellite remote sensing**

**Petar MARINOV**  
**Coordinator: Milena Lazarova**

The paper presents parallel models for snow cover detection based on satellite remote sensing of the Earth. Two different algorithms are selected for parallelization that use normalized difference visible/infrared snow cover index and microwave scattering indices calculated based on satellite multi-spectral data. Both data and functional decomposition using message-passing (MPI), multithreading (OpenMP) and hybrid (MPI+OpenMP) parallel models are suggested and implemented. The experimental evaluation of the performance parameters is made on a heterogeneous compact cluster and the speedup results achieved show good scalability of the parallel algorithms in respect to both the processed data and the high-performance computer platform.

## **Image manipulation in frequency domain**

**Marko MILOSEVIC, Jelena TASIC**  
**Coordinator: Milan Tuba**

There are many ways to analyze images and for some purposes convenient spatial domain algorithms are appropriate, but for some operations like compression or many types of image enhancements more natural form of image representation is by amplitude coefficients in frequency domain.

Images are represented as weighted sums of sine and cosine functions of different frequencies. Nowadays image analysis and enhancement become increasingly important. Besides everyday use in digital cameras, analysis and image enhancement are very important in areas like medicine, robot vision, satellite images etc. In this paper a software system that we developed for image manipulation in frequency domain is described as well as applications on some image enhancement processes.

## **Building and programming a robotic arm**

**Kaloyan MIRONOV**  
**Coordinator: Katalina Grigorova**

The paper describes the process of building and programming a robot arm. The paper contains a little research about the different types of robotic arms. It describes their hardware specifications. The paper describes the advantages of Java as language for the development of robot's software.

## **Case-based Reasoning software framework extension**

**Andrei NEAGU, Stelian MORARIU**  
**Coordinator: Ciprian Candea**

This paper describes the Case-based Reasoning (CBR) methodology, a young sub-domain of Artificial Intelligence, and its practical uses in real world problems. It focuses on the implementation of foundational concepts of CBR within an open source framework - jColibri2 – and the innovative work made by Ropardo S.R.L. in international research activity in order to extend the framework, to add functionality to it and to integrate it on a web infrastructure, enabling it to work with other larger systems. The primary objective is to provide an easy to use black-box layer for jColibri2, that will enable fast design, implementation and deployment of CBR systems, capable to reason in an unknown environment, with incomplete and disorganized data, learning on-the-fly, testing, adapting, extracting useful knowledge and developing in supervised and unsupervised manners.

## **Using Limited Influence Maps to Control Agents in Pac-Man**

**Dragos NICOLESCU**  
**Coordinator: Catalin Stoean**

In this paper we present the development of an influence map based controller for the Pac-Man agent and the results it yields when compared to a previous implementation. While influence maps have been used before to control an agent, the method presented in this paper differs by using a limited area of propagation for the influence. This particularity helps the agent better avoid enemies, leading to a longer lifetime. When conducting experiments in similar circumstances the resulting agent met our expectations, being competitive or better when compared to the previous implementation. Tests have also revealed the way certain parameters should be set and how they affect the model. Overall, the limited influence map proved to be an ideal solution in some situations, resulting in an adaptable agent that is very sensitive to the environment.

## **MathCast – a universal prediction application**

**Dragoş Iulian OBANCEA**  
**Coordinator: Vlad Monescu**

Since ancient times, people felt the desire to find out what the future holds for them. Although there are many contradictory opinions in this domain, one thing is for sure: there is no model or algorithm that can accurately predict future events and values. However, throughout history, people have developed various mathematical models, which were subsequently implemented into specialized software in order to give approximate numerical values, more or less close to real values, on certain

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**„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”**  
Sibiu, April 7-9 2011

aspects of the future. Creating a similar software would not bring anything new in this field, so *MathCast*, beside the provided support for adding and using mathematical models to predict the future, it also offers the possibility for users to create various scenarios and to build predictions in the form of a text, describing events that may occur with a certain probability on certain periods of time. Also, during the creation of this software, I have developed new mathematical models. These models are unpolished yet, but in some cases the values resulted surpass other possible values, resulted from any other type of algorithm.

