

2016

# Information Technology & Computer Science Abstracts

Twelfth Annual International  
Conference on Information  
Technology & Computer Science,  
16-19 May 2016, Athens, Greece

Edited by Gregory T. Papanikos

THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH





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Computer Science Abstracts

12<sup>th</sup> Annual International  
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Technology & Computer  
Science, 16-19 May 2016,  
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# Preface

This abstract book includes all the summaries of the papers presented at the *12<sup>th</sup> Annual International Conference on Information Technology & Computer Science, 16-19 May 2016, Athens, Greece*, organized by the Computer Research Unit of the Athens Institute for Education and Research. In total there were 34 papers, coming from 12 different countries (Argentina, Bhutan, China, Egypt, Germany, Lithuania, Mexico, Poland, Russia, Sudan, Switzerland, and USA). The conference was organized into sessions that included areas of Management Systems Development, Internet of Things, Industrial Internet, Smart Factories and Industry 4.0, etc. As it is the publication policy of the Institute, the papers presented in this conference will be considered for publication in one of the books and/or journals of ATINER.

The Institute was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world could meet in Athens and exchange ideas on their research and consider the future developments of their fields of study. Our mission is to make ATHENS a place where academics and researchers from all over the world meet to discuss the developments of their discipline and present their work. To serve this purpose, conferences are organized along the lines of well established and well defined scientific disciplines. In addition, interdisciplinary conferences are also organized because they serve the mission statement of the Institute. Since 1995, ATINER has organized more than 150 international conferences and has published over 100 books. Academically, the Institute is organized into four research divisions and nineteen research units. Each research unit organizes at least one annual conference and undertakes various small and large research projects.

I would like to thank all the participants, the members of the organizing and academic committee and most importantly the administration staff of ATINER for putting this conference together.

**Gregory T. Papanikos**  
**President**



**FINAL CONFERENCE PROGRAM**  
**12<sup>th</sup> Annual International Conference on Information Technology &  
Computer Science, 16-19 May 2016, Athens, Greece**

**PROGRAM**  
**Conference Venue: Titania Hotel, 52 Panepistimiou Avenue, Athens,  
Greece**

**CONFERENCE PROGRAM**

**Monday 16 May 2016**  
(all sessions include 10 minutes break)

**08:00-09:00 Registration and Refreshments**

**00-09:30 (ROOM E - Mezzanine Floor) Welcome & Opening Remarks**

- Dr. Gregory T. Papanikos, President, ATINER.
- Dr. George Poulos, Vice-President of Research, ATINER & Emeritus Professor, University of South Africa, South Africa.

**09:30-11:30 Session I (ROOM E - Mezzanine Floor): Colloquium on Online and Distance Education\***

Chair: Olga Gkounta, Researcher, ATINER.

1. Timothy Newby, Professor, Purdue University, USA. Instructional Digital Badges in an Online Masters Degree Program. (*Colloquium on Online & Distance Education*)
2. Sarah Smetzer-Fox, Manager of Educational Technology and Ph.D. Student, California Institute of Integral Studies and Florida Atlantic University, USA & Dilys Schoorman, Professor, Florida Atlantic University, USA. Virtual Education: Emancipatory or Oppressive? (*Colloquium on Online & Distance Education*)
3. Vassiliki Michou, Educational Engineer, University Pierre and Marie Curie, France. The Instructional Video in the Teaching Practice.
4. \*Augustine Maruva Tirivangana, Director, Zimbabwe Council for Higher Education (ZIMCHE), Zimbabwe. Towards a Quality Assurance Framework for the Assessment of on-Line Programmes: Developing Indicators of Excellence for Developing Countries. (*Colloquium on Online & Distance Education*)

\*This session is jointly offered with the Human Development Research Division of ATINER

**11:30-13:00 Session II (ROOM E - Mezzanine Floor): Educational Technology I\***

Chair: \*Christine Conley-Sowels, Professor, Ferris State University, USA.

1. Chang-Hwa Wang, Professor, National Taiwan Normal University, Taiwan. Factors Influencing Learner Presence in Augmented-Reality-Mediated Instruction.
2. \*Wolfram Laaser, Former Akademischer Direktor, Fern Universität in Hagen, Germany. Video Formats. Yesterday and Tomorrow.
3. Abeer Watted, Ph.D. Student, Technion-Israel Institute of Technology, Israel & Miri Barak, Assistant Professor, Technion-Israel Institute of Technology, Israel. Knowledge Construction and Career Advancement in a Massive Open Online Course in Nanotechnology and Nanosensors.
4. Maria de Fatima Goulao, Assistant Professor, Universidade Aberta, Portugal. Concept Maps as Facilitative Tools in E-Learning Context. (Monday, before lunch)
5. Bahareh Shojaie, Ph.D. Candidate, The University of Hamburg, Germany, Hannes Federrath, Professor, The University of Hamburg, Germany & Iman Saberi, Ph.D. Student, Technical University of Hamburg, Germany. The Effects of National Culture on the Implementation of ISM Standards Based on the ISO 27001.
6. Roseli Zen Cerny, Professor, Federal University of Santa Catarina, Brazil, Carla Cristina Dutra Búrigo, Professor, Federal University of Santa Catarina, Brazil, Marina Bazzo de Espindola, Professor, Federal University of Santa Catarina, Brazil & Nayara Cristine Müller Tosatti, Student, Federal University of Santa Catarina, Brazil. The Curriculum in the Digital Culture and the Process of Formation: A Mediated Relation.

\*This session is jointly offered with the Human Development Research Division of ATINER

**13:00-14:30 Session III (ROOM E - Mezzanine Floor): Internet of Things, Industrial Internet, Smart Factories and Industry 4.0**

Chair: Till Hanisch, Professor, BW State University, Heidenheim, Germany.

1. \*Dimitris Kiritsis, Professor, EPFL - École Polytechnique Fédérale de Lausanne, Switzerland. Enabling Technologies for Closed-Loop Lifecycle Management of Intelligent Products & Assets. (*COMIND*)
2. \*Jarogniew Rykowski, Professor, Poznań University of Economics and Business, Poland. HCN: Low-Cost Networking for DIY Internet of Things. (*COMIND*)
3. Nerijus Jusas, Ph.D. Student, Kaunas University of Technology, Lithuania, Algimantas Venckauskas, Professor.

Kaunas University of Technology, Lithuania & Vytautas Stuikys, Professor, Kaunas University of Technology, Lithuania. Model-Driven Framework to Develop the IoT-Based Healthcare Applications. (COMIND)

**14:30-15:30 Lunch**

**15:30-17:00 Session IV (ROOM E - Mezzanine Floor): Management Systems Development I**

Chair: \*Dimitris Kiritsis, Professor, EPFL - École Polytechnique Fédérale de Lausanne, Switzerland.

1. \*Peter Stoehr, Professor, University of Applied Science Hof, Germany & Christin Seifert, Research Assistant, University of Passau, Germany. Extending the Language of the Web for Dynamic Content Integration.
2. Noureldien Abdelrahman Noureldien, Dean, Faculty of Computer Science and Information Technology, University of Science and Technology, Sudan & Izzeldin M. Yousif, Postgraduate Student, University of Science and Technology, Sudan. Accuracy of Machine Learning Algorithms in Detecting DoS Attacks Types.

**17:00 -18:30 Session V (ROOM E - Mezzanine Floor): Cloud, Internet, Management Systems**

Chair: \*Jarogniew Rykowski, Professor, Poznań University of Economics and Business, Poland.

1. Cam Nguyen, Professor, Texas A&M University, USA, Jaeyoung Lee, Research Associate, Texas A&M University, USA, Cuong Huynh, Research Associate, Texas A&M University, USA, Donghyun Lee, Research Associate, Texas A&M University, USA & Juseok Bae, Research Assistant, Texas A&M University, USA. A Millimeter-Wave Dual-Band Phased Array for Communications and Radar.
2. Mary-Angela Papalaskari, Assistant Professor, Villanova University, USA. Algorithmic [Jigsaw] Puzzles in Computer Science Education.
3. \*Thomas Fehlmann, Senior Researcher, Euro Project Office AG, Switzerland. Organizing Knowledge in the Internet of Things (IoT).

