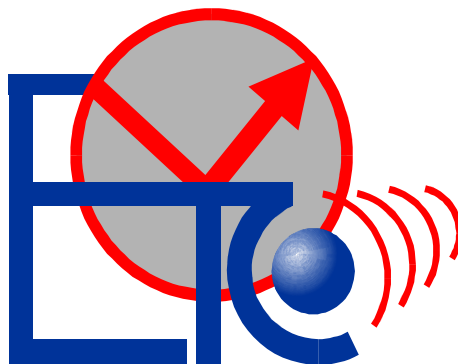# FACULTY OF ELECTRONICS AND TELECOMMUNICATIONS ENGINEERING

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INTELLIGENT INDUSTRIAL ELECTRONIC SYSTEMS RESEARCH CENTER – *I. I. E. S.*

GENERAL PRESENTATION

Intelligent Industrial Electronic Systems (I.I.E.S.) is a **research center**, type C, that has been evaluated and accredited by CNCSIS. The Center was created in 11.05.2001, in accordance with the CNCSIS certificate, nr. 106/CC-C. The director of the Center is **prof. dr. eng. Mircea CIUGUDEAN**.

MAIN ACTIVITIES

The Center performs research and design activities in domains such as:
➢ Robotics (production systems, drive control, mobile robots, sensors)
➢ Integrated circuits design
➢ Power electronics (dc-dc converters, power factor correction, neuro-fuzzy control, fuzzy controllers, power active filters)
➢ Neural networks and intelligent sensors.

CONTACT

Prof.dr.eng. Mircea CIUGUDEAN – Director
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RESEARCH FIELDS

Integrated Circuits Design
➢ Keywords: ASIC, VLSI, DA, arithmetic coprocessor

Robotics
➢ Keywords: sensor, robot, transducers, industrial robot driving

Neural Computing and Intelligent Sensors
➢ Keywords: intelligent sensors, artificial neural network, sensor data processing

Power Electronics
➢ Keywords: power converters, power quality, harmonic pollution, power factor correction, soft switching, chaos

Electronic Packaging and Testing Field
➢ Keywords: CAE, CAD, CAM, test sequence-generation, self-testing design, test points, EMC, logic analysis, spectral analysis

Researches in *INTEGRATED CIRCUITS DESIGN*

FIELD DESCRIPTION
The research group in this domain is lead by prof. dr. eng. Mircea CIUGUDEAN and also includes an associate professor, one lecturer, three assistants, and three graduate students. The group will grow further by four graduate students and three PhD students per year.

Researches in *ROBOTICS*

FIELD DESCRIPTION
The Research Team in Robotics (RTR) is lead by prof. dr. eng. Tiberiu MURESAN and prof. dr. eng. Ivan BOGDANOV. The team includes one more professor, associate professors, three lecturers and one assistant professor.

The members of the RTR are members of the Robotics Association from Romania which is part of the International Federation of Robotics with the headquarters in Stockholm, Sweden.

In the last years the main research subjects were:
➢ Pilot intelligent production systems
➢ Research on passive systems and active intelligent systems interaction
➢ Microcontroller based control of electrical drives
➢ Interpolation in robot control
➢ Mobile robots control
➢ Sensors for robotics
➢ Equipment for leading the welding heads.

The Robotics Research Team uses six PC computers and simulation software.

RESEARCH PROJECTS

1. **CNCSIS grant A, 98GR/11.06.2008 Tema 10 cod CNCSIS 351**
Image quality improvement in sonar systems by speckle noise reduction

Value: 10,000 RON
Director: Assoc.prof.dr.eng. Dorina ISAR
Members: Prof.dr.eng. Sabin IONEL
         Prof.dr.eng. Andrei CÂMPEANU
         Prof.dr.eng. Alexandru ISAR
         Lect.dr.eng. Cornel BALINT
         Assist.eng. Sorin POPESCU
         Assist.eng. Maria KOVACI
         Assist.eng. Andy VESA
         Assist.eng. Marius SĂLĂGEAN
         PhD Stud. Ioana ADAM

FIELD AND GRANT DESCRIPTION

The images obtained using a set of sound or ultrasound transducers such the SAR images used in aerial navigation or the sea floor images acquired with sonar or the echo graphic images are perturbed by a multiplicative acquisition noise, called speckle noise. For the correct interpretation of the information contained in these images, the enhancement of the quality of those images, based on the rejection of the speckle noise is required. For this purpose the wavelets theory is used more often today. An algorithm dedicated to the reduction of the speckle noise has the following steps: the speckle noise is transformed into an additive noise by the computation of the logarithm of the acquired image; the discrete wavelet transform of the obtained result is then computed; then the non-linear filtering of the new result is performed, reducing the noise; the inverse discrete wavelet transform is then computed and the anti-logarithm of the new result is computed. So, the noise-free estimation of the acquired image is obtained. The purpose of our grant submission is to match this denoising algorithm to the specificities of the sea floor images acquired with sonar images: the statistics of the information contained, the statistics of the speckle noise, the time required for acquisition. The results obtained will be used for the realization of some computing programmes dedicated to the use of geologists for the interpretation of sea floor images, to study the tectonic changes, for the appreciation of the age of different components or of the relief modifications tendencies or for the ecology or military control of different regions. The performances of those programmes will be superior to the performances of the programmes already conceived, affecting less the statistics of the useful image contained into the images to be processed, being faster and using less memory.

ACTIVITIES AND RESULTS

Our researches concentrated this year on the choice of the best wavelet transform for sonar image processing. At the beginning we had used the enhanced diversity wavelet transform, DEDWT, invented in our research team few years ago. Using this transform we decreased the sensitivity of the discrete wavelet transform with respect to the mother wavelet involved. Some diversification mechanisms were developed in the paper "Alexandru Isar, Sorin Moga, Corina Naforniţă, Marius Oltean, Ioana Adam, *Image Denoising Using Wavelet Transforms With Enhanced Diversity*, Proceedings of International Conference Communications 2006, Bucharest, June, 3-4, 2006."

The theoretical proof for the synthesis of partial results used in DEDWT computation can be found in "Quinquis A., Isar D., Isar A., *Multi-scale MAP Denoising of SAR Images*, Proceedings of IEEE International Conference Oceans'06, Boston, USA, September 20-23", because SAR images represent a more general case that SONAR images.

Later we found more useful a complex wavelet transform, namely the double tree complex wavelet transform, DTCWT. Its use for denoising SONAR images is treated in the paper "Alexandru Isar, Dorina Isar, Ioana Adam, *Denoising Sonar Images*, Proceedings of The Romanian Academy, Series A, Volume 7 , Number 2 May - August 2006, pp. 1-14", where we presented a comparison between our results and the results obtained using classical filters for SONAR images denoising, i.e. Lee and Frost filters. Discussing the subject whit the members of a research team from IFREMER Brest in France we agreed that the results obtained using DTCWT are better because it is a translation quasi-invariant transform with an enhanced directional selectivity. But the complex transform is very sensitive with the choice of wavelet mother. Consequently we proposed ourselves another objective: the design of diversity enhanced complex wavelet transform. The one-dimensional form of this transform, invented in our research team, was published in Proceedings of International Symposium ETc 2006:

"I. Adam, M. Oltean, M. Bora, *A New Quasi Shift Invariant Non-Redundant Complex Wavelet Transform,* Proceedings of International Symposium ETc 2006, September 21-22, 2006, Timişoara".

Researches in *NEURAL COMPUTING AND INTELLIGENT SENSORS*

The research group is coordinated by prof.dr.eng. Virgil TIPONUT and includes three assistant professors from the Department of Applied Electronics, 8 post-graduates from other universities in Romania and industrial companies (Romania, Canada, USA), who are developing their PhD thesis.

FIELD DESCRIPTION

➢ VLSI Implementation of Cellular Neural Networks (CNN)

➢ Applications of CNN in Intelligent Sensors

➢ Applications of CNN in Robotics (Mobile Robots and Colony of Interacting Robots)

The research activities are also focused in the field of Computational Intelligence (CI) applications. Using CI paradigms problems like biometrics - face detection and recognition, time series prediction or autonomous mobile robot navigation are tackle. For coding purpose, mainly MATLAB and C are employed.

Hardware/Software resources:
➢ General purpose PC compatible computers
➢ DSP boards from Texas Instruments

➢ Microconverter boards from Analog Devices
➢ Software development tools
➢ Prototyping facilities

RESEARCH TEAM

Prof.dr.eng. Alexandru GACSADY
Lect.dr.eng. Catalin CALEANU
Lect.eng. Aurel FILIP
Lect.eng. Calin LAR
Lect.eng. Ioan GAVRILUT
Assist.eng. Laviniu TEPELEA

Contact person
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Researches in *POWER ELECTRONICS*

The main research themes investigated are:

➢ Improvement and development of new high-frequency PWM and resonant dc/dc converter topologies

➢ Elaboration of new power factor correction circuits

➢ New control techniques for power factor correction circuits using classical solutions or neuro-fuzzy controllers

➢ Research on ac-ac matrix converters and the corresponding control methods

➢ Improvement of the electrical drives using active power filters and fuzzy regulators

➢ Research regarding topologies and operation improvement of active power filters
➢ Development of experimental prototypes for the different circuits as resulted from the theoretical research

The research team uses as technical support six PCs, design and simulation software for power electronics, two power analyzers and many other power electronics devices.

For the present, the research team efforts are focused on creating a power quality test center, according to European regulations.