## **Companion – An intelligent agent architecture**

**Adrian Tudor PĂNESCU**  
**Coordinator: Dan Cristea**

This paper presents the main aspects regarding the architecture of an intelligent agent named Companion. It is intended to support its user (Master) as an adviser for several daily life aspects. To obtain a flexible smart operation more methods and tools from Artificial Intelligence are used. Two main components of the proposed layout are discussed, namely the knowledge base and the decisional system.

The knowledge representation scheme uses an ontology that considers both the information specific for the Master, and certain issues that are necessary to support the decisional mechanism. Thus, taking into account that planning is a key aspect for Companion, the ontology and its corresponding transposition into a knowledge base are designed to provide the pieces of information needed by the planning mechanism. Various planning aspects can be taken into account, the paper describing the basic points for a temporal planning method. This is based on a proper time representation and an adapted planning procedure that operates in the plan space. Such an approach is favored by the combination between rule based and object oriented programming, which is supported by the chosen programming tool, CLIPS. Moreover, this solution facilitates an easy link between the ontology (built in Protégé) and the knowledge base the inference engine operates on. The paper underlines the advantages of the proposed solution and different possibilities of extension.

## **3D Interior Design**

**Daniel-Sorin RADU, Vasile Nicușor NECHIFOR**  
**Coordinators: Dana Simian, Ralf Fabian**

The article presents an original application for interior design using Java 3D that helps to place furniture on a 3D house plan. This application with a user friendly interface was made for people who want to design their interior quickly, whether they are moving or they just want to redesign their existing home.

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**„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”**  
Sibiu, April 7-9 2011

## **Methodology for creating automated unit of organization scientific conferences**

**Author: Lidiya SIVKO**  
**Coordinator: Oleksandr Dorokhov**

At the modern stage of transition from post-industrial community to information society in conditions of permanent radical shifts in scientific and technological sphere substantially increase demands on the level of information of society. This involves a complex of fundamental problems. One of the most important of such problems is a scientific issue. The part of solving this fundamental problem is an urgent need for automation unit for scientific conferences. This necessity is caused by the fact that the main way of providing quality and reliable information, which contains the results of scientific activity, is the science conferencing. One of the key elements to ensure the automation of this module is the process of creating websites of scientific conferences. Resources of this type has already become one of the ways (with great potential) to grab the attention of the scientific community to organized conferences. At the moment, the problem which concerns to formalization of methodology and determine the direction of the module support for the conference is still very actual.

## **Cost effective funding method (CEFM software)**

**Alexandra Elena STAN, Claudia Elena PAMFILOIU**  
**Coordinators: Marian Cristescu, Laurențiu Ciovică**

In a market economy and inevitably in a global financial crisis enterprise resources are often limited and insufficient to cover all needs or to implement investment projects necessary to continue their work. The funding process presents a particular interest, considering the necessity of obtaining them with lower costs. The options for collecting enterprise resources are characterized by diversity and complexity. This paper explores the entities' potential in raising capital for investment and presents a case study on the most likely financing options with B Test. The proposed new program comes to help managers in choosing the best solutions in terms of costs. The friendly interface suggests that with the variables included in the program the user can view the most profitable form of medium and long term investment: loan or lease.

## **Zero-Client Computing**

**Mihai STANCU**  
**Coordinator: Dana Simian**

The purpose of this paper is to present an original software solution for zero-client computing and the design and implementation of an original application that allows rapid deployment of such architectures.

## **System for voice control of car modules communicating through CAN**

**Dimitar STOIMENOV**  
**Coordinator: Philip Petrov**

A system for voice control of car electronic modules is presented in the paper. Speech recognition of the driver voice commands is used. The system is based on duplicating the CAN messages and moving the relevant actuators as certain voice command is issued. The system can be configured for car models with different CAN network specifications. The system comprises a software implementation with intuitive user interface and flexible navigation as well as hardware components additionally installed in the car.

## **Coding and decoding messages with HILL'S System**

**Maria Bianca SUROIU, Carmen-Ioana TANASE**  
**Coordinator: Simian Dana**

From the beginning of Roman Empire people developed many systems of decoding messages. Later, Lester Hill, a mathematics professor at Northern University that in 1929 invented a code, named by him. Nowadays, security of data is vital in each domain, so the research of cryptography is more and more developed.