**18:30-20:00 Session VI (ROOM E - Mezzanine Floor): Management Systems**

Chair: \*Peter Stoehr, Professor, University of Applied Science Hof, Germany.

1. \*Till Hanisch, Professor, BW State University, Heidenheim, Germany, Manfred Rossle, Professor, University of Applied Sciences Aalen, Germany & Rene Kubler, Research Fellow, University of Applied Sciences Aalen, Germany. Storing Sensor Data in Different Database Architectures.
2. Biswadip Ghosh, Associate Professor, Metropolitan State University of Denver, USA. Benefits of using ERP Simulations on Building Information Literacy.
3. Carlos Franco, Ph.D. Student, Universidad Nacional Autónoma de Mexico (UNAM), Mexico, Abel Herrera-Camacho, Professor, Universidad Nacional Autónoma de Mexico (UNAM), Mexico & Fernando Del Rio-Avila, Research Assistant, Universidad Nacional Autónoma de Mexico (UNAM), Mexico. Design of a Mexican Spanish Synthesizer using HTS.

**21:00-23:00 Greek Night and Dinner (Details during registration)**

**Tuesday 17 May 2016**  
(all sessions include 10 minutes break)

**08:00-10:00 Session VII (ROOM E - Mezzanine Floor): Management Systems Development II**

Chair: \*Thomas Fehlmann, Senior Researcher, Euro Project Office AG, Switzerland.

1. Sotiris Skevoulis, Professor and Chair, Software Engineering Program, Pace University, USA, Constantine Coutras, Professor, Montclair State University, USA & Manoj Syal, IT Developer, Citigroup, Inc., USA. Identity Management and Access Control. Techniques and Mechanisms for Managing Identity Management and Access Control.
2. Feng Qin Yu, Professor, Jiangnan University, China & Qing Fan, Graduate Student, Jiangnan University, China. Improved Algorithm with Spatial and Temporal Characteristics for Video Saliency Detection.
3. Christopher Stuetzle, Assistant Professor, Merrimack College, USA & Gavril Bilev, Assistant Professor, Merrimack College, USA. Adapting Cellular Automata Simulation Techniques to the Study of Democratization.

**10:00-11:30 Session VIII (ROOM E - Mezzanine Floor): Knowledge Computing in the Bio-Medical and Digital Health**

Chair: Christopher Stuetzle, Assistant Professor, Merrimack College, USA.

1. Heba Mohsen, Assistant Lecturer, Future University, Egypt, El-Sayed El-Dahshan, Professor, Egyptian E-Learning University, Egypt, El-Sayed El-Horbaty, Professor, Ain Shams University, Egypt & Abdel-Badeeh Salem, Professor, Ain Shams University, Egypt. A Comparative Study of Segmentation Techniques for Brain Magnetic Resonance Images. (COMMED)
2. Margarita Kruchinina, Leading Researcher, Federal State Budgetary of Scientific Institution "Institution of Internal and

- Preventive Medicine”, Russia, Andrey Gromov, Senior Researcher, Federal State Budgetary of Scientific Institution “Institution of Internal and Preventive Medicine”, Russia, Anna Rabko, Cardiologist, Federal State Budgetary of Scientific Institution “Institution of Internal and Preventive Medicine”, Russia, Vladimir Generalov, Leading Researcher, Federal State Budgetary of Scientific Institution “Institution of Internal and Preventive Medicine”, Russia & Konstantin Generalov, Programmer, Researcher, The State Research Center of Virology and Biotechnology VECTOR, Russia. Is it Possible to Apply the Hemorheological Parameters as Precursors of Recurrent Strokes.
3. \*Hector Rabal, Principal Researcher, Centro de Investigaciones Opticas, Argentina, Nelly Cap, Researcher, Centro de Investigaciones Opticas, Argentina, Eduardo Grumel, Researcher, Centro de Investigaciones Opticas, Argentina & Marcelo Trivi, Researcher, Centro de Investigaciones Opticas, Argentina. Dynamic Laser Speckle on Biomedical and Biological Applications. (COMMED)

**11:30-14:30 Urban Walk (Details during registration)**

**14:30-15:30 Lunch**

**15:30-17:00 Session IX (ROOM E - Mezzanine Floor): Educational Technology II\***

Chair: Panagiotis Petratos, Vice-President of Information Communications Technology, ATINER & Fellow, Institution of Engineering and Technology & Professor, Department of Computer Information Systems, California State University, Stanislaus, USA.

1. Patricia Scherer Bassani, Professor, Feevale University, Brazil & Rafael Vescovi Bassani, Professor, Unisinos University, Brazil. Production and Sharing of Learning Activities with Technologies: Designing for Learning in Teacher Formation Courses.
2. Alvino Moser, Vice Rector and Professor, UNINTER, Brazil, Yuri Berri Afonso, MSc Student, UNINTER, Brazil & Germano Bruno Afonso, Professor, UNINTER, Brazil. Immersive 3D Technology in the Indigenous Scholar Education.
3. Mary Connor, Associate Professor, Bridgewater State University, USA, \*Jon Cash, Assistant Professor, Bridgewater State University, USA & Lisa Battaglino, Dean, College of Education and Allied Studies, Bridgewater State University, USA. Mastering the Use of Tablet Technology in a Teacher Preparation Curriculum.
4. Luiz Corcini, MSc Student, UNINTER, Brazil, Luciano Medeiros, Professor, UNINTER, Brazil & Alvino Moser, Vice Rector and Professor, UNINTER, Brazil. Changing Ways for a Better Education: A 3D Gamified Virtual Learning Environment (VLE).

\*This session is jointly offered with the Human Development Research Division of ATINER

**17:00-18:30 Session X (ROOM E - Mezzanine Floor): Management Systems Development III**

Chair: \*Hector Rabal, Principal Researcher, Centro de Investigaciones Opticas, Argentina.

1. \*Izzeldin Osman, Emeritus Professor, Sudan University of Science and Technology, Sudan. Empowering Women in Academia: A Novel Internet Mediated PhD Program in Computer Science and Information Technology.
2. Erdal Kose, Lecturer, Fairleigh Dickinson University, USA. A Survey of Artificial Intelligence (AI) Search Algorithms and Their Efficiency When Applied to Path Finding Problems. (Tuesday May 17, 2016)
3. Pravakar Pradhan, Associate Lecturer, Royal University of Bhutan, Bhutan & Axel Holst, University of Rostock, Germany. Development of a Dynamic Power System Model of Bhutan for Stability Investigations.

**21:00- 22:30 Dinner (Details during registration)**

**Wednesday 18 May 2016**  
**Cruise: (Details during registration)**

**Thursday 19 May 2016**  
**Delphi Visit: (Details during registration)**

**Noureldien Abdelrahman Noureldien**

Dean, Faculty of Computer Science and Information Technology,  
University of Science and Technology, Sudan

&

**Izzeldin M. Yousif**

Postgraduate Student, University of Science and Technology, Sudan

## **Accuracy of Machine Learning Algorithms in Detecting DoS Attacks Types**

Intrusion detection systems are commonly used as a major security tool to detect and prevent networks from malicious attacks. Intrusion detection systems are classified either as misuse or anomaly detection systems.

Anomaly based intrusion detection systems are categorized into three basic techniques, statistical based, knowledge based and machine learning based.

On the other hand, networks attacks are generally classified into four classes. Probes, which are attacks targeting information gathering. Denial of Service (DoS), which are attacks that either denies resource access to legitimate users or render system unresponsive. Remote to Local (R2L), these are attacks in which an attacker bypass security controls and execute commands on the system as legitimate user, and User to Root (U2R), the attacks in which a legitimate user can bypass security controls to gain root user privileges.

Out of these four classes, DoS is the known to be the most common and serious network attack. DoS attack class constitutes various attacks such as, Smurf, Neptune, Land, Back, teardrop, and TCP SYN flooding. Accordingly, building intrusion detection systems to detect DoS attacks becomes an interested research area and many machine learning based intrusion detection systems have been proposed.