RESEARCH PROJECTS

1. *Intelligent three phase ac power supply,*
104/ 28.09.2007, ANCS – ID1178
Total value: 816.611 lei
Members: Prof. dr. ing. Viorel Popescu
         Prof. dr. ing. Dan Lascu
         Conf. dr. ing. Adrian Popovici
         S.l. Dr. ing. Dan Negoiţescu
         As. ing. Mircea Băbăiţă

INTERNATIONAL PROGRAMMES AND GRANTS

1. **LEONARDO DA VINCI Community Vocational Training Action Programme** *E-learning Distance Interactive Practical Education (EDIPE)* **CZ/06/B/PP-168022**
Value: 25,000 EURO
Director: Prof.dr.eng. Dan LASCU
Members: Prof.dr.eng. Viorel POPESCU
              Assoc.prof.dr.eng. Mihaela LASCU
              Assoc.prof.dr.eng. Adrian POPOVICI
              Lect.dr.eng. Dan NEGOIŢESCU
              Assoc.prof.dr.eng. Adrian POPOVICI
              Assist.eng, Mircea BĂBĂIŢĂ
Partners: Technical University of Brno, SK
              Technische Universiteit Delft, NL
              Technische Universität Wien, AT
              Institut für Elektrische Antriebe und Maschinen, Wien, AT
              Ruhr Universität Bochum, D
              National Technical University of Athens, GR
              Institut National Polytechnique de Lorraine, FR
              Budapest Muszaki es Gazdasagtudomanyi Egyetem, HU
              Fakulta elektrotechniky a informatiky Technická univerzita V Košiciach, SK
              Trencianska Univerzita Alexandra Dubceka v Trencine, SK
              University of Maribor FERI, SL

FIELD AND PROGRAM DESCRIPTION

So far the E-learning and Distance-learning via the Internet, is focusing on information delivery where typically multi-media rich web pages are offered to the student sitting at home in front of the computer, taking lessons in a certain subject, while keeping contact to other students and teacher via e-mail, chat-rooms, on-line tests, etc.
Other issues focus on the style of teaching under the impression of extensive usage of multi-media like videoclips, audio or "slide shows" in the classroom or via distance (Internet). Advanced material use interactivity and combination of text explaining the theory with interactive programs that allow student to do little experiments via a simulator or solving some engineering problems. The rapid changes in society and technology have also generated a demand for more flexible engineers having many more qualifications than just a high level of technical or scientific specialisation. The drawback of a pure theoretical approach in undergraduate electrical engineering (EE) curriculum is that there is paid less attention to the phenomena that loom by laboratory experiments and exploration of system components. The result of this, in combination with the rapid development of computer applications, is that hands-on and laboratory experience vanished and computer

simulations are getting more and more attention. However, it is crucial to let students have some real practice. The real experiment gives the students a sense of practical testing and they can also see the influence of the second/higher order effects, real time effects, effect of parasitics which are difficult or impossible to be simulated perfectly. The reason is that the simulation is always based on more or less simplified model. Therefore it is important to give to the students a real world experience.

However, to build an experiment is expensive and it is impossible for an educational institute to have the complete scale of experiments. From the learner point of view, there is a need for easy accessible hardware experiment. The hardware experiment should therefore be redesigned such that they also can be accessed on the Web. This way the advance in ICT will be combined with the real practical experience.

The proposed virtual or distance laboratory does not present any web-based simulation. It is a real electro-technical experiment conducted in the laboratory but remotely accessed, controlled and monitored by web-based tools. The experiment is either conducted online or based on recorded valued (virtual experiment). It allows students to perform experiment safely, without a guidance and official working hours in the laboratory are not limiting the users. The students can also experience the appearance of the measurement instrument, the electronic components and many more factors such as lay-out. The facility is useful for today's requirement of teaching in the Internet.

The experiments should be not only analysis oriented (to measure and see the results) but also synthesis oriented. It should involve a design aspect. Therefore the measurements are designed as a project with educational philosophy. The technology of such integration is planned to be realised within framework of the project. First of all the technology of such an integration and guidelines to achieve distance Interactive Practical Education will be defined. With this new e-learning tool this technology will be applied to the basic fields of applied electrical engineering starting from fundamentals of EE, through electronics, power electronics, applications of power electronics, dynamics of electro-mechanical systems, including industrial application of electrical drives, motion control and also complex drive systems will be addressed. A complete set of 18 different interactive design oriented virtual or distance laboratories will be prepared with the active participation of the educational expert. This technology will enable us to transfer results of different sectors of education and it will revolutionize education as it is today.

During the kick-off meeting hold in Vienna on November 30th – December 1st the project web page, evaluation group, dissemination plan,

financial management, contents of the materials, selection of software for distance practicals management and a workshop on profect oriented and design oriented education were established.

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RESEARCH TEAM

Prof.dr.eng. Viorel POPESCU – head of the group
Prof.dr.eng. Tiberiu MURESAN
Assoc.prof.dr.eng. Dan LASCU
Lect.dr.eng. Adrian POPOVICI
Lect.dr.eng. Dan NEGOITESCU
Lect.eng. Mircea BABAITA

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Researches in *ELECTRONIC PACKAGING AND TESTING*

The research group in this domain is coordinated by prof. dr. eng. Horia CÂRSTEA, and includes two assistants and three graduated-students. The group established relationships with several regional powerful companies in the electronic packaging field, like SOLECTRON, ABB, TELCO and NOVAR. Also, the group has preferential relations with ALCATEL Network System, Romania in the field of testing electronic equipment.

RESEARCH PROJECTS

1. *Code2Mob,* **Application for coding / de-coding 2D bar codes to access Web services on mobile telephones / platforms**
*Programme: The project represents a **contribution to the implementation of the National Strategy** for Research, Development and Innovation (RDI) and it corresponds to the aim and objectives of Program 4 of The National Plan for Research, Development and Innovation II for 2007-2013*
Total value: 500,000 EURO (48% SIPS, 30% UPT, 28% ATS).
Director: Prof.dr.eng. Horia Calin CARSTEA
Members: Drd.eng. Daniela Mihet
          Drd.eng. Paul Constantinescu
          Dr.eng. Marius Rangu
          Conf.dr. Romeo Negrea
          Drd.eng. Stefan Dumitru
          Eng. Stefan Antoniu
Partners:
o   SIPS Design SRL, Deva, Romania, Coordinator of project
o   Polytechnic University of Timisoara(UPT), Romania, Partner 1

o   Advanced Technology Systems SRL (AST), Targoviste, Romania, Partner 2

FIELD AND GRANT DESCRIPTION

Creating and implementing a platform for mobile telephony. By the Code2Mob application a platform will be implemented which will use the 2D bar codes to access Web Services in SOA architecture, on the mobile telephone. The 2D bar codes will be read with the help of the video camera of the mobile phone. The innovation consists exactly in porting SOA and the Web Services on mobile phones, thus opening unlimited uses of these services. Through the project the platform for Mobile telephony and two demonstrative applications will be created, in two different fields: m-Learning and m-Marketing.

ACTIVITIES AND RESULTS

➢ Execution Phase 1: Analysis of SOA and Web Services, Analysis of 2D barcode
➢ Execution Phase 2, Mathematic Model of 2D barcode, Risk Analysis, Encoder/Decoder Algorithm, WS-SOA-Server's Analysis and Implementation, Market Analysis for Mobile Applications and 2D barcode
➢ Execution Phase 3: Experimental Model for Encoder/Decoder, Specifications of Reader/Writer and Architecture of System, Specification Server GalssFish,

Contact person:
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PhD RESEARCH ACTIVITIES

1. Scientific supervisor *Prof.dr.eng. Virgil TIPONUŢ*

PhD students
➢ Ciprian GAVRINCEA: *Researches on a Neural Network Implementation for Processing the Signals Generated by Muscle System*
➢ Liviu LUCACIU: *Contributions to the Biometric Systems Development and Implementation*
➢ Cristian BURSAŞIU: *Contributions to the Optimization of Neural Network Applications Development.*
➢ Alin BRÎNDUŞESCU: *Contributions to the biological signals simulation using artificial neural networks*
➢ Ionuţ MIREL: *Methods for Digital Video Images Processing*
➢ Călin LAR: *Contributions to the Sensorial Data Fusion*
➢ Sorin POPESCU: *Optimization of the electrical welding process by means of artificial neural networks*
➢ Laviniu ŢEPELEA: *Human-Machine Interface.*

➢ Lucian BUGLEA: *Smart Transducers Array*
➢ Philipp ROEBROCK*, Multi Sensor Controlled Assembly and Application with Manipulators*
➢ Daniel IANCHIŞ
➢ Zoltan HARASZY
➢ Robert LORINCZ
➢ Radu MARŞU
➢ Sebastian MICUŢ
➢ David CRISTEA
➢ Adrian FAULHABER SFARAILA

2. Scientific supervisor: *Prof.dr.eng. Tiberiu MUREŞAN*

PhD students:
➢ Solomon MIMIS: *Integrated Circuits for Transmission Bit Error Rate Measurement*
➢ Petru PAPAZIAN: *Intelligent Subsystems for Optimal Control of Technological Processes*
➢ Dan Mircea ANDREICIUC: *Analysis and Correction Methods for Positioning and Orientation of Mobile Industrial Robots*

3. Scientific supervisor: *Prof.dr.eng. Mircea CIUGUDEAN*

PhD students:
➢ Aurel FILIP: *Researches on CMOS Frequency References*
➢ Marllene DANEŢI: *Propagation time estimation algorithms for noise sources location*
➢ Beniamin DRAGOI: *Researches on CMOS Integrated Digital Correlator Conception and Design*
➢ Radu MIHAESCU, *Telecommunication-system integrated optimum structures based on mobile cellular automatic devices*
➢ Iosif MUDRA: *Researches on CMOS Integrated Fast Synchronous Comparators*
➢ Bogdan MARINCA: *Ultrasonic Investigation Optimization by Algorithms Implemented in Dedicated Integrated Circuits.*
➢ Andrei Paşca
➢ George Rosu
➢ Mircea Tomoroga (*cotutela cu prof.dr.ing. Corneliu TOMA*)

4. Scientific supervisor: *Prof.dr.eng. Viorel POPESCU*

PhD students:
➢ Mircea BĂBĂIŢĂ: *Reaserches on a.c.–d.c. converters*
➢ Cornel GLISICI: *Contributions regarding improved capabilities of uninterruptible power supplies*
➢ Daniel ALBU: *Contributions regarding improved capabilities of switched mode converters with PFC applications*
➢ Lucian PĂUN: *DC/DC converters with optimized energy parameters*

- Adrian ŞCHIOP: *Contributions to theoretical and experimental study of power converters with ac motor drive applications*
5. Scientific supervisor: *Prof.dr.eng. Horia CÂRSTEA*