Cryptology studies the mathematical methods linked to security information, capable to ensure the privacy, authentication and non-reject messages and also the integrity of usual dates.

The purpose for this project is to present a method for coding and decoding secret messages using a method that is applied also in army. This method uses Hill's code, which is based on some mathematical applications.

## **Edge Detection in Spatial Domain**

**Jelena TASIC, Igor VALJEVIC**  
**Coordinator: Milan Tuba**

This paper introduces two classical approaches to detecting edges in images, which, respectively, make use of the first and second derivative of the intensity values across the image. A particular attention is given to the assumptions implicitly made by these approaches as to what makes an edge in the image, drawing a particular distinction between the discontinuities in the gradient and the user-defined, content-sensitive notions of the edge. The methods that are discussed in more detail include Gradient, Roberts Cross, Sobel, Prewitt and Kirsch (examples of first order differential methods), as well as, Laplacian and Laplacian of Gaussian (examples of second order differential methods).

## **Quantization in the JPEG image compression algorithm**

**Ana TUBA, Marko MILOSEVIC**  
**Coordinator: Milan Tuba**

This paper describes the quantization in the JPEG image lossy compression algorithm. JPEG algorithm is not a fixed standard but a set of recommendations. It uses discrete cosine transform on blocks of 8\*8 pixels transforming 64 light intensity values to 64 frequency coefficients. Main compression is done by neglecting less important frequency coefficients. Which coefficients are less important is determined by the process of quantization which can be adjusted for different types of images and different applications. Some basic and some more advanced quantization methods are described. Software system for experimenting with various quantization methods and parameters is developed with corresponding graphical user interface.

## **An applied steganography study on the “Least Significant Bit” method**

**Gabriel TUDORICĂ, Paul STÂNEA**  
**Coordinator: Daniel Hunyadi**

The purpose of this project is to present the benefits of steganography and emphasize popular ways it can be applied to. We will focus on a digital steganography technique, using Bitmap files as carrier files for our hidden messages, thus hiding it in plain sight. Even though the picture can be seen by others, only the sender and the intended recipient will actually be able to get the messages. Finally, we built an application using C# capable of applying this steganography technique, and



**First International Students Conference on Informatics**  
„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”  
Sibiu, April 7-9 2011

allowing the user to embed hidden messages in 24 bit Bitmap files. Additionally, we implemented a chat-like environment using 24 bit Bitmap files to send the encrypted data.

## **Histogram manipulations as a pre-step to image recognition**

**Igor VALJEVIC , Ana TUBA**  
**Coordinator: Milan Tuba**

Histogram graphs allow examination of image pixel color and intensity distribution at a glance. Speed at which histogram can be checked by human eye translates well into computer programs that allow very fast (usually linear) algorithms to enhance image. Various types of histogram matching adjust different types of images for different types of processing. In this paper we discuss several different types of histograms and histogram matching techniques in effort to improve overall efficiency of image recognition algorithms. Software system with appropriate graphical user interface has been developed to test and compare effects of different histogram matching techniques.

## **Designing And Constructing A Robotic Arm**

**Ivan VASILOV**  
**Coordinator: Milena Lazarova**

The increased use of systems based on programming and robotics in the industry is motivated by the new possibilities that the relationship between these two technologies open for controlled robot systems. The paper presents the design and construction of a robotic arm with five rotational movements. The robot uses servomotors and a servo controller. For solving the inverse kinematics problem an algorithms based on cyclic coordinate descent is applied and a program written in C# is used to control the robot arm. A prototype of the robotic arm is built and the experiments made showed the suggested solution provides satisfactory results of the movement and control of the robotic arm.