To attain a machine learning-based intrusion detection system with high detection accuracy of specific DoS attack type, detection accuracy of individual machine learning algorithm to that DoS type must be measured.

In this paper we examine the detection accuracy of a set of selected machine learning algorithms that belongs to different supervised techniques in detecting different DoS attack types. The selected algorithms are PART, BayesNet, IBK, Logistic, J48, Random Committee and InputMapped.

The experimental work is carried out using NSL-KDD dataset and WEKA as a data mining tool. The results show that the best algorithm in detecting the Smurf attack is the Random Committee with an accuracy of 98.6161%, and the best algorithm in detecting The Neptune

attack is the PART algorithm with an accuracy of 98.5539, and on the average PART algorithm is the best algorithm in detecting DoS attacks while InputMapped algorithm is the worst.

**Mary Connor**

Associate Professor, Bridgewater State University, USA

**Jon Cash**

Assistant Professor, Bridgewater State University, USA

&

**Lisa Battaglini**

Dean, College of Education and Allied Studies, Bridgewater State  
University, USA

## **Mastering the Use of Tablet Technology in a Teacher Preparation Curriculum**

Current technology, including iPads and other tablets are used extensively in public schools in the United States. This has become a critical issue in universities preparing future teachers. Student teachers must enter the student teaching site and eventually the workplace with training and innovative approaches for leveraging tablet technology. At Bridgewater State University, the oldest permanently situated college of teacher education in the United States, a bold move has been made to give each faculty member an iPad and require each junior, senior and graduate student in the College of Education and Allied Studies to own a tablet. The challenge is to ensure that faculty, “digital immigrants” are trained and motivated to use the new technology in ways that enhance and expand upon traditional teaching and learning techniques. Education majors, often considered “digital natives” are at ease with the technology but need guidance in using it to create cutting edge instruction for their future students. This presentation is a description of the year long journey of 3 professors to move from a point of fear and ignorance regarding the use of tablets to competence and confidence in the potential of using tablets in the university curriculum.

**Luiz Corcini**

MSc Student, UNINTER, Brazil

**Luciano Medeiros**

Professor, UNINTER, Brazil

&

**Alvino Moser**

Vice Rector and Professor, UNINTER, Brazil

## **Changing Ways for a Better Education: A 3D Gamified Virtual Learning Environment (VLE)**

It is widely proven that the NICTs require educators and teacher's new attitudes and methodologies. Digital young people crave for faster response to their actions; contextualization, objectivity and applicability in the subject matter in the classroom; connectivity and interaction with their peers and prefer doing based learning.

This requires teacher's accommodation effort, overcoming the assimilation to reinvent and transform before in catalysts and mentors than transmitters, exploiting the full potential of digital media, rather than assimilating them, guided by constructivism, socio-interactionism and connectivism.

These assumptions guide the project of creating a gamified 3D virtual learning environment that uses an open-source server platform for hosting virtual worlds and meta-verse. An Intelligent Tutor System (ITS), developed in PHP language, to guide and monitor, in a pedagogical way, the students in the virtual campus. The 3D virtual learning environment's interface to the STI will be done by a web server and for data storage will used the relational database.

In this 3D Gamified Environment the student will be able to explore a virtual campus, with activity rooms (that follow the curriculum requirements), library (documents, links, videos, websites, games), study room, interaction environments and codesign and he (the student) will be constantly challenged to solve tasks, carry out or complete surveys, submit proposals, among others.

As a result we expect a better motivation and knowledge retention by students, because he (the student) will be unwittingly being monitored, challenged and constantly guided by the STI that, as a coach makes his players, will monitor and verify performance, stimulate curiosity and drive the resolution of tasks to awaken and maintain student interest in their path in the learning process, overcoming their limitations and reaching goals.

**Maria de Fatima Goulao**

Assistant Professor, Universidade Aberta, Portugal

## **Concept Maps as Facilitative Tools in E-Learning Context**

**Background:** The e-learning contexts appeals to the autonomy of the learner in the construction of knowledge. The teacher has a very important role in designing environments that are appropriate for the development of this competence. Furthermore, the proposed tasks, and the methodologies as well, have a significant impact on the achievement of this goal.

**Purpose of Study:** Our study aimed to understand how the use of concept maps it is perceived, as a working method in the construction of individual knowledge and in helping to collaborative work.

**Research Methods:** The students worked over a semester with this approach. One maps were prepared in groups, and in the other one, maps were prepared individually. At the end of the semester it was requested for them to answer a questionnaire regarding the relevance of the concept maps in different aspects, including the construction of knowledge. The questionnaire was composed of 3 parts.

**Findings:** Preliminary results of this study indicate a positive evaluation of concept maps, particularly in the construction, representation and organization of knowledge. They help to simplify complex realities, promoting collaborative work and learning.

As a general observation, concept maps were considered a tool that allows a better understanding and representation of the different themes contents. However, the construction of concept maps in group is a more complex process.

**Conclusions:** This study and its preliminary results show the potential of this working tool, as well as the methodology adopted by us to promote not only individual learning but also collaborative work. Based on this evidence we will adopt the same methodology in other themes and with other groups of students, in order, to strengthen or find other work tracks.

**Thomas Fehlmann**

Senior Researcher, Euro Project Office AG, Switzerland

## **Organizing Knowledge in the Internet of Things (IoT)**

Today, we embark on a new conquest of Ilium: The Internet of Things (IoT). It was already difficult to learn how to develop software properly. Only recently it had been understood that agile methods are the only ones capable of handling the complexity of developing software against unknown customer requirements. What has paved the way for agile understood that the aim of software development is not only the well-engineered code but understanding the needs of the customer and translating them into a language that machines understand. For traditional civil engineers, this looks frightening

An even more challenging quest is to master the multitude of intelligent things around us. Things talk to each other, exchange information affecting behavior out of direct human control. It is already common experience that cars block for good because some internal intelligent network decided the car is out of service. Medicine cupboard deny access because the software cannot authenticate the doctor. Self-driven cars crash because different manufacturers build them. How avoiding that our intelligent things close us out of our homes, decide blocking the fridge because we ate too much and reveal to our consort the birthday gift we secretly prepared?

There is a political way how to deal with arising problems – ignore, or blame others for them – and there is a scientific way. The scientific way is finding a theory that explains the world of IoT, and apply it to practice (Russo). Such a theory is available: it is the theory of Combinatory Logic, part of constructive mathematics. It proved its usefulness in over forty years of practical industrial applications. Engeler, based on research by Barendregt, published the main theoretical result in one of the shortest paper (four pages only) ever published in *Algebra Universalis* (1981). Hofstra and other continued the research. On the other side of the scientific world, Akao and other Japanese scientists developed around the same time Comprehensive Quality Function Deployment (QFD) to make Japanese economy more competitive. They put the theory into practice. Sure they were successful, and all other proper applications of QFD as well, because the theory is sound.

Combinatory logic lays the theoretical foundations for managing complexity in the IoT. An example of such complexity is safety of self-controlled cars; another one is making the IoT helpful and enjoyable for humans. Just as Euclid's geometry, from the University of Alexandria, made the transition from agricultural to urban living possible since 300

BC, now is the time to use combinatory logic for the transition from industrial production to value creation by intelligent things.

This paper explains in very short terms, what a model of combinatory logics is and how currently QFD implements such a model in practice. It explains how to model IoT collections as combinatory algebras and discuss new approaches base on theory for predicting strange and unforeseeable conditions, and how the “things” behave under them. Although this cannot solve the Turing halting problem, it approximates safety and security of IoT collections up to some defined level.

**Carlos Franco**

Ph.D. Student, Universidad Nacional Autónoma de Mexico (UNAM),  
Mexico

**Abel Herrera-Camacho**

Professor, Universidad Nacional Autónoma de Mexico (UNAM),  
Mexico

&

**Fernando Del Rio-Avila**

Research Assistant, Universidad Nacional Autónoma de Mexico  
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## **Design of a Mexican Spanish Synthesizer using HTS**

Speech synthesis is at a superb research moment. At the beginning of this century, the introduction of hidden markov models (hmm) rocked new research at speech synthesis. The old synthesis systems were adapted to work with hmm's, and were called hts systems.