   PhD students:
- Dumitru MĂRGELOIU: *Contributions to the improvement of electronic equipment for monittoring and controlling of low and medium voltage electrical network parameters*
- Ovidiu MIŢARIU: *Contributions to the improvement of autotesting equipment in digital data conditioning and transmission*
- Corneliu TRIPA: *Contributions to the development of fault diagnose and identification tests in applied electronics equipment*
- Mircea RIF: *Automated system for data acquisition, processing and management in industry*
- Mircea-Florin MIHĂESCU: *Contributions to the development of dynamical diagnose and reconfiguration tests in digital fault redundant systems*
- Liviu ION: *Contributions to the development of digital regulation in electrical driven industrial processes*
- Andy BERCOVICI: *Contributions to the increase of fiability in digital electronics equipment*
- Cornel GLĂVAN: *Contributions to increased security of digital transmissions in special applications.*
- Liviu CHIŞ: *Contributions to pattern recognition test development in automated visual control*
- Călin SÂRBU: *Contributions to predictive test development concerning electrostatic discharge in electronic industry*
- Paul Constantinescu
- Daniela Mihet
- Silvana-Oana Popescu

PHD THESES SUSTAINED

- Marin TOMŞE: *Contributions to theoretical and experimental study of inductive heating power supplies*, Scientific supervisor Prof.dr.eng. Viorel POPESCU
- Corina-Mirela **IVAN:** *Contributions concerning analysis and modeling of switching power converters,* Scientific supervisor Prof.dr.eng. Viorel POPESCU
- Radu-Dan MIHĂESCU**,** *Design of a branch current reference for CMOS integrated circuits*, Scientific supervisor Prof.dr.eng. Mircea **CIUGUDEAN**

PUBLICATIONS

BOOKS
1. Gontean A., *Software for electronics and telecommunications*, Politehnica Publishing House, 2008, 112 pages (published in Romanian).
2. Ionel Sabin, *Pspice Schematic Capture*, Politehnica Publishing House, 2008, 250 pages, ISBN 978-973-625-784-1 (published in Romanian)
3. Dan Lascu, Viorel Popescu,*Power Electronics*, Politehnica Publishing House, 2008, 120 pages (published in Romanian)
4. Dan Negoiţescu, Power Electronics. Applications, West Publishing House, Timisoara, 2008, 184 pages, ISBN 978-973-36-0465-5 (published in Romanian)

PUBLISHED PAPERS
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3. R.Mihaescu, M.Ciugudean, *Second-order temperature - compensated total – current Reference,* Proceedings of the 12-th WSEAS International Conference on Circuits, p.119-124, ISBN 978-960-6766-82-4
4. C. D. Căleanu, V. Tiponuţ, I. Bogdanov, I. Lie, *Emergent Behaviour Evolution in Collective Autonomous Mobile Robots,* WSEAS International Conference on SYSTEMS, Heraklion, Crete Island, Grecia p.428-433, ISBN 978-960-6766-83-1
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6. I Jiveţ, A Brinduşescu, I Bogdanov, *FPGA Implementation of Image Morphological Decomposition with Reconstruction*, Proceedings of 12th International Confeence on Circuits, Heraclion 2008, p.385-391, ISBN 978-960-6766-82-4

7. I Jivet, A Brindusescu, I Bogdanov, *A Perception Oriented Formal Model for 3D Sensors,* Proceedings of 12th International Confeence on Systems, Heraclion 2008, p.227-234, ISBN 978-960-6766-83-1

8. V. Tiponut, S. Popescu, I. Bogdanov, C. Caleanu, *Obstacles Detection System for Visually Impaired Guidance*, Heraklion, Greece, July 22-24, 2008, p.345-349, ISBN: 978-960-6766-83-1 ISSN: 1790-2769

9. Dan Negoiţescu, Dan Lascu, Viorel Popescu, Corina Ivan, *Chaotic Behavior of the Buck-Boost Converter under Current-Mode Control,* Proceedings of the 12th WSEAS International Conference on Circuits, p.125-130, ISBN 978-960-6766-82-4

10. Ioan Lie, Virgil Tiponuţ, Ivan Bogdanov, Sabin Ionel, Cătălin Căleanu, *A Low Cost CPLD-Based Ultrasonic Flowmeter,* WSEAS Transaction on Circuits and Systems, Issue 3, Volume 7, March 2008, p.102-108, ISSN 1109-2734

11. Ciprian Seiculescu, Ioan Lie, Aurel Gontea, *PWM encoding method for wireless communication in sensor networks*, WSEAS Transaction on Circuits and Systems, Issue 4, Volume 7, April 2008, p.194-202, ISSN 1109-2734

12. I Jivet, B Dragoi, *Performance Analysis of Direct Digital Synthesizer Architecture with Amplitude Sequencing,* WSEAS Transaction on Circuits and Systems, Issue1, Vol.7, Jan. 2008, p.1-6, ISSN 1109-2734

13. I. Jivet, B. Drăgoi, *FPGA Implementation of the Curve Generator Algorithm for H/W Acceleration Applications,* WSEAS Transaction on Circuits and Systems, Issue1, Vol.7, Jan. 2008, p.7-12, ISSN 1109-2734

14. I. Jivet, A. Brindusescu, *Real Time Representation of 3D Sensor Depth Images*, WSEAS Transaction on Circuits and Systems, Issue5, Vol.7, May 2008, p.65-72, ISSN 1109-2734

15. I. Jivet, A. Brindusescu, I. Ivan, *Static and Dynamic Abstract Formal Models for 3D Sensor Images*, WSEAS Transaction on Circuits and Systems, Issue9, Vol.7, Sept. 2008, p.844-854, ISSN 1109-2734

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17. Dan Negoiţescu, Dan Lascu, Viorel Popescu, Corina Ivan, *Bifurcation and Chaotic Aspects in Peak Current Controlled Buck-Boost Converters*, WSEAS Transaction on Circuits and Systems,Issue7, Vol.7, July 2008, p.688-697, ISSN 1109-2734

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21. D. Isar, A. Isar, *On the Discrete Wavelet Transform Initialization Errors in Continuous-Time Applications*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53(67), Fasc.2, 2008, p.93-96, ISSN 1583-3380

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RESEARCH INTERESTS

➢ Prof.dr.eng. Mircea CIUGUDEAN: *Conception of Analog Integrated Circuits and their Applications*

➢ Prof.dr.eng. Tiberiu MUREŞAN: *Digital Circuits, Industrial Robot Driving, Switched Mode Power Supplies*

➢ Prof.dr.eng. Viorel POPESCU: *Switched-Mode Power Supplies, Industrial Electronics*

➢ Prof.dr.eng. Virgil TIPONUȚ: *Analog Electronic Circuits, Logic Programmed Systems, Sensors and Transducers, Neural Networks*

➢ Prof.dr.eng. Mihail Eugen TĂNASE: *Doppler Telemetry*

➢ Prof.dr.eng. Ivan BOGDANOV: *Industrial Robots, Computer control of electrical drives*

➢ Prof.dr.eng. Sabin IONEL: *DSP applications, Statistical signal processing. Failure diagnosis*

➢ Prof.dr.eng. Horia CÂRSTEA: *Electronic Technology, Electrical Equipment Testing*

➢ Assoc.prof.dr.eng. Ioan JIVEȚ: *Designing ASIC (VLSI) Circuits, Design of Digital Systems with Micro-Controllers and Micro-Processors, Clinical Applications of Electrical Bio-impedance Tomography*

➢ Prof.dr.eng. Aurel GONTEAN: *Programmed Logic Systems, Digital Circuits*

➢ Prof.dr.eng. Dan LASCU: *High Frequency Power Processors, Power Factor Correction Circuits, Switched-Mode Power Supplies, CAD Design in Power Electronics*

➢ Assoc.prof.dr.eng. Dan ANDREICIUC: *Industrial Robots, Mobile Robots*

➢ Prof.dr.eng. Dorina ISAR: *Industrial Process Control Equipment, Signal Processing for Signal / Noise Ratio Enhancement*

➢ Lect.dr.eng. Lucian JURCA: *Analog Electronic Circuits*

➢ Assoc. prof. dr.eng. Adrian POPOVICI: *Industrial Electronics, Materials for Electronics*

➢ Assoc. prof. dr.eng Cătălin CĂLEANU: *Electronic Devices and Circuits*

➢ Assist.eng. Aurel FILIP: *Analog Electronic Circuits*

➢ Assist.eng. Sorin POPESCU: *Analog Electronic Circuits, Logic Programmed Systems*

➢ Assoc. prof. dr.eng. Ioan LIE: *Electronics, Doppler Telemetry*

➢ S.l..dr.eng. Dan NEGOIȚESCU: *Industrial Electronics, Power Factor Correction Circuits*

➢ Assist.eng. MIRCEA BĂBĂIȚĂ: *Digital Circuits*

➢ S.l.dr.eng. Valentin MARANESCU: *Conception of Analog Integrated Circuits*

➢ Assist.eng. Beniamin DRĂGOI: *Conception of Analog Integrated Circuits*

➢ Assist.eng. Marlene DĂNEȚI: *DSP applications, Statistical signal processing, Failure diagnosis*

➢ Assist.eng. Petru PAPAZIAN: *Digital Circuits*

➢ Assist.eng. Bogdan MARINCA: *Doppler Telemetry*

DEPARTMENT OF COMMUNICATIONS
RESEARCH GROUP IN SIGNAL PROCESSING

RESEARCH FIELDS

➢ Adaptive signal processing
➢ Image processing
➢ Digital watermarking
➢ Time-frequency representations
➢ Wavelets theory applications
➢ Multiresolution analysis
➢ Nonlinear signal processing
➢ Neural networks
➢ Coding
➢ Compression
➢ Communication networks

KEYWORDS

Signals Circuits and Systems, Adaptive Signal Processing, Time-Frequency Representations, Wavelets Theory and Applications, Nonlinear Signal Processing, Neural Networks, Image Processing, Microwave Technique, Theory of Information and Coding, Data Transmission, Modern Communication Networks, Telecommunication Circuits, Digital Signal Processing, Digital Watermarking, Data Transmission on Radio Channels, Mobile Radio Communications

INTERNATIONAL PROGRAMMES AND GRANTS

1. IFREMER Brest France, contract d'étude: 2007 3 30742142

Débruitage des images SONAR

Value: 15.000 Euro
Director: Assoc. prof. dr. eng. Sorin MOGA,
Members: Prof. dr. eng. Alexandru ISAR.