**First International Students Conference on Informatics**  
**„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”**  
 Sibiu, April 7-9 2011

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 Sibiu, April 7-9 2011

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**„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”**  
 Sibiu, April 7-9 2011

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**„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”**  
 Sibiu, April 7-9 2011

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**First International Students Conference on Informatics**  
**„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”**  
 Sibiu, April 7-9 2011

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**First International Students Conference on Informatics**  
**„IMAGINATION, CREATIVITY, DESIGN, DEVELOPMENT”**  
 Sibiu, April 7-9 2011

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 Sibiu, April 7-9 2011

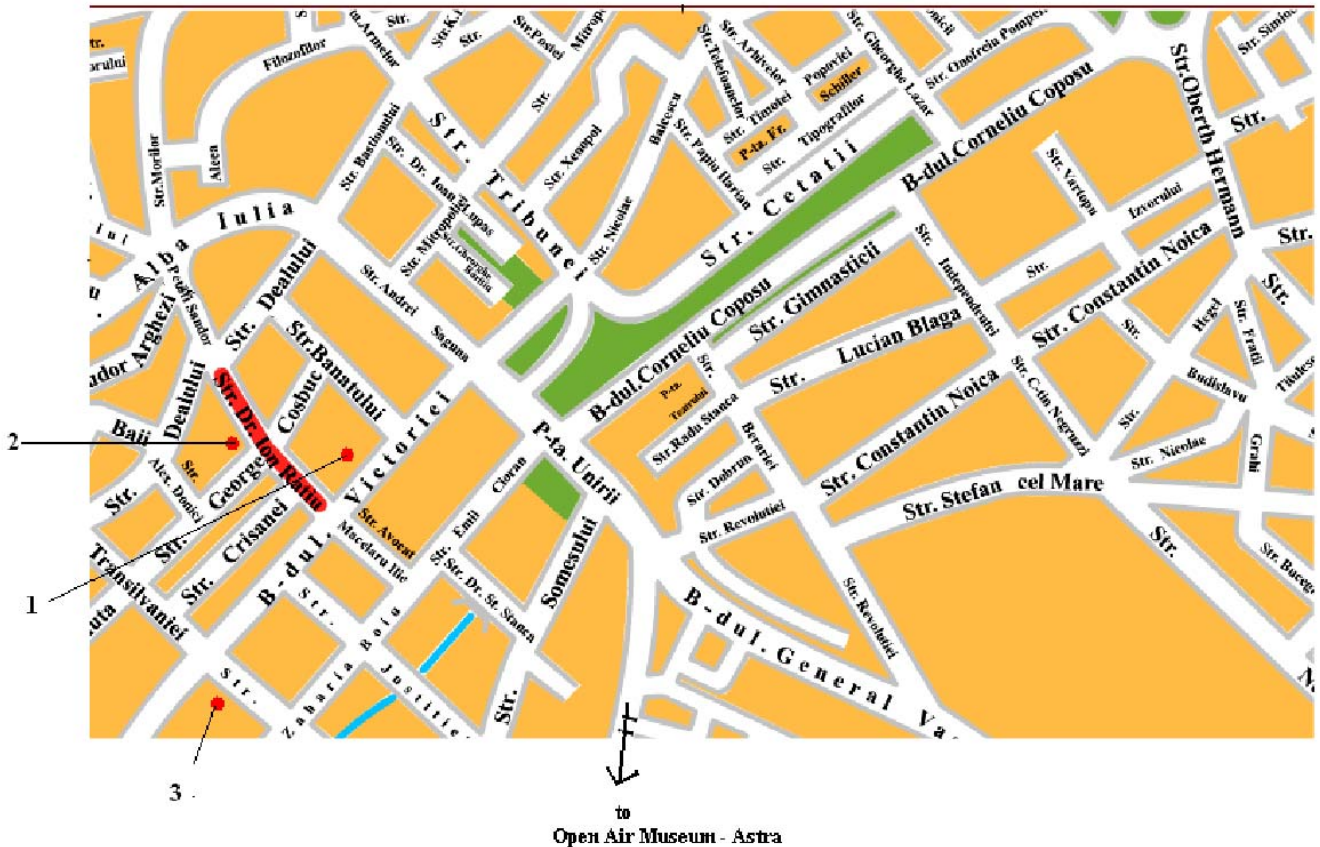
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**GENERAL INFORMATION**

The main locations of the conference are indicated on the map below:



**Map of Sibiu – conference venue**

<b>Location</b>	<b>Address</b>
1. Senate Hall	10 Victoriei Blvd.
2. Faculty of Science	5-7 Dr. Ratiu Str.
3. University Canteen	31 Victoriei Blvd.