At Mexico, the authors have adapted the hmm technique to Mexican Spanish, the official language at this country. The last version of this system was done with a professional speaker and in anechoic chamber. We designed the text to include many allophones and be linguistic balanced.

The process from text to phonemes text was designed according to Spanish language rules. The Spanish orthography rules for all worldwide Spanish language countries; however, we included many regional rules for word or expressions abbreviations. The Mexican Spanish phonetics have some regionals special phonemes, also phonemes and words from ancient Mexican languages.

The design of trees were done in a similar way to others languages, but including our special language characteristics. At the step, the hmm's are applied widely.

The standard or regular test of speech synthesis are the MOS test; now we have introduced a new set of tests from language experts. The way at these both tests can be mixed to obtain a score are not yet designed; however the specific terms to evaluate our hts design from the language experts is very rich and we are working how translate it in an algorithm.

The MOS tests show significant improvement of speech quality of our hts system compared to deterministic trees approaches.

When hts systems have been applied to English Language, many authors perceive a hiss noise characteristic; however, at Spanish in our experiments the perceiving noise is not equivalent, it is a more complex phenomena, it is described.

**Biswadip Ghosh**

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**Benefits of using ERP Simulations on Building Information Literacy**

“Information literacy” refers to an understanding of how information systems (IS) can be applied to solve cross functional business problems. It involves mastering the knowledge of systematic collection, organization, processing and distribution of data/information and includes the transfer of that learning to designing new IS. These competences are among the most sought after job skills for business graduates. Understanding IS theory and grasping information and communication technology skills are necessary to master “information literacy”. Curriculum that helps build comprehension of the interactions of parts of complex systems can support these cognitive outcomes. Exposure to Enterprise Resource Planning (ERP) systems, because of their tight integration with inherent business processes, challenges students to think cross-functionally and can develop information literacy.

ERPSim is a simulation based educational tool that builds an understanding about how ERP business software can be used to execute and control integrated business processes. The ERPSim game facilitates the students’ use of the SAP system to run the full business cycle of a manufacturing company. The game requires the students to receive and fulfill orders from customers by planning production, acquiring raw materials and running manufacturing and distribution processes.

Practical work with the ERPSim game in an “Introduction to IS” course, when paired with the traditional theoretical discourse, can help in learning the concepts of enterprise integration and build information literacy. The goals of this longitudinal research study is to understand the magnitude to which using ERPSim can complement IS theoretical knowledge and improve cognitive outcomes of learning “information literacy” and transferring that knowledge to information systems planning. Based on survey results, this study finds that practical work with ERPSim significantly increases “information literacy” among students over alternative approaches of (i) only covering theoretical concepts or (ii) covering theoretical concepts and practicums with desktop productivity applications.

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&

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## **Storing Sensor Data in Different Database Architectures**

The Internet of Things comes along with a huge number of “things” producing data. All collected mass data must be stored in real time for actual data processing and future analysis. Almost every database on the market has problems handling time series data. In the past that was only a problem for a small group of users, but today and in the future that will change: one important manifestation of the Internet of Things are sensor networks, possibly large numbers of sensors generating data in more or less fixed time intervals. Internet of Things applications have to handle large amounts of time series data efficiently. There are many different approaches for storing this kind of data like relational databases, NoSQL databases, in-memory systems files and so on. This paper benchmarks typical software platforms used in Internet of Things scenarios especially regarding their ingestion rates and reveals interesting results.

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&

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## **Model-Driven Framework to Develop the IoT-Based Healthcare Applications**

Health is one of the most important aspects of human life, and the delivery model of healthcare will transform from the present hospital-centric to the hospital-home-balanced in coming decades. This healthcare transformation will face with a lot of problems and will require new technologies. This healthcare transformation will face with a lot of problems and will require new technologies. The objects of it operates in an insecure environment and usually have an independent battery power supply. Healthcare applications must cope not only with energy consumption, but also with technical and capabilities for adaptation and personalization requirements. The most important requirement for IoT-based healthcare applications is security/privacy, because vital information should be protected. Typically, the functionality of the IoT-based healthcare applications are predefined by the patient's data, collected using sensor networks and then transferred through the Internet for treatment and decision-making, unfortunately and for data transferring is using wireless networks, which are less secure than wired. Therefore, before creating the application these requirements must be evaluated. We proposed the model-driven framework to develop the IoT-based prototype and its reference architecture for healthcare applications, which evaluates requirements for security/privacy, energy consumptions and suggest the best solution how healthcare application could be implemented. A proposed framework applies known Product Line Engineering methods to achieve a great deal of flexibility and reuse. The framework consists of the multi-layered structure, at the top layer is a feature model-based modelling and feature model transformation, and while at the bottom is application software generation. The proposed framework was validated by using the available tools, and an experimental application to test some aspects the functionality of the reference architecture in real time, was developed. The main contribution is the framework, based on the feature-model, for IoT-based healthcare application implementation, which describes the overall functionalities, while focusing on the synergistic effect of security and energy issues.

**Erdal Kose**

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## **A Survey of Artificial Intelligence (AI) Search Algorithms and Their Efficiency When Applied to Path Finding Problems**

Search is a problem solving mechanism in AI, and the choice of search procedure is a prescription for determining in what order the nodes in a problem are to be generated and examined. The goal of the search algorithms is to map a given start node to a target node. The choice of search method, knowledge representation method, and the programming language is significant for solving search problems. This survey includes various Artificial Intelligence search algorithms and their efficiency when applied to certain problems. The algorithms have been classified as unidirectional - bidirectional algorithms, and informed- heuristic algorithms.

We start our discussion by describing the AI problems which have a well-known goal state, and a brief explanation of knowledge representation methods. After that, we presented certain unidirectional and bidirectional search algorithms and compared their efficiency. Finally, we briefly described probabilistic methods.

The focus of this survey is to investigate diverse AI search algorithms and compare their efficiency by applying to certain sliding puzzles such as fifteen puzzle, donkey puzzle, and mazes.

**Dimitris Kiritsis**

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## **Enabling Technologies for Closed-Loop Lifecycle Management of Intelligent Products & Assets**

ICT in general represents a set of key enabling technology to manufacturing competence, competitiveness and jobs of modern industrialised countries. The trend is towards more customised, intelligent and networked products and systems, integrating intelligence in miniaturised smart product embedded information devices (PEID), such as RFID tags, embedded systems (including sensors) and standards that enable the development of the so called Cyber Physical Systems (CPS). In the coming years, and in the perspective of Industry 4.0, the use of PEIDs and CPS will be extended to a wide pallet of applications for manufacturing including real time visualisation, predictive maintenance and decision making support in general. These wider applications include the involvement of consumers and users together with producers and service providers, beyond traditional use of current product life-cycle management (PLM) solutions. In this context the use of semantic technologies and ontologies is becoming more and more popular in engineering applications. Still, the use is limited in academia and applications are of a small scale. In this paper we will present the research work done by at the ICT for Sustainable Manufacturing group of the Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland, on the use of ontology-based technologies for the life cycle management of products and engineering assets. This research has been performed through a number of PhD works partially financed by the European Framework Program for research. It aims at providing both a wider understanding of the benefits of applying such technologies in the complex environment of asset life cycle management (ALM) and at providing a platform for implementing ontology models in industrial environments.

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**Is it Possible to Apply the Hemorheological Parameters as  
Precursors of Recurrent Strokes?**

The aim of the work was to assess the possibility of using the hemorheological parameters as precursors of recurrent strokes for different pathogenetic variants of the disease.

We examined 214 patients ( $47.7 \pm 0.8$  years) with stroke: 197 - with ischemic, 17 - hemorrhagic one (162 - in the dynamics of the therapy). Erythrocyte (Er) characteristics were studied by dielectrophoresis; hemostatic parameters - by standard techniques.