FIELD AND CONTRACT DESCRIPTION

The images obtained using a set of sound or ultrasound transducers such the sea floor images are affected by a multiplicative acquisition noise, called speckle. For the correct interpretation of the information contained in these images, the enhancement of the quality of those images, based on the rejection of the speckle noise is required. For this purpose the wavelets theory is used more often today. An algorithm dedicated to the reduction of the speckle noise has the following steps: the speckle noise is transformed into an additive noise by the computation of the logarithm of the acquired image; the discrete wavelet transform of the obtained result is then computed; then the non-linear filtering of the new result is performed, reducing the noise; the inverse discrete wavelet transform is then computed and the anti-logarithm of the new result is performed. So, the noise-free estimation of the acquired image is obtained. The purpose of this contract is to match this denoising algorithm to the specificities of the sea floor images: the statistics of the information contained, the statistics of the speckle noise, the time required for acquisition. The results obtained were integrated into a software product, called SONARSCOPE, commercialized by IFREMER Brest, which is used by geologists for the interpretation of sea floor images, to study the tectonic changes, for the appreciation of the age of different components or of the relief modifications tendencies or for the ecology or military control of different regions. The SONARSCOPE performances are superior to the performances of other software products already conceived, affecting less the statistics of the useful image contained into the images to be processed, being faster and using less memory.

ACTIVITIES AND RESULTS

Our researches concentrated last year on the choice of the best wavelet transform for sonar image processing. Our first choice was the Double Tree Complex Wavelet Transform (DTCWT). The results obtained were reported in the papers: "Sorin Moga, Alexandru Isar, *SONAR images despeckling using a Bayesian approach in the wavelet domain*, Proceedings of SPIE Conference Photonics Europe, Vol. 7000: Optical and Digital Image Processing, 700029 (Apr. 25, 2008), Strasbourg, France, ISBN: 97808194 71987" and "A. Isar, S. Moga, D. Isar, *Denoising Images Using a New Type of Bishrink Filter*, accepted for publication in Revue Roumaine de Sciences Techniques-Electrotechnique et Energetique".

We have also conceived a new implementation of the Hyperanalytic Wavelet Transform (HWT), which denoising properties are comparable with the properties of the DTCWT. The results obtained in image watermarking using this new implementation were reported at the same international conference "Corina Nafornita, Ioana Firoiu, Jean-Marc Boucher, Alexandru Isar, *A new watermarking method based on the use of the hyperanalytic wavelet transform*, Proc. SPIE Europe: Photonics Europe, Vol. 7000: Optical and Digital Image Processing, 70000W (Apr. 25, 2008), Strasbourg, France, ISBN: 97808194 71987".

The corresponding algorithms were included into a second variant of SONARSCOPE. We have conceived the documentation for this new variant. In this respect we have proposed a diploma project theme, which was selected by Lucia Cerghizan, former student at the master Traitement du signal. She made this project at Telecom Bretagne, cooperating with the specialists from IFREMER Brest. She also organized interviews with the beneficiaries of the first variant of SONARSCOPE, to identify its drawbacks. At this occasion it becomes clear the necessity of a new graphical interface, with a better semantic organization. We have identified solutions based on the last variant of Matlab to build faster the new graphical interface, using Java. Lucia Cerghizan was employed at the end of her contract in France in the department of computers at Telecom Bretagne.

NATIONAL PROGRAMMES

1. ANCS grant type CAPACITATI PN II, 77/CP/II/13.09.2007, year 2008
Improvement of research & development basis in the field of communications at the Faculty of Electronics and Telecommunications, Politehnica University of Timisoara, CDC

Value:	1,312,842 RON
Director:	Prof.dr.eng. Ioan NAFORNITA
Members:	Prof. dr. ing.Corneliu TOMA
	Prof. dr. ing. Miranda NAFORNIȚĂ
	Prof. dr. ing. Alexandru ISAR
	Prof. dr. ing. Andrei CÂMPEANU
	Prof. dr. ing.Marius OTEŞTEANU
	Prof. dr. ing.Vasile GUI
	Prof. dr. ing.Radu VASIU
	Prof. dr. ing. Adrian MIHĂESCU
	Conf. dr. ing. Eugen MÂRZA
	Conf. dr.Florin ALEXA
	Conf. dr. ing. Lorin FORTUNA
	Conf. dr. ing.Corina BOTOCA
	Conf. dr. ing. Georgeta BUDURA
	Asist. drd. ing. Călin SIMU
	S.l. dr. ing Cornel BALINT.
	S.l. dr. Ing. Muguraş MOCOFAN
	S.l. dr. ing Horia BALTĂ
	As. drd. ing. Maria KOVACI
	As. drd. ing. Radu LUCACIU
	As. dr. ing. Nicolae MICLĂU
	As. drd. ing. Janos GAL
	As. drd. ing. Gheorghe-Daniel POPA
	As. drd. ing. Marius OLTEAN
	As. drd. ing. Andy VESA
	S.l. dr. ing. Corina NAFORNIȚĂ

As. drd. ing. Marius SĂLĂGEAN
S.l. dr. ing. Marian BUCOS
As. dr. ing. Ciprian DAVID
As. drd. ing. Mihai ONIȚĂ

FIELD AND GRANT DESCRIPTION

The goal of this project is the endowment of the research & development laboratories of the Communications Department, Faculty of Electronics and Telecommunications (Politehnica University of Timisoara) with modern equipment. These laboratories have as objective the main branches of this particular important R&D domain from the National Strategy entitled Information Technology and Communications. This is one of the most dynamical fields of R&D at the present moment in Romania; it has a contribution of over 10% in the Gross National Product (GNP). The level of development from the west region of the country tends to be closer in this case to the global medium level. An important trend in the field is the development of integrated systems that transmit and process all types of data and information. Both the technology and the technical standards organizations are driving toward integrated public systems that make virtually all data and information sources around the world easily and uniformly accessible. Such a system allows integration of services such as telephony, television, and data communications. Computer networks are being widely used as architecture of a communications system.

ACTIVITIES AND RESULTS

New investments in the infrastructure of Research-Development-Innovation were made. The value of the contract for the year 2008 was 1312842 RON.
The lab of Signals and Systems developed a contract with a telecommunications industry leading firm, Alcatel-Lucent, with a value of 54000 RON. The acquisitions for the entire department of Communications, made throughout 2008, consisted of:

➢ System for controlled access for eight laboratories, using card access, card access and PIN code or only PIN code, memory of 1000 transactions, Qty: 1, 8800 RON
➢ Scanner/copy machine/printer HP/LaserJet 3035, format A4, resolution 1200x1200 dpi, interface USB 2.0, volume 75000 pages/month, Q 7051A, 6885, Qty: 1, 6885 RON
➢ Smart boards with intelligent screen CCD, Panasonic UB5315-G, diagonal 61'', Qty: 6, 27833 RON
➢ Equipment for video-conference, POLYCOM, connected to PC, ImageShare II, maximum transfer via IP – 2 Mb/s, integrated video camera video, Qty: 7, 172200 RON
➢ Video camera Canon DM-XM2, resolution 3 CCD, optical zoom 20x, digital zoom 100x, Qty: 1, 8476 RON

➢ Printers HP LaserJet P2015N, monochrome, resolution 1200x1200, Q7553A/X, Qty: 6, 6613 RON
➢ Desktop PC, CPU INTEL - Intel Core2 Duo E6400, 2,13 GHzx1066 MHz, Qty: 32, 72582 RON
➢ Monitors, 19" YAKUMO XPT, LCD, TFT, 500:132 pieces, 27187 RON
➢ Antivirus software, NOD 32 Antivirus, Qty: 32 licenses, 4576 RON
➢ Laptop, Intel Mobile Pentium 4, 2.8 GHz, 128 KB L2 cache I, Memory RAM-1x512 MB, Hard disk-40 GB, Qty: 32, 128000 RON
➢ PDA, OS: Microsoft Windows Mobile 2003, memory slots SD, Mini SD, touch-sensitivity display-minimum 3,0", USB 1.1 Client, Integrated IrDA (SIR) , Serial RS232, integrated GSM/GPRS, integrated GPS, receiver Bluetooth, integrated camera Built-in SXGA, 1.3 MP, resolution 1280x1024, Qty: 32, 73600 RON.
➢ Scanner, HP ScanJet 5530, resolution 2400 dpi, Qty: 6; 6029 RON.