Results. We revealed different hemorheological variants of stroke during the first examination: 149 patients had "hard" Er on the background of metabolic syndrome (the 1st group); 65 patients had "fragile" cells on the background of connective tissue dysplasia, viral infections (the 2nd group). Based on the data obtained different emphasis was given to the courses of the administered therapy. In the 1<sup>st</sup> group, positive dynamics of the Er parameters was reflected by increase of Er amplitude deformation, capacitance, dipole moment, polarizability and decrease in conductivity, viscosity, rigidity ( $p < 0,001-0,05$ ). In the 2nd group "+" dynamics was accompanied by the increased polarizability at all frequencies, reducing relative polarizability, aggregation, destruction indices while maintaining sufficient plasticity ( $p < 0,0001-0,03$ ). Positive changes in Er parameters were correlated with "+" dynamic on MRT, in hemostasis parameters, reduction in neurological symptoms ( $r=0,72$ ,  $p=0.03$ ). Lack of positive or negative dynamics of Er parameters (low deformability, high aggregation, destruction indices, low membrane capacitance, dipole

moment, polarizability) in combination with high hematocrit, low activity of platelet aggregation, protein-C-deficiency and high D-dimer within the course of studies of patients correlated with the recurrence of ischemic attacks, increased of hypoxia areas on MRT and neurological symptoms ( $p < 0,0001-0,02$ ). When ROC curves were provided, the AUC value was 0.828 in patients with strokes.

Conclusions. We identified different pathogenetic variants of stroke which required different approaches to the therapy. Hemorheological parameters were found to be the predictors of recurrent stroke.

**Wolfram Laaser**

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**Video Formats. Yesterday and Tomorrow**

In the actual debate about introducing MOOCs (Massive Open Online Courses) as a teaching and learning environment audio and video have been rediscovered as an important element for presenting instructional content. In a recent report of Kaltura (2015) the vision concerning the future of video in the web is summarized by the following statements:

- Video will be a standard part of education.
- Videos role will grow beyond delivering content to students, serving purposes of communication, feedback, student's assignments and portfolios.
- Video will continue to enable flipped learning and distance learning.
- Video will enable innovative types of learning and teaching.
- Video will replace most of the textbooks.

The article will outline, that the function of audio visual media can only be understood by first looking at past experience with successes and failures. After going rapidly through some steps of development of audio visual digital media, we then analyse the actual presentation formats in the web. Special focus is put on recent discussions related to the MOOC development.

**Augustine Maruva Tirivangana**

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**Towards a Quality Assurance Framework for the  
Assessment of on-Line Programmes: Developing Indicators  
of Excellence for Developing Countries**

**Vassiliki Michou**

Educational Engineer, University Pierre and Marie Curie, France

## **The Instructional Video in the Teaching Practice**

This paper aims at discussing the difficulties and opportunities related to the creation of educational videos, based on the comments made by the teachers that contributed to their creation. For all the people involved, educational videos pose a series of challenges, not only on the pedagogical aspects. We would like to propose some reflexions and thoughts generating from our experience within the University Pierre and Marie Curie. From the simplest and possibly the first use of instructional video as part of an enriched on-campus teaching, to the personalized accompaniment of the student on a learning management system in a distance learning course, there are many options, and many insights on education.

Our choice within UPMC is the creation of online courses reserved to a targeted audience, the SPOC (small private online courses). The project that initially targets the distance students was the opportunity for exchanges with many teachers on today's pedagogical practices and on their vision for tomorrow. We discuss the enhancements or modifications that can be made in order to offer an active learning more in line with the needs and expectations of today's students. This article is the first part of a research on the concrete evolution of teaching practices in our university. Here we try to study the process of the implementation of these new educational formulas. We present the implications of the use of this new audiovisual and multimedia content in the preparation of the course's educational design and teachings. We discuss how the teachers consider their role in this new context.

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**El-Sayed El-Horbaty**

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## **A Comparative Study of Segmentation Techniques for Brain Magnetic Resonance Images**

Segmentation is a core process for automatic detection and identification of brain tumors as it plays a vital role in extracting the information of the image as measuring and visualizing the brain's anatomical structures and analyzing the brain changes. From this point the need for accurate and automatic segmentation techniques has risen as manual segmentation is not a realistic solution and yet time consuming. This paper examines the various automated segmentation techniques used by researchers on brain magnetic resonance images (MRI), giving detailed description for the most common techniques used in the area of brain tumors. Moreover, we will discuss briefly the differences, limitations, advantages and challenges of each technique mentioned when being used on brain MRI to compare their efficiency in this area and to put guidelines that should be considered when using these techniques.

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**Yuri Berri Afonso**

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&

**Germano Bruno Afonso**

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## **Immersive 3D Technology in the Indigenous Scholar Education**

In the last 20 years, there has been an effort to recover, transcribe and interpret the traditional native Brazilian knowledge related to the constellations, the moon, the sun, the planets and the cosmovision.

This study is the result of the application of *NTIC (New Technologies of Information and Communication)* in order to use, within the native Brazilian and Western school education, the traditional Brazilian native knowledge that was recovered in a participative study.

The native Brazilians learn through their direct contact with nature. The immersion with virtual reality 3D glasses satisfactorily simulates this contact and can also enhance it.

Through the development of computer programming, modeling and animation an “individual native Brazilian planetarium” has been built. The planetarium makes possible, for whoever uses it, the virtual visualization of the apparent motions of the sun, determine the solar day, the cardinal points and the seasons the same way the Brazilian natives see them in real life. Besides, it is possible to simulate the celestial firmament with the constellations used by the Brazilian natives as a calendar and as well as for other daily activities.

This planetarium is portable which allows taking it to far and hard to reach places as well as places with no electricity, which are the places where most Brazilian natives live. Thus, the Brazilian native knowledge can be passed on, in outdoor activities, to both native and western students.

It was realized that the students learning interest increases significantly when the NTIC are used, especially when associated to the real life.

Then, through the “virtual Brazilian native planetarium”, one of the main purposes of education, which is the insertion of the student directly and intentionally into the knowledge produced by the humankind, was honored. Which, in this particular case, is the traditional Brazilian native knowledge.

**Timothy Newby**  
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## **Instructional Digital Badges in an Online Masters Degree Program**

Researchers have begun to examine the benefits of the use of digital badges in education (e.g., Ahn, Pellicone, & Butler, 2014; Ostashewski & Reid, 2015). In particular, the structure and the sequence of well-constructed badges offers users an effective way to capture and review potential learning paths while increasing desires for continued or additional learning, to set goals, to build confidence in personal performances, and to foster a sense of accomplishment. Badges may also motivate users from a more extrinsic perspective by increasing their effort invested in a task in order to receive a tangible reward or status symbol of personal accomplishments that can be shown and compared to the performances of others.

The high amount of structure and sequence within digital badges may also prove to be effective for use within online distance education courses. At Purdue University, a fully online Master of Science in Education program has implemented a new set of instructional digital badges that are available to their online students at all times while they are enrolled in the program. This paper will discuss the design and implementation process used to create a set of badges tailored specifically for the online student and how that was accomplished using the Purdue Passport system. In particular, focus will be on the lessons learned from the design, development, implementation, and evaluation of the badges.

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## **A Millimeter-Wave Dual-Band Phased Array for Communications and Radar**

Wireless communications and sensing have become an indispensable part of our daily lives from communications, public service and safety, consumer, industry, sports, gaming and entertainment, asset and inventory management, banking to government and military operations. As communications and sensing are poised to address challenging problems to make our lives even better under environments that can potentially disrupt them, like highly populated urban areas, crowded surroundings, or moving platforms, considerable difficulties emerge that greatly complicate communications and sensing. Significantly improved communication and sensing technologies become absolutely essential to address these challenges.

Phased arrays allow RF beams carrying the communication or sensing information to be rapidly steered or intercepted from different angles across areas with particular amplitude profiles electronically, enabling swift single- or multi-point communications or sensing over large areas or across many targets while avoiding potentially disrupting obstacles. They are particularly attractive for creating robust communication links for both line-of-sight (LOS) and non-line-of-sight (NLOS) due to their high directivity and scanning ability.