The acquisitions for the laboratory of **Information Theory and Coding (room B219)** made throughout 2008 consisted of:

➢ Desktop PC, CPU INTEL - Intel Core2 Duo E6400, 2,13 GHzx1066 MHz, 2M, LGA, 15 pieces, 34023 RON
➢ Monitor, 19" YAKUMO XPT, LCD, TFT, 500:1, Qty: 16, 13600 RON
➢ Server IBM System X3400-797514G, Qty: 1, 4800 RON
➢ Antivirus software, NOD 32 Antivirus, Qty: 16 licenses, 2290 RON
➢ License software Matlab/Simulink Classroom, Qty: 10 licenses, 7811 RON
➢ Laptop Intel, Processor-Intel Mobile Pentium 4, 2.8 GHz, 128 KB L2 cache I, Qty: 1, 4000 RON

The laboratory of Information Theory and Coding (room B219)

➢ Video projector, NEC VT-47, Microportable, SVGA 800x600, 1500 ANSI lumen, contrast 400:1, weight 2.9 kg, Qty: 1, 3700 RON

➢ Tripod projection screen 1,25*1,25 m, Qty: 1, 250 RON

➢ USB wireless adaptor, AirLive Turbo G USB adapter, 2X speed of 11g, 802.11e&WMM, Qty: 16, 944 RON

➢ Microwave Technology Training System (8090), Qty: 1 license, 50.000 RON

The laboratory of Information Theory and Coding (room B219)

The acquisitions for the laboratory of **Radio communications (room B714)** made throughout 2008 consisted of:

➢ Programmable Oscilloscope OD582, Qty: 3, 29998 RON

➢ Programmable frequency generator 2GHz, GR205, Qty: 1, 19999 RON

➢ Spectrum analyzer, AE967, Qty: 1, 32371 RON

➢ Radiofrequency analyzer, AC725, Qty: 1, 24928 RON

➢ Equipment for studying the systems of telecommunications, EC796, Qty: 1, 8970 RON

➢ Systems for studying TV antenna, EA815G, Qty: 1, 25904 RON

➢ Dipole antenna, AM03, Qty: 2, 1195 RON

The laboratory of Radiocommunications (room B714)

➢ Equipment for research in digital telecommunications, EF970E, OP97001, OP97002, Qty: 1, 42672 RON

➢ Equipment for research in analogue telecommunications, KL900A, Qty: 1, 13382 RON

➢ Equipment for research in analogue telecommunications, KL900B, Qty: 1, 10581 RON

➢ Equipment for studying the systems of emission reception AM/FM, KL900C, Qty: 1, 5977 RON

➢ Equipment for research in Bluetooth transmission, BT2001, Qty: 1, 17986 RON

➢ AM/FM 108 radiokit, Qty: 20, 7900 RON

➢ Matlab/Simulink Classroom, 10 users, software license, Qty: 1, 9000 RON

➢ LabView software license, Qty: 1, 9000 RON.

The laboratory of Radiocommunications (room B714)

B712b-The research laboratory

B712a-Research laboratory

RESEARCH PROJECTS

1. CNMP PN II, nr. 51-102, Title: *New piezoelectric sensors based on α-quartz type materials, for safety and quality control food industry*

Value: 2.000.000 RON
Director: Lect. dr.eng. Nicolae MICLĂU
Members: PhD Stud. Alexandru BOLTOSI
             Tehn. Virgil POPOVICI

FIELD AND GRANT DESCRIPTION: The current project follows as objectives solving the next underlined scientific and technological problems, pursuing the main objectives of Program 4:

- Obtaining new piezoelectric single crystalline materials of higher quality, such as α-Quartz $Si_{1-x}Ge_xO_2$ and $A_{1-x}B_xO_4$ (A = Al, Ga ; B=Fe), using hydrothermal crystal growth method at high pressures and temperatures, in alkali and acid medium.
- Designing, creating and testing the new improve piezoelectric sensor perceptible to ammonia or organic amines and also the control and monitoring apparatus.
- Creating and improving a prototype of the piezoelectric sensor, perceptible to ammonia or organic amines and also the control and monitoring apparatus suitable for food industry.
- Informing the business media on partial and final project results.
- Scientific excellency elicitation and international projects cooperation extension

Achieving such aims would lead to a further more development of piezoelectric sensors field, by implementing a novel single crystalline piezoelectric layer based on new α-Quartz type materials, superiors as quality to classic α-Quartz, and also by a practical extension of these materials in quality control and food security.

Also, the project strongly seeks realizing and developing a regional partnership among reference national research and development institutions specialized in synthesis and material characterization, electronic, agronomy and food industry processing technology

ACTIVITIES AND RESULTS
On national and international level of research in the field of piezoelectric sensors, the project aims to accomplish the following activities:

- increasing the performances of piezoelectric sensors (nanogrames sensibility), by obtaining single crystal α-Quartz type plates materials $Si_{1-x}Ge_xO_2$ and $A_{1-x}B_xO_4$ (A = Al, Ga ; B=Fe) using hydrothermal crystal growth method at high pressures and temperatures, in alkali and acidic medium.
- Increasing the efficiency of piezoelectric sensor in detection of ammonia and organic amines followed as a result of food alteration.

- Decreasing the size of the sensor and costs.
- Realizing and patenting a piezoelectric prototype sensitive to substances associated with food alteration.
- Extending the applicability of new and improved piezoelectric sensors in the detection of pathogen micro-organisms associated with food alteration.
- *Industrial research results:*
  R1. Bibliographic study on piezoelectric materials, "state of art" evaluation on processing technologies and sensors applications.
  R2. Projects on laboratory technologies suitable for growing single crystal α-Quartz type materials $Si_{1-x}Ge_xO_2$ and $A_{1-x}B_xO_4$ (A = Al, Ga ; B=Fe), and piezoelectric sensor perceptible to ammonia or organic amines;
  R3. High quality α-Quartz type piezoelectric single crystals;
  R4. Single crystal oriented piezoelectric plates cut from bulk high quality single crystal α-Quartz type materials $Si_{1-x}Ge_xO_2$ and $A_{1-x}B_xO_4$ (A = Al, Ga ; B=Fe);
  R5. Quantification of structural and piezoelectric proprieties of single crystal oriented piezoelectric plates cut from bulk high quality single crystal α-Quartz type materials $Si_{1-x}Ge_xO_2$ and $A_{1-x}B_xO_4$ (A = Al, Ga ; B=Fe);
  R6. Piezoelectric sensor perceptible to ammonia and organic amines and control and monitoring apparatus;
  R7. Experimental prototype which quantify the influence of chemical composition, structural parameters, crystallographic axes, quality, plates thickness and the influence of the nature of sensitive material to ammonia and organic amines on to the performances of the piezoelectric;
  R8. Preliminary experimental study on the sensibility of the prototype to pathogen micro-organisms from food;
- *Laboratory research results:*
  R9. Project of novel piezoelectric sensor based on new α-Quartz type materials perceptible to ammonia and organic amines, project on control and monitoring apparatus;
  R10. Prototype of novel piezoelectric based on new α-Quartz type materials perceptible to ammonia and organic amines, project on control and monitoring apparatus;
  R11. National patent and EPO.
- *Support activities results:*
  R12. Interactive web page of the project;
  R13. Scientific paper published in ISI indexed reviews, sustained by national and international conferences;
  R14. National and european projects propositions;

R15. Study support, monographies, published materials;

R16. Master and doctoral thesis papers;

R17. Forming and specializing courses specially dedicated to young researchers, students, master and doctoral students in the field of piezoelectric sensors related to food industry.

R18. Workshop and yearly conferences dedicated to economic medium.

Contact person:
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2. CNCSIS grant A, contract no. 98GR/11.06.2008, CNCSIS code 342, Title: *Neural Networks Based System For The Diagnosis And Prognosis Of Urological Deseases*

Value:　　20.000 RON
Director:　Assoc.prof.dr.eng. Corina Botoca
Members:　Prof.dr.eng. Gui Vasile
　　　　　　Assoc.prof.dr.eng.Budura Georgeta
　　　　　　Assoc.prof.dr.eng.Alexa Florin
　　　　　　Assoc.prof.MD.Bucuras Viorel, UMF
　　　　　　Assoc.prof.MD.Dema Alice, UMF
　　　　　　Lecturer MD.Botoca Mircea, UMF
　　　　　　Asist eng. Miclau Nicolae
　　　　　　Ass. MD.Cumpanas Alin, UMF
　　　　　　Ass. MD.Bardan Razvan, UMF
　　　　　　MD.Dragoi Razvan, UMF

FIELD AND GRANT DESCRIPTION

Thematic area: Advanced informatics systems and models for the assistance of medical diagnosis and preventive medicine. The deseases diagnosis and prognosis are usually realized by analyses and processing of clinical information. When the volume and the variety of the information become too demanding for the clinician, the need for supportive statistical prediction methods emerges. When the classical methods, like statistical modeling, are failing, due to the computational complexity and to the long processing time, the neural networks (NN) could offer effective solutions, being able to perform real-time prediction of the deseases diagnosis and prognosis of a particular patient.

Our project developed and validated a neural integrated system, in an adequate programming medium, capable to offer solutions to some urological problems. The proposed system is a package of complex analyses and evaluation programs, similar with the evaluation-decision model from the clinical medicine.

The system inputs are variables carefully selected, with different weights, obtained from the real situations and readily comparable with the real, functional, clinical models. In order to collect the clinical data necessary to develop a diagnosis and prognosis system for urology, clinical trials have been completed, on patients with prostate cancer, bladder cancer, kidney cancer, benign prostatic hyperplasia and urinary lithiasis. The project data base acquired is unique in the country and has a special importance for the urological and oncological research. Models of clinical urological applications have been developed using various NN architectures, such as multilayers perceptrons, radial basis function NN, competitive NN and recurrent NN. A comparison of the performance of different NN architectures and training algorithms has been accomplished and the model with the best accuracy/complexity ratio was selected, in each particular case, in order to be integrated into our diagnosis and prognosis system.

The experience acquired by the team was and will be shared with other interested research teams, forming a national research community in the field of neural networks applications in medicine.

ACTIVITIES AND RESULTS

The research team has completed during this year the data base for the neural system. A rigorous comparative study on the performance of different NN architectures and training algorithms has been performed in order to establish the best structure in each of urological diagnosis or prognosis application.

Scientific contacts with researches having the same preoccupations have been maintained by the participation of some researches to the "The 23rd EAU. Congress", which took place in Milan, Italy between 25-30 March 2008. The project manager has participated to a course having a subject similar with our project theme "Predictive Modelling in Prostate Cancer" 17-19 April, Venice, Italy. This mobility was partially sustained from the project resources. Also others two members of the team participated to the above mentioned course and have established new scientific contacts with researchers having similar preoccupations.

The team researchers were partially financially sustained to pay the dues to international organizations, respectively at the IEEE, EAU and SIU from the project resources. This gave easy access to prestigious publications permitting an up to date documentation.

Some chemical and laboratory materials necessary for the clinical trials have been acquired.

It is on the way of publishing a book entitled "Atlas of macro- and microscopically images from the tumour urological pathology. Methods of images processing and interpretation" authors. A. Dema M. Botoca, V. Bucuras, A. Cumpanas, R Bardan, C.Botoca, V. Gui, F.Alexa, Politehnica Publishing House, 2008, ISBN 978-973-625-563-2. The images book represents a novelty in the medical literature in the country. This book offers to the ones interested a collection of typical and

also exceptional images from the uro-neoplasycal pathology, acquired during the research. The chapter of images processing is addressing to the students and engineers interested in developing applications in computer assisted medicine.