In this talk, we will present a millimeter-wave dual-band phased-array frontend capable of two-dimensional scanning with orthogonal polarizations at 44 and 60 GHz. This phased array particularly resolves the “RF signal leakage and isolation dilemma” encountered in the existing phased-array systems. It integrates “electrically” the phased-array functions in two separate millimeter-wave bands into a single phased array operating concurrently in dual-band. These unique features, not achievable with existing millimeter-wave phased arrays, will push the phased-array system performance to a next level, while reducing size and cost, and enhance the capability and applications for

wireless communications and sensing, particularly when multifunction, multi-operation, multi-mission over complex environments with miniature systems become essential. This phased array enables vast communication and radar applications, either communication or radar or both simultaneously - for instance, concurrent Earth-satellite/inter-satellite communications, high-data-rate WPANs and HDMI, and accurate, high-resolution, enhanced-coverage multi-target sensing.

**Izzeldin Osman**

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**Empowering Women in Academia: A Novel Internet  
Mediated PhD Program in Computer Science and  
Information Technology**

Female lecturers in Sudanese universities and colleges holding Master degrees in Information Technology or Computer Science have to pursue PhD degrees locally in Sudan due to economic, social and family obligations. The PhD degree is a mandatory requirement for the promotion in academia. The severe brain drain experienced by the country has led to a scarcity of qualified PhD supervisors in the preferred modern narrow specializations. In the Sudan women constitute a majority in the lower academic ranks in Computer Science and IT departments but there is a sharp drop in their number in the ranks requiring a PhD.

This paper describes the PhD program of Sudan University of Science and Technology which employs ICT to empower women in higher education through the utilization of the international human and technical resources and providing PhD supervisors from renowned universities all over the world. PhD students from all over Sudan and the neighboring countries participate in lectures, seminars and receive research supervision through an interactive software (WebEX) providing audio, video and chat interactive facilities.

Students (female lecturers) pursue their studies from their homes or offices in their home towns and have to come to the university once or twice a year for face-to-face exams, discussions with supervisors or for the presentation of progress seminars.

The program has entered its sixth year with about one hundred women participating. Nine women have already graduated with PhD. This experiment can be improved, modified and applied by GCC universities for the benefit of GCC women.

A short video will be presented. Women graduates will tell their success stories.

**Mary-Angela Papalaskari**

Assistant Professor, Villanova University, USA

## **Algorithmic [Jigsaw] Puzzles in Computer Science Education**

Educators and business leaders recognize that computer science is a new basic skill necessary to educate a new generation of scientists, as well as to prepare a large number of people for the increasingly technological global job market. President Obama's \$4 billion "Computer Science for All" 2016 initiative aims to empower all American students from kindergarten through high school to learn computer science and to be equipped with the computational thinking skills they need to be creators in the digital economy, not just consumers, and to be active citizens in a technology-driven world.

This paper discusses an approach to instilling computational thinking through two kinds of puzzles:

1) Algorithmic puzzles, which can be used to illustrate specific algorithm design strategies and are generally recognized as useful in introducing computational thinking skills. Algorithmic puzzles have a long history of use in education (beginning with Alcuin of York, river crossing puzzles 800CE; see also Levitin & Levitin, "Algorithmic Puzzles", 2011 - first large-scale collection of algorithmic puzzles).

2) Algorithmic jigsaw puzzles, i.e., jigsaw puzzle-like exercises that result in the construction of an algorithm, where students are challenged to rearrange pseudocode elements in order to devise an algorithm for solving a specific problem. We present examples of well-known algorithms cast as algorithmic jigsaw puzzles and discuss their use in formative assessment. Both algorithmic puzzles and algorithmic jigsaw puzzles can play a significant role in educational settings, specifically in the development of problem-solving skills and creativity. Algorithmic jigsaw puzzles additionally help develop the ability of students to express their ideas in a rigorous manner.

The paper presents results from the use puzzles in three different levels of computer science courses at Villanova University.

**Pravakar Pradhan**

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&

**Axel Holst**

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## **Development of a Dynamic Power System Model of Bhutan for Stability Investigations**

Bhutan is a small kingdom in south Asia, landlocked between China and India in the Himalayas. Because of its geographical location, Bhutan is endowed with huge hydropower potential. Only about 1.5 GW of the total 24 GW potential is utilized till date. However, rapid development of new hydropower projects is being carried out. 10 GW of additional generations is planned to be put in operation till the year 2020.

The existing hydropower plants (HPP) are being managed by Druk Green Power Corporation (DGPC). Bhutan Power Corporation Limited (BPC) is the power system operator of the Bhutan power network, which is controlled via interconnection from the Indian grid. With power demand growing rapidly the power network and the associated increase in interconnection with the Indian grid, DGPC feels the urgent need to ensure that its generating facilities are prepared to operate in the fast changing network scenario [1]. BPC also needs to enhance its current state of expertise on the dynamic and static studies of the transmission network of Bhutan towards operating the system optimally at present and the future with the expected network expansion as per the National Transmission Grid Master Plan (NTGMP).

This paper describes comprehensive modelling and simulation method of a complete power system incorporating the HPP Chhukha (with high pressure Pelton turbines and a complex control structure) integrated with the transmission system of Bhutan. The complete nonlinear model of HPP is developed in Matlab/Simulink software and validated with the measured data. For validation of network elements parameters, the model is developed in network simulation software DIgSILENT PowerFactory and tested to match the actual system output to the simulated output for making the model as close to reality as possible through appropriate adjustment to the system parameters. To conduct the necessary investigation concerning the behavior in island mode operation and the transition process, HPP model is added to the existing network model.

The paper shows some simulation results and describes findings; firstly, for various contingencies (static and dynamic responses) of the

system and secondly, for optimal and efficient operation as well as for planning the Bhutan Power system of future which is very strongly interconnected to one of the largest electrical Grids: India. The paper also evaluates the static and dynamic performance of its generating units to ensure a safe and stable performance in interconnected as well as islanded operation in case of faults.

At present the Eastern and Western Transmission Network of Bhutan is only interconnected through India. There is a plan to interconnect the network through the 220 kV line between Jigmeling and Tsirang. Case studies on voltage stability of the entire system under various operating conditions are conducted and recommendations to improve the grid operating conditions and/or up-gradation to improved voltage profile are given.

A research team consisting of experts from the Royal University of Bhutan, the University of Rostock, DGPC and BPC was founded, supported by the German Academic Exchange Service (DAAD) within the University-Business-Partnership Programme.

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## **Dynamic Laser Speckle on Biomedical and Biological Applications**

Dynamic laser speckle (DLS) is an optical technique that has been used for several applications in biology, medicine and industry. It is based on a scattering phenomenon occurring when coherent laser light illuminates an active surface. The surface appears to be covered by tiny bright and dark dots that fluctuate in a seemingly random way as for a boiling liquid, according with the surface fluctuation. Thus, the study of the temporary evolution of the speckle patterns may provide an interesting tool to characterize the parameters involved in the sample dynamic processes. Very important applications have been developed in its use to monitor blood perfusion.

In this paper, we present a brief account of the basic concepts of both the speckle phenomenon and the DLS techniques. Then, we show several biomedical and biological applications developed by our group, such as:

- Pharmacodynamics evaluation of parasite motility.
- Assessment of seed's viability, bruising in fruits and detection of fungi in seeds.
- Determination of maize hardness.
- Arterial pulse monitoring using speckle.
- Analysis of bacterial chemotactic responses towards attractors.
- Discrimination of motile bacteria from filamentous fungi
- Blood Clotting time Measurements.
- Monitoring Bacterial Colony Growth (Escherichia Coli and Staphylococcus Aureus).

**Jarogniew Rykowski**

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**HCN:**

**Low-Cost Networking for DIY Internet of Things**

In most nowadays networks, the transportation layer is quite restricted to conform to certain standards such as Ethernet or WiFi. Even if several protocols and hardware were proposed towards efficient networking, still the area of Do-It-Yourself home (amateur) networks is not covered. What should be taken into attention in this case is wider incorporation of 2,4 GHz and 433/868 MHz radio transceivers/receivers, traditional serial lines such as RS-232 and RS-435, Bluetooth, Zigbee/xBee, and similar low-cost and short-range communication links, linked together within a single communication standard. As the radio range of these communication media is usually restricted, multi-hop networking should be applied to extend the signal-coverage area.