During 2008 two licence papers concerning the bladder and kidney pathology and a dissertation on the cancer staging using neural networks were conceived.

The research team have sustained and published a number of 12 papers to national and international conferences, in prestigious revues, mentioned in scientific data bases recognised by the international scientific community.

3. CNCSIS grant TD (PN2 program), code 403, contract no 1/01.10.2007

Radio channels transmission optimization techniques.
Value: 42,498 RON (28,332 on 2008)
Director: Teach assistant Marius Oltean

FIELD AND GRANT DESCRIPTION
The wireless access techniques have known an impressive expansion in the recent years. Most of these solutions rely on the muti-carrier approach for signal transmission at physical layer. The most successful muti-carrier version is Orthogonal Frequency Division Multiplexing (OFDM), used by a large number of standardized solutions, such as WiFi, WiMAX, DAVB etc.

Despite its indubitable advantages, OFDM shows some drawbacks too. Recent research has shown that, by associating the multi-carrier concept and the wavelet signals, some of the OFDM's classical drawbacks can be counteracted. Several versions of new transmission technique, referred to as wavelet modulation (or Wavelet OFDM) were proposed in the recent years. Most of the research activity associated with this grant is focused on the study of this modern multi-carrier approach.

ACTIVITIES AND RESULTS
The main objectives of the research in this year were focused on the following directions
➢ A comparison between the classical version of OFDM and the wavelet modulation
➢ An extensive study of WOFDM from the BER performance point of view, in various types of channels
➢ An empirical study whose objective was to reveal how, and to what extent, some parameters of the WOFDM transmission can impact the system's performance (namely the wavelets mother and the number of Inverse Discrete Wavelet Transform iterations)

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marius.oltean@etc.upt.ro

4. *CNCSIS grant TD-24, nr. 189/09.10.2007 Contributions to the application of Kalman filtering in communications*

Value: 35.400 RON (*28.320 for 2008*)
Director: Assist. eng. Gal Janos

FIELD AND GRANT DESCRIPTION
Polynomial phase signals (PPS) are frequently encountered in many signal processing applications such as in radar, sonar, laser velocimetry or telecommunications. There are non-stationary signals having a fast-varying instantaneous frequency. The estimation of the parameters of PPS signals affected by additive Gaussian noise has received considerable interest in signal processing literature and several methods formulated as linear system identification problems, have been used to solve the problem. These approaches admit the solution in the form of a linear Kalman filter which is the optimal tracking algorithm when the signal models are assumed linear and both state and observation noise are additive and Gaussian.
A linear state model can be obtained by the approximation of Tretter which regards as uncorrelated both amplitude and phase components of the gaussian noise.
As the Tretter linear state model works satisfactorily as far as the signal-to-noise ratio (S/N ratio) exceeds 13dB, at lower levels of S/N ratios will be used nonlinear state models and Extended Kalman Filtering (EKF) procedures which considers a local linearization that uses a first order Taylor expansion of nonlinear equations.
This research gives a new state space model of variable amplitude polynomial phase signals that allows better performances for EKF algorithm than the old linear Kalman method. The robust EKF implemented on this model extends the range of performances of Kalman algorithms in the polynomial phase estimation from a S/N ratio of 13dB to 5dB.

ACTIVITIES AND RESULTS
I considered an estimation method based on an approximate linear state space representation of the polynomial phase signal. This approach offers the opportunity to use a nonlinear but exact measurement equation and guide the estimation of the states of these signals to an extended Kalman filtering algorithm. Procedure simulations were made on linear and quadratic phase modulation signals with time-varying amplitude and are consistent with the theoretical approach. The results given by this new algorithm are compared with the performances of a standard Kalman technique.
Some diversification results were developed in the paper "Gal Janos, Campeanu Andrei, Nafornita Ioan*, Identification of Polynomial Phase Signals by Extended Kalman Filtering*, EUSIPCO 2008, 16th European Signal Processing Conference, 25-29 August, 2008, Lausanne, Switzerland"

5. Alcatel-Lucent Timisoara, contract nr. 1984910/4945, 2008, *Interference Reduction in WiMAX Technology*

Value: 54.000 RON
Director: Prof. dr. eng. Alexandru ISAR,
Members: Assist. Prof. Horia Balta,
Assist. Maria Kovaci,
Assist. Marius Oltean,
Assist. Marius Salagean.

FIELD AND CONTRACT DESCRIPTION
WiMAX represents the last network communication technology. Despite its revolutionary advancements, the performance of this new technology is penalized by the presence of interferences. The goal of this contract is the identification of the interference sources, the definition of a new signal quality measure which takes into account the interferences, the signal to interference plus noise ratio (SINR), the estimation of the effects of interferences in the reduction of performance (for example the influence on traffic) and the identification of the solutions to reduce the interference.

ACTIVITIES AND RESULTS
First we have made a theoretical analysis, reported into the document: "M. Kovaci, H. Balta, M. Oltean, M. Salagean, A. Isar, *How could be better defined an effective CINR for multi-carrier modulation user in order to effectively determine the link error performance obtained ?*". We exploited the results by publishing some revue articles: "M. Oltean, M. Kovaci, H. Balta, A. Campeanu, *Multy Binary Turbo Coded WOFDM Performance in Flat Rayleigh Fading Channels*, ACTA Technica Napocensis, 3/2008, 9-14" and "H. Balta, D. Bosneagu, M. Kovaci, M. Oltean, *A Study of the Permutation Schemes Used in the Mobile WIMAX*, ACTA Technica Napocensis, 3/2008, 15-18".
Next we have conceived a physical level WiMAX network simulator in Matlab.
Finally, we have studied the traffic of a WiMAX network and we have written the rapport "I. Firoiu, C. Stolojescu, A. Isar, *Forecasting of WiMAX BS Traffic: Observations and Initial Models*".

PUBLICATIONS

BOOKS
1. Corina Nafornita, *Contributions to image transparent watermarking in wavelet domain, Contributii la marcarea transparenta a imaginilor in domeniul transformatei wavelet*, PhD Thesis, Politehnica Publishing House, 240 pages, ISSN 1842-7014, ISBN 978-973-625-774-2

2. Corina Nafornita, *Culegere de probleme de teoria probabilitatilor si procese aleatoare*, Manual pentru student, http://hermes.etc.upt.ro /corina/probabilitati.pdf, 46 pages, published online

3. Ioan Nafornita, *Estimation Theory Based on Model*, Politehnica Publishing House, 332 pages, ISBN 978-973-625-797-1

PAPERS
1. G. Budura, C. Botoca, *Efficient Implementation and Performance Evaluation of the Second Order Volterra Filter Based on the MMD Approximation*, WSEAS Transactions on Circuits and Systems, Issue 3, Vol.7, March 2008, pp.139-149, ISSN 1109-2734

2. I. Buciu, I. Pitas, I. Nafornita, *Global Gabor features for rotation invariant object classification*, Proceedings of IEEE Fourth International Conference on Intelligent Computer Communications and Processing, 28-30 Aug. 2008, Cluj-Napoca, pp.41-46, Digital Object Identifier 10.1109/ ICCP. 2008. 4648341

3. A. Câmpeanu, J. Gal, *Building Universal Curent-mode Biquad Active Filters using CMOS Transconductance Elements*, Proceedings of Fourth European Conference on Circuits and Systems for Communications, Bucuresti, 10-11-iulie, Romania, pp.63-67, ISBN 978-606-521-043-1

4. C. Nafornita, I. Firoiu, J.-M. Boucher, A. Isar, *A New Watermarking Method Based on the Use of the Hyperanalytic Wavelet Transform*, Proc. SPIE Europe: Photonics Europe, vol. 7000: Optical and Digital Image Processing, 7-9 April 2008, Strasbourg, France, 70000W-1-70000W-12, ISBN 978-081-947-198-7

5. S. Moga, A. Isar, *SONAR Images Despeckling Using a Bayesian Approach in the Wavelet Domain*, Proc. SPIE Europe: Photonics Europe, vol. 7000: Optical and Digital Image Processing, 7-9 April 2008, Strasbourg, France 700029-1-700029-12, ISBN 978-081-947-198-7

6. Marius Oltean, *On the Wavelet OFDM Performance in Time Variant Channels: Choosing the Number of DWT Iterations*, Recent Advances in Data Networks, Communications, Computers, Proceedings of the 7th WSEAS Conference on Data Networks, Communications and Computers, Bucuresti, Romania, 2008, pp.85-90, ISBN 978-960-474-020-8 (ISSN: 1790-5109)

7. Oltean M., Kovaci M., Baltă H., Câmpeanu A., *Multi Binary Turbo Coded WOFDM Performance in Flat Rayleigh Fading Channels*, Acta Technica Napocensis-

Electronics and Telecommunications, Vol. 49, nr. 3, pp. 9-14, ISSN 1221-6542

8. Nafornita C., Isar A., *Watermarking Based on the Hyperanalytic Wavelet Transform*, Acta Technica Napocensis - Electronics and Telecommunications, Vol. 49, nr. 3, pp. 19-26, ISSN 1221-6542

9. H. Balta, D. Bosneagu, M. Kovaci, M. Oltean, *A Study of the Permutation Schemes Used in the Mobile WiMAX*, Acta Technica Napocensis – Electronics and Telecommunications, Vol.29, Nr.3/2008, pp. 15-18, ISSN 1221-6542

10. M. Oltean, M. Kovaci, H. Baltă, A. Câmpeanu, *Multi Binary Turbo Coded WOFDM Performance in Flat Rayleigh Fading Channels*, Acta Technica Napocensis – Electronics and Telecommunications, Vol.29, Nr.3/2008, pp. 9-14, ISSN 1221-6542

11. I. Buciu, I. Nafornita, I. Pitas, *Facial expression recognition under noisy environment using Gabor filters*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc. 2, pp. 76-79, ISSN 1583-3380