Due to the fact that typical DIY computers are very small, with restricted resources such as limited memory (usually up to 2-3 kB) and processing capabilities (8-bits CPUs with no co-processing units), the networking protocol should be simple, however observing some necessary features such as encryption for digital signage and privacy protection. Also, the network should allow both addressable and address-free information exchange, the latter preferably based on broadcasting and multicasting, freely mixed according to application area and end-user needs.

The goal of the paper is to propose such a method of small networking called Home Computer Network (HCN). HCN protocol stands for a flexible standard of generic, stateless information exchange among two or more nodes, regardless the communication links on the way from a sender node to all the receivers. Two addressing modes are possible. In the address-free mode, the incoming message is to be accepted by the receiving node based on message contents (semantic description of the command expressed by the message). Once a message is accepted, the node performs certain actions related to the message. In parallel, the message is re-transmitted to other communication channels (except the channel the message arrived by) to be inspected by other nodes. To eliminate possible circles in information flow, the repeated messages are identified and stopped, based on unique descriptors of the messages.

In the addressable mode, the message is linked with an identifier of the receiving node - such a message is accepted only by a certain node, but anyway propagated in multi-hop mode by any other node.

Each message may be encrypted. Due to limited node resources, simple however powerful encryption standard have been applied, namely xxTEA algorithm, with pre-shared encryption key common for all the nodes.

HCN makes it possible to automate the process of linking several micro-controllers at home into a single consistent network, with limited amount of programmers' work and with very low-cost hardware such as AVR-based computers, Raspberry boards, and similar DIY solutions.

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&

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## **Production and Sharing of Learning Activities with Technologies: Designing for Learning in Teacher Formation Courses**

Studies about innovation in education show us that pedagogical practices can enhance the way students apply their knowledge in real situations which is something of great importance in the teacher formation process. This study is complementary to an ongoing research project called "Pedagogical practices on cyberspace" and aims to promote the development and the documentation of learning activities with technologies. The sharing of learning activities with the use of technologies is in the center of the studies of the Learning Design area. Learning activities can be shared through mediation artifacts and this process enables the construction of an educational practices database. Thus, these practices can be published and accessed by different teachers who can reuse, modify, and validate them in different contexts. The research, based on a qualitative approach, was conducted in a teacher formation course, where undergraduate students were majoring in Portuguese/English. This way, the activity with these students aimed to promote the reflection on the use of digital technologies in an educational setting and the production of learning activities based on Learning Design concepts. Tools for development of conceptual maps can be used as mediation artifacts based on graphical representation. The students explored three different tools for the development of conceptual maps (Mindomo, Cmaptools, and Goconqr). Results show that the Learning Design approach can be explored in the academic context with the use of conceptual maps as mediation artifacts. Furthermore, the learning activities represented in conceptual maps became available on the web and can be accessed by different subjects and the practices can be adapted and reused in different contexts. Summarizing, we understand that the proposed innovation allows undergraduate students, throughout their whole course, to experiment activities based on the fundamental principles of cyberspace – produce, distribute, and share.

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**Constantine Coutras**

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&

**Manoj Syal**

IT Developer, Citigroup, Inc., USA

**Identity Management and Access Control. Techniques and  
Mechanisms for Managing Identity Management and  
Access Control**

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&

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## **Virtual Education: Emancipatory or Oppressive?**

Virtual education (VE) is viewed as an indicator of an institution's ability to adapt to changing realities and demands of an increasingly digital world. Viewed as an option to increase access to educational opportunities, customize/enhance individualization of learning, and facilitate technological literacy, VE requires the attention of knowledgeable researchers in critical assessments of its impact. While critical theorists have drawn attention to the oppressive educational practices brought about through neoliberal policies that engender factory-like approaches to education in general, they have been particularly concerned about the potential detriments of unbridled proliferation of VE in schools and universities (Giroux, 2002; Noble, 1998). We draw upon critical scholars who have framed virtual education within neoliberalism warning us about the corporatization of education, knowledge commodification, and education as profit-generating (Giroux, 2002). This perspective shifts education away from its democratizing and humanizing potentiality to align with market-driven values. Given VE's proliferation, it is crucial that members of the educational profession are aware of its oppressive and/or emancipatory potentialities.

This autoethnographic study (Ellis, Adams, & Bochner, 2010) focuses on the experiences and dialogic processes of a doctoral student and professor as they explore the emancipatory/oppressive potentialities of VE, with a view to reconceptualizing it as an opportunity to expand access to liberatory pedagogy, rather than merely an extension of access to education that is limiting, dehumanizing and potentially exploitative. Both authors support critical pedagogy and the emancipatory potential of VE, but are concerned about its current manifestations. The findings feature insights that emerged as conscientization developed about the policies/pedagogical procedures of virtual education. As public funding dwindles, education institutions have embraced VE. As VE is seemingly "inevitable", it is our responsibility to think critically about pedagogical integrity, intellectual property implications, knowledge as commodity, standardization/academic freedom, teacher-as-technician and student-as-consumer rather than accepting unbridled implementation of VE.

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## **The Effects of National Culture on the Implementation of ISM Standards Based on the ISO 27001**

This paper analyses the reasons for creating national security standards and laws in contrast to applying international security standard ISO/IEC 27001, and classifies them based on the common characteristics, such as historical background, national economy and global activities. These national ISM (Information Security Management) standards are popular among organisations because they offer market assurance and IT governance by protecting sensitive information in a structured way. ISO 27001 is the most adopted international ISM standard by several countries and industries. The main differences between the studied national standards and the ISO 27001 standard are investigated. Furthermore, this paper analyses the reasons for low adoption rate of the ISO 27001 in the selected countries, based on the 2014 survey carried out by the ISO/ IEC organisation. This paper finds out the most relevant and applicable cultural dimensions to this international standard, and defines new ways of enhancing ISMS (Information Security Management System) long-term performance, based on the ISO 27001. Recent literature has indicated that the performance and selection of the ISO 27001 as well as several types of best practices and national information security guidelines are influenced by organisational types and national characteristics. For the first time, this paper continues contributes to the literature by defining the relationship between the studied national ISM standards and the selected cultural dimensions. These analyses uncover national cultural and socio-economic barriers, which should be taken into account during future development of the ISO 27001 standard as well as when measuring its effectiveness and adoption rate. Effectively implementing the ISO 27001 requires a cultural change as it changes employees' routine and communication devices, and cultural characteristics, international trends as well as national economic power have to be taken into account. One of the reasons for creating national standards could be that the ISO 27001 is very general and tries to address every organisational type regardless of its expertise or the national culture. Another possible reason is that ISO 27001 didn't exist at the time when

these standards were established. The main differences between these national standards are the stakeholder description, the level of focus on technical aspects, the policies development, risk management formulation and IS safeguarding. However, the security process or management duties are defined the same.

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## **Extending the Language of the Web for Dynamic Content Integration**

In this paper we present ongoing research on semi automatic integration of dynamic information into web pages. This approach allows web editors to insert search queries to define the dynamic information. After creating a web page keeping its content up to date requires human effort and leads to increased maintenance costs. For not too complex web sites and well-defined dynamic data, e.g. data of a weather forecast, an automated request to a database can be used to keep the content up to date. As soon as the content of the web site is more complex a simple one to one copying of information without manual quality control is not feasible. Our approach forwards the quality control process from the presentation of the web page to the creation stage of the content. Instead of a server based approach we propose a client based solution, the SeCH-Browser, for integrating dynamic information into the web page; SeCH stands for Self Embedding Characteristic Hyperlinks. The current version of the SeCH-browser extends the normal way of handling web-pages by a four step process: 1. While creating the HTML page, the author uses newly defined HTML micro format tags to embed meta information in the HTML code of the web page. This meta information describes a query that is used at runtime to search the web for the dynamic information that is included in the web page. Because the author has the full control over this meta information he can ensure that the search will return suitable results. 2. To improve quality of the search the meta information is enriched by information describing the user of the SeCH-browser (user profiles). 3. The SeCH-browser uses this combined information, describing parts of the content of the web page and information about the user, as an input for a web-based search for the additional content. This search is done using an intelligent search-engine. Currently the EEXCESSfederated recommender system (<http://www.eexcess.eu>) is used for this search. 4. The response from the search service is post-processed to display the enclosed information as an overlay on top of original version of the HTML-page. The use of HTML micro format tags combined with the SeCH-browser solves the problem mentioned at the beginning. Because the definition of the dynamic content is performed by the web author while creating the

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web page additional maintenance efforts can be avoided. With the help of this semi autonomic the editor of the web page is integrated in the quality assurance process by selecting the appropriated key words for the web search.