12. C. Simon, M. Nafornita, *Network-wide Proportional Services*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc. 2, pp.161-166, ISSN 1583-3380

13. D. Isar, A. Isar, *A New Time-Frequency Adaptive Filter*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc. 1, pp.115-118, ISSN 1583-3380

14. D. Isar, A. Isar, *On the Discrete Wavelet Transform Initialization Errors in Continuous-Time Applications*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc. 2, pp.93-96, ISSN 1583-3380

15. C. Nafornita, A. Isar, *Hyperanalytic Wavelet-Based Watermarking*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc. 2, pp.189-197, ISSN 1583-3380

16. Marius Salagean, *A New Processing Algorithm For the Time-Frequency Mathematical Morphology Operators Method*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on

Electronics and Communications, vol. 53 (67), fasc.2, pp. 198-200, ISSN 1583-3380

17. A. Câmpeanu, J. Gal, *Electrically tunable CMOS Biquad Cells Implementation of High-Order Filters*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc. 2, pp. 63-67, ISSN 1583-3380

18. Georgeta Budura, Cornel Balint, Eugen Marza, *Blocking Probabilities in GSM/GPRS Cellls with Different Radio Resources Allocation Strategies*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc. 2, pp. 85-92, ISSN 1583-3380

19. A.Vesa, A.Iozsa, *Directivity Pattern for Linear Arrays*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc. 2, pp.173-176, ISSN 1583-3380

20. M. Oltean, *In Depth Analysis of Wavelet Modulation Performance in Flat Fading Channels: Choosing the Wavelets Mother*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), Tom 2, pp.167-172, ISSN 1583-3380

21. M. Oltean, *A Study of the Multi-Scale WOFDM Transmission in Time Variant Channels*, INTERNATIONAL JOURNAL OF COMMUNICATIONS, Issue 1, Vol. 2, pp. 96-105, ISSN 1998-4480

22. H. Balta, A. de Baynast, M. Kovaci, *On the Encoding of the Multi-Non-Binary Convolutional Codes*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53 (67), Fascicola 2/2008, pp. 183-188, ISSN 1583-3380

23. Janos Gal, Andrei Campeanu, Ioan Nafornita, *Identification of Polynomial Phase Signals by Extended Kalman Filtering*, EURASIP, EUSIPCO 2008, 16th European Signal Processing Conference, Lausanne Switzerland, http://www.eurasip.org/Proceedings/Eusipco/Eusipco2008/papers/1569099206.pdf4 pag. CD

24. I. Buciu, I. Pitas, I. Nafornita, *Holistic and Local Image Representations for Human Face Analysis-part I*, Proceedings of Communications 2008 Workshop "New Technologies and Trends in IT and

Communications, Jun 5-7, 2008, Bucharest, pp. 137-140, ISBN 978-606-521-008-0

25. I. Buciu, I. Pitas, I. Nafornita, *Holistic and Local Image Representations for Human Face Analysis-part II*, Proceedings of Communications 2008 Workshop "New Technologies and Trends in IT and Communications, Jun 5-7, 2008, Bucharest, pp. 141-144, ISBN 978-606-521-008-0

26. I. Nafornita, C. Nafornita, A. Isar, M. Borda, *Perceptual Watermarks in the Wavelet Domain*, Proceedings of Communications 2008 Workshop "New Technologies and Trends in IT and Communications, Jun 5-7, 2008, Bucharest, pp.19-28, ISBN 978-606-521-008-0

27. Alis Dema, Sorina Taban, Elena Lazar, M. Botoca, Corina Botoca, *Caracteristici imunohistochimice ale focarelor de PIN de grad inalt*, Cel de-al IX-lea Congres National al Societatii Romane de Morfologie, Craiova, 28-31 mai 2008, Volumul de rezumate al lucrărilor pp. 196

28. Alis Dema, Sorina Taban, Mihaela Iacob, M. Botoca, Corina Botoca, V. Bucuras, R. Bardan, *Studiul unor markeri IHC de agresivitate in carcinoamele uroteliale* , Cel de-al IX-lea Congres National al Societatii Romane de Morfologie, Craiova, 28-31 mai 2008, Volumul de rezumate al lucrărilor, pp.197

PhD RESEARCH ACTIVITIES

1. *Scientific Supervisor: Prof. dr. eng. Ioan NAFORNIŢĂ*

    PhD students
- Mirela BIANU, *Contributions on adaptive signal processing in telecommunications*
- Ciprian DAVID, *Contributions on faults detection using image processing techniques*
- Romulus REIS, *Non-Stationary Signal Description by Non-Parametrical Method*
- Janos GAL, *Contributions on Kalman Filters Use in Telecommunications*
- Marius SALAGEAN, *Non-Stationary Signal Description by Non-Parametrical Method*
- Andy VESA, *Improvement of Digital Radio Systems Detection*,
- Mircea COSER, *Systems Optimization using TRIZ Technique*,
- Teodora PELA, *Traffic Optimization on Metropolitan Area Networks*,
- Adina DABA, *Non-Stationary Signal Description by Non-Parametrical Method*,
- Florin Dumitru CHIS, *Improving Security Level In Broadband Networks*.
- Arpad IOZSA, first year student.
- Mirela MIOC, first year student.

- Ioan Marius BUCIU, *Human Face Analysis(cotutela cu prof. Ioanis PITAS - Aristotle University of Thessaloniki)*
- Daria Ioana BATIU

2. *Scientific Supervisor: Prof. dr. eng. Miranda NAFORNIŢĂ*

    PhD students:
- Horia BALTA, *Hierarchical coding for spread spectrum transmission systems*
- Radu LUCACIU, *Optical communication systems with OCDMA*
- Maria KOVACI, *N-PSK multiresolution modulations in the COFDM hierarchical systems*
- Mirela VIOR, *Quality transmission improvement using turbo codes*
- Sorin POPA, *Synchronization techniques improvement for radio channel transmission systems*
- Marius OLTEAN, *Radio channel equalization using cyclic prefix*
- Florin Lucian MORGOS, *Radio channels equalization techniques improvement*
- Florin VANCEA, *Data Protection in Communication Networks*
- Simu Călin
- Ezri Norbert
- Mangri Marin

3. *Scientific Supervisor: Prof. dr. eng. Alexandru ISAR*

    PhD students:
- Ioana Firoiu (Adam), *Despeckling of sonar images by multi-resolution filtering*
- Cristina Stolojescu, *Data minning in communications*
- Lucian Ardelean (first year student),
- Mircea Bora, *WiMAX technologies*

    PHD THESIS SUSTAINED

- Ioan BUCIU, *Human Face Analysis*, PhD advisor: Prof. dr. eng. Ioan NAFORNITA and Prof.dr.eng. Ianis PITAS (Aristotle University of Thessaloniki)

- Ciprian DAVID, *Détection d'hétérogénéités linéaires dans les textures directionnelles– Application à la détection de failles en sismique de réflexion*, PhD advisors: Prof.dr.eng. Ioan NAFORNITA and prof.dr.eng. Yannick BERTHOUMIEU (Université Bordeaux I)

- Corina NAFORNITA, *Contributions to digital watermarking of still images in the wavelet transform*, PhD advisors : prof.dr.eng. Monica BORDA (Tehnical University of Cluj-Napoca) and prof. dr. eng. Alexandru ISAR

➢ Horia BALTA, *Contribuţii la dezvoltarea şi proiectarea turbo-codurilor binare şi nebinare* PhD advisor: Prof. dr. eng. Miranda NAFORNITA

RESEARCH TEAM

➢ Prof.dr.eng. Ioan NAFORNIŢĂ: *Signals, Circuits and Systems, Adaptive Signal Processing, Time-frequency Representations, Wavelets Theory's Applications, Microwave Techniques, Image processing, Digital watermarking*

➢ Prof.dr.eng. Miranda NAFORNIŢĂ: *Theory of Information and Coding, Data Transmission, Signals, Circuits and Systems, Modern Communication Networks*

➢ Prof.dr.eng. Alexandru ISAR: *Signals, Circuits and Systems, Wavelets Theory's Applications, Time-frequency Representations, Compression, Coding*

➢ Prof.dr.eng. Andrei CÂMPEANU: *Telecommunication Equipment Technology, Telecommunication Circuits*

➢ Assoc. Prof. dr. eng. Corina BOTOCA: *Microwave Techniques, Signals, Circuits and Systems, Neural networks*

➢ Assoc.Prof.dr.eng. Georgeta BUDURA: *Signals, Circuits and Systems, Nonlinear Signal Processing, Telecommunication Circuits*

➢ Lect.dr.eng. Cornel Balint: *Speach coding, Telecommunications network, Digital Switching*

➢ Assist.eng. Horia BALTĂ: *Optical Transmission and Processing of Information, Statistical Theory of Information Transmission, Theory of Information and Coding*

➢ Assist.eng. Maria KOVACI: *Statistical Theory of Information Transmission, Theory of Information and Coding, Signals Circuits and Systems*

➢ Assist.eng. Janos GAL: *Signals, Circuits and Systems, Telecommunication Circuits*

➢ Assist.eng. Radu LUCACIU: *Optical Transmission and Processing of Information*

➢ Assist.dr.eng. Nicolae MICLĂU: *Optical Transmission and Processing of Information, Theory of Information and Coding*

➢ Assist.dr.eng. Corina NAFORNIŢĂ: *Digital Signal Processing, Digital Watermarking*

➢ Assist.eng. Marius OLTEANU: *Data Transmission on Radio Channels*

➢ Assist.eng. Marius SĂLĂGEAN: *Signals, Circuits and Systems*

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RESEARCH GROUP IN IMAGE PROCESSING AND MULTIMEDIA TECHNOLOGIES

RESEARCH FIELDS

➢ Television and Digital Television
➢ Image Compression
➢ Digital Image Processing
➢ Motion Analysis
➢ Pattern Recognition
➢ Interactive Multimedia Techniques
➢ Media Streaming
➢ Multimedia Databases
➢ Internet Security Techniques
➢ E-learning
➢ Advanced learning technologies
➢ WWW, Hypermedia and Internet

INTERNATIONAL PROJECTS

1. LLP project: *"VICADIS – Virtual Campus for Digital Students",* Agreement **2007-2611/001-001,** Project number **134039-LLP-1-2007-1-RO-ERASMUS-EVC**

Director: Prof.dr.eng. Radu VASIU
Value: 365.747 EURO
Members: Assoc.lect.eng. Diana ANDONE
                Lect.dr.eng. Mugur MOCOFAN
                Assist.eng. Marian BUCOS
                Assist.eng. Mihai ONITA
                Eng. Marius CONDREA
                Lucia RAZMERITA, journalist
                Cristian TECU, PhD student
                Iasmina ERMALAI, PhD student
                Andrei TERNAUCIUC, PhD student
                Bogdan DRAGULESCU, PhD student
Partners: University of Palermo, Italy
                Baltic Education Technologies Institute, Lithuania
                University of Miskolc, Hungary
                Oulu University of Applied Sciences, Finland
                University of Brighton, UK
                VISIONI Di Caro arch. Ernesta, Italy
                Euro-Contact Business School, Hungary
                BRIDGEMAN SRL, Romania
                JME Associates Ltd, UK

FIELD DESCRIPTION

The main objective is to build a virtual campus for digital students aimed at providing open educational resources and tools available and accessible for all students and ensuring the interoperability between the different eLearning environments used in the partner universities.