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## **Adapting Cellular Automata Simulation Techniques to the Study of Democratization**

This work adapts popular techniques in cellular automata theory and application to the study of the spread of Democracy in the world, or Democratization. Much work in Comparative Politics has focused on determining the most important factors that lead to a country's regime (government) being either Autocratic or Democratic. We use a cellular automata-based simulation to model the spread of democracy from 1945 to 2011 (years for which comparison data is available), whose time steps are individual years. The two primary sources of influence on a country's regime value are Internal and External. Internal influence is determined by the Gross Domestic Product (GDP) of the country in question as well as a linear fitting of known data for a variety of parameters (including the country's stability, religious populations, and age), and the external influence is set by the regime value of all countries (weighted by their Internal influences) within its 'neighborhood.' Our simulation treats each country as a cell whose state is governed by a linear weighting between Internal and External influences, and its resistance to change by its own GDP (the higher it is, the more resistant to regime change).

A parameter sweep method is employed to test ranges of the parameters (each unique set of parameter values is called a parameter set) used to determine the regime score of each country each time step. These tested parameters are weights on internal vs. external influence, neighborhood sizes, neighborhood types, extent to which outside democracies are considered, and stability weighting. Each parameter set produces a configuration of the world in 2011 that is compared against the actual world configuration and a series of error values are calculated using Percent Correct, Moran's I, and Percent Democratic. 1000 trials are run for each parameter set and the median regime values are used. The global minimum error for each metric is calculated, determining the parameter set that most resembles those which are responsible for democratization in the world.

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## **Factors Influencing Learner Presence in Augmented-Reality-Mediated Instruction**

Nowadays, augmented reality (AR) techniques have been well developed. AR prevails over other complicated virtual reality tools by its nature of low-cost and easy-to-operate. AR technology is capable of superimposing virtual objects to the real scenes. Augmented virtual objects are able to display information, exhibit 3D figures, or simulate phenomena that are abstract or impractical to present in real instructional settings, therefore AR-facilitated instruction has been claimed to have much educational values. Although past research results seem to support that AR-facilitated instructional could improve learning performances, others challenge that virtual presentations of instructional messages could not completely replace the life experiences as some learners may not fully be immersed in a real/virtual mixed learning environment. Some researchers asserted that learner's level of presence in a mixed-reality learning (MRL) environment should be considered in designing adequate MRL materials. We believe a satisfactory MRL learning experience could increase learner's level of presence.

In this study, we assume that in an AR-facilitated learning process, satisfaction of AR learning experience would affect learner's level of presence, and learner's level of presence would affect the learning outcome. A game-type AR learning process was developed with the instructional content on "Carbon Footprint", which embeds with several abstract concepts and is suitable for being delivered through AR-mediated learning processes. An experiment was implemented with 71 5<sup>th</sup> and 6<sup>th</sup> grades elementary students. Three sets of research instruments were developed- a learning achievement test sheet, an inventory measuring learner presence in AR environment, and a questionnaire acquiring learner's satisfaction on AR learning experiences. Learning achievement test items include all issues taught in AR learning process; learner presence inventory consists of three factors- the AR presence, the learning presence, and the time presence; and learner satisfaction questionnaire consists of learning experience and interaction experience. Pilot tests were done for these instruments to examine the reliabilities. The reliabilities of these three instruments were all above .75. Instructional material was carefully developed with expert's inspections for content validity. During the experiments, tablets were used for triggering and displaying AR objects that distributing questions refer to the trigger images and providing clues

that helped to answer the question. The total instructional time is 70 minutes including pretest, eliciting motivation, the AR instruction, and posttest.

60 validated data were collected and statistically analyzed, partial correlation and independent t-test were employed. The results indicated that the levels of learner presence in AR instructional environment are significantly different between highest 27% and lowest 27% of learner presence. It is also a significant correlation between level of presence and learner satisfaction on AR learning experience. No significant result was found in correlation between overall level of presence and learning achievement. However, there was a significant correlation in the low learner presence group. We conclude that learner's satisfaction of AR learning experience affects their levels of presence in AR learning process, and the level of presence particularly affects the learning achievement for the low learner presence group. These preliminary results indicated that the more satisfactory for the AR experience, the higher the level of learner presence in the mix-reality environment, consequently results in better learning outcomes for the low presence learners

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## **Knowledge Construction and Career Advancement in a Massive Open Online Course in Nanotechnology and Nanosensors**

The growing popularity of massive open online courses (MOOCs) introduces an alternative to traditional higher education. However, there is yet little evidence regarding the extents to which MOOCs promote personal knowledge and professional careers among adult learners. Guided by the constructivist theory, this study was set to examine the role of MOOCs in the process of knowledge construction and career advancement of science and engineering students or employees. We compared between two groups of MOOC learners who successfully completed the course: University students (N = 28) who took the course for credit points, and general participants (N = 58). The research two null hypotheses were: H1. MOOC students are more likely to acquire specific knowledge for professional advancement compare to university students, and H2. University students are more likely to receive higher grades compared to MOOC students. The 'mixed methods' design was employed for data collection, analysis, and interpretation. The quantitative approach followed the pretest posttest design, in which data was collected via online questionnaires. The qualitative approach included a content analysis study in which semi-structured interviews and digital documents were examined. Findings indicated that both the MOOC and the university students asserted similar inclination toward acquiring specific knowledge for professional advancement; thus the first null hypothesis can be rejected. In addition, there were no significant differences between the groups in their gained knowledge or final grades; thus the second null hypothesis can also be rejected.

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## **Improved Algorithm with Spatial and Temporal Characteristics for Video Saliency Detection**

In order to reflect salient regions in video sequence accurately, a spatiotemporal saliency detection algorithm integrated with motion characteristic is proposed. First, use SLIC segmentation algorithm to segment each frame into super-pixels blocks and to maintain the target boundary structure and then to extract the color histogram as the feature for each block. Then, on the one hand, use algorithm of optical flow vector regional construct to compute temporal saliency. On the other hand, in view of the global contrast model ignores the characteristics of spatial distribution, compute spatial saliency by joining the color spatial distribution. Finally, use an adaptive fusion strategy to merge the temporal saliency map and the spatial saliency map into final spatiotemporal saliency map. Simulation experiment results demonstrate that proposed method is able to extract salient target with clear outline in dynamic scenes.

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## **The Curriculum in the Digital Culture and the Process of Formation: A Mediated Relation**

The present paper aims to comprehend the way the authors of didactic materials of a distance education course conceive the mediated relation in the constitution process of the curriculum in the digital culture and the process of formation. This work is a part of a broader research which objectives to follow and to analyze the process of management and of development of a postgraduate certificate in Education in the Digital Culture offered as a distance education course by a Brazilian university. The conceptions of curriculum and of formation in the digital culture are essentially lapped and they pervade the relation between the education and the process of culture, where the Digital Information and Communication Technologies (DICT) are also present. This study is a qualitative research, a Study Case, which explore the potentialities and the constraints interacting in the process of formation in and for the digital culture, from the view of the authors of didactic materials for the commented Course. For collecting the information, we had semi-structured interviews with the authors - professors of universities and teachers of basic schools. Therefore, facing the challenge of empowering the school in the processes of formation in the digital culture and of the digital culture in schools, we comprehend it is priority and relevant that the school express itself collectively, as a collective and social practice, with the aim to rethink itself as from the integration of the DICT in its pedagogical practice. This means taking the school as a collective which is often asking itself, which rethink its practices, which is concerned about its formative needs and which in this process promotes its formation, as a social institution. We recognize the formation as a process which, such as, is given in certain cultural contexts, whether in formal spaces or not, but all lapped in the culture. Thus, the formation is naturally linked to the digital culture.