Aims of the project:

• To overview and implement emerging tools and technology commonly referred to as "social software" that can create personal as opposed to institutional learning environments, as well as the mobile learning tools

• To support practitioners in becoming aware of the new features of the digital students, to learn to effectively use and develop resources with new digital technologies and new communication tools in ways that are aligned with what they want to achieve educationally.

• To provide the organisational and technical framework for the development of an interoperable virtual campus

• To make available a virtual campus based on Open Educational Resources which will offer a free, open personal learning environment

• To improve the quality of education in eLearning by international co-operation and by new methodological approach to learning. The project intends to develop an interoperable virtual campus, not a new one to replace the existing ones used in the universities, and to provide a new methodology based on modern techniques of education such as open sources, adaptability and interactive learning.

• To evaluate, test and transfer the ICT tools, pedagogical methodology and the Set of Guidelines to other education and training areas and throughout Europe.

The main scope of ViCaDiS is to provide an accessible and attractive environment for all students within the Member States, using already existing tools which will be enhanced with new tools wanted by the new generation of students. By providing students the tools which they use anyway extensively outside the institutional framework of learning (wiki, blogs, forums, IM, podcasting, RSS) ViCaDiS will support the learning attractiveness of the university curricula, will improve the quality of the learning process by encouraging the exchange of information/knowledge between students from different universities, and will reduce university drop-out or student de-motivation for learning. It will also produce an instructional or pedagogical shift inside the universities eLearning moving the focus from the education materials and technology to the user- student, to user generated content.

In ViCaDiS, a wide range of ODL actors from EU

and CEE countries will focus on developing an innovative approach for enhancing international eLearning by moving the strength from the institutional learning environment to the personal learning environment (PLE) which focuses on students. It will also produce an instructional or pedagogical shift inside universities eLearning moving the focus from the education materials and technology to the user-student, to user generated content.

The main objective is to build a virtual campus for digital students aimed at providing open educational resources and tools available and accessible for all students and to ensure the interoperability between the different eLearning environments used in the partner universities.

The goal of ViCaDiS is to create an attractive environment for all students within the Member States, using already existing tools which will be enhanced with new tools wanted by the new generation of students. An innovative multilingual ICT-based environment unique in Europe (as an international virtual campus), it will incorporate several open educational resources (library, glossary, external links, student projects, course activities), open educational tools (wiki, blog, forum, calendar, podcasting, instant messaging communication, audio-video conferencing over IP,

RSS, mobile text messaging, mobile accessibility to ViCaDiS) and will promote social networking as an instructional method.

The project **workpackages** are:

- Developing and testing of the ViCaDiS scenario
- ViCaDiS tools design and implementation
- Piloting/testing and evaluation of ViCaDiS
- Evaluation and elaboration of the Set of Guidelines
- Exploitation of ViCaDiS
- Dissemination and Awareness raising of ViCaDiS
- Project management of ViCaDiS

The main **outcomes** of the project are:

- ➢ open personal learning environment methodology
- ➢ ViCaDiS scenarios
- ➢ ViCaDiS multilingual virtual campus: online environment and mobile environment based on Open Educational Resources
- ➢ Multilingual web portal
- ➢ Multilingual Set of Guidelines (on paper, CD and online)
- ➢ ViCaDiS evaluation
- ➢ Promotional and multiplication materials

2. Leonardo da Vinci II project "Creative Trainer", Agreement **LLP/LdV/TOI/2007/AT/19**

Director: Prof.dr.eng. Radu VASIU
Value: 20.082 EURO
Members: Assoc.lect.eng. Diana ANDONE
Assist.eng. Marian BUCOS
Assist.eng. Mihai ONITA
Cristian TECU, PhD student
Iasmina ERMALAI, PhD student
Andrei TERNAUCIUC, PhD student
Partners: University of Graz, Austria
SFG Graz, Austria
University of Wien, Austria
University of Marburg, Slovenia
College Drenthe, Netherlands
Innova Venice, Italy

FIELD DESCRIPTION:
The main aim of the project is to disseminate the creativity technique „idea machine" via developing a training course on this topic, to train partners from Europe and to carry out national training courses in the partner countries.
The methodology of the „idea machine" is based on:

- Working out a mass of ideas
- Including insiders and outsiders in the idea finding process

The second requirement of the Leonardo programme is to transfer results from projects, especially via training projects to Europe.
The project phases are:

- Project management
- Development of a training course
- Pedagogical concept
- Web-based learning materials
- TTT- course
- Company projects
- National training courses
- Certification
- dissemination

The training course will consist on 3 modules:
Module 1: Ideamachine
Module 2: creativity and youth
Module 3: idea evaluation

3. Leonardo da Vinci II project "ESIL - European Sustainable Innovation License (for SME´s)", Agreement **LLP/LdV/TOI/2008/AT/23**

Director: Prof.dr.eng. Radu VASIU
Value: 11.157 EURO
Members: Assoc.lect.eng. Diana ANDONE
              Assist.eng. Marian BUCOS
              Assist.eng. Mihai ONITA
              Cristian TECU, PhD student
              Iasmina ERMALAI, PhD student
              Andrei TERNAUCIUC, PhD student
Partners: Cleaner Production Centre Graz, Austria
              Stenum GmbH, Austria
              Bit Media E-Learning Solution, Austria
              University of Maribor, Slovenia
              Enviros, Czech Republic
              AREA Science Park, Italy
              Insin, Germany
              LTC, Sweden
              Cork Institute of Technology, Ireland
              Hess Innovation, Switzerland

FIELD DESCRIPTION:
Aims of the project:
1. **Uniform** understanding and **model of an innovation training** (innovation & sustainably)
2. Creating a **Standard of Quality for Training of Innovationmanagement**, incl. an **examination and a certificate „Innovation Licence"** (especially for SME´s)
3. Setting up a **European Network & regular conferences for SME's**
4. Creating an **E-Learning platform**

Estimated results of the project:
- An **integrated Training Concept for "Sustainable Innovation Management"**, combining existing and sucessfully proved training materials. Considering the main barriers for adult education and trainíng of people from industry. (time, availability, costs, lack of competences in structured problem solving)
- An **ESIL – Training Concept** with an clear, given structure: introduction module and continuing, advanced training modules

- ▪ **2 days introduction training module** (overview of innovation management and sustainability) and
- ▪ **4 to 8 2-days advanced training modules** (innovation strategy and sustaimable development, innovation and creativity, tools for analysis of problems, tools for generation ideas, tools for assessment and protection of ideas, r&d-project management,…)
- Consolidated Course Materials (slides, working materials, text, …)
- Coordinated **Concept for Examinations and Certification** (Model: ECDL)

NATIONAL RESEARCH PROJECTS

1. CEEX Project, Contract Nr. CEX 60 / 28.07.2006, *Control and Monitoring from the Distance System for Intelligent Buildings „COMODICI",* **period 2006-2008**
Director: Prof.dr.eng. Radu VASIU
Value 2008: 83,000 RON
Members: Lect.dr.eng. Mugur MOCOFAN
              Assoc.lect.eng. Diana ANDONE
              Assist.eng. Marian BUCOS
              Assist.eng. Mihai ONITA
              PhD student Iasmina ERMALAI
              PhD student Andrei TERNAUCIUC
              PhD student Cristian TECU
              PhD student Bogdan DRAGULESCU
Partners: Technical University of Cluj-Napoca
              "Transilvania" University of Brasov
              Siemens PSE Brasov

FIELD AND GRANT DESCRIPTION: Intelligent buildings apply technologies to improve the building environment and functionality for occupants/tenants while controlling costs. Improving end user security, comfort and accessibility all help user productivity and comfort levels. The owner/operator wants to provide this functionality while reducing individual costs. Technologies make this possible.

An effective energy management system, for example, provides lowest cost energy, avoids waste of energy by managing occupied space, and makes efficient use of staff through centralized control and

integrating information from different sources. An efficient integrated system enables a modern, comprehensive access and security system to operate effectively and exchange information with other building systems. Fully integrated functionality includes the ability to open doors, notify responsible staff of unwanted intrusions and ensure that lighting, fire and other building management systems are informed of staff that arrive or depart the building. This information can then be used to manage the local environment and the resulting energy usage. Life safety systems, notably fire systems, are heavily regulated by stringent code requirements. These requirements do not, however, prevent the information from a fire system being provided to other systems. This opportunity can be exploited to open doors and illuminate a building when fire alarms are received. Transducers (detectors) can measure many building parameters, e.g., vibration, strain and moisture, to continually monitor the building's infrastructure condition. To integrate these systems and exchange information effectively, a ubiquitous and reliable communications infrastructure is needed. These systems are typically managed by personal computers (PCs) using data processing communication techniques and both wired and wireless communication technologies. The key communications issues are redundancy, resilience, security and the assurance for all users that "their data" is secure. Integration considerations may be addressed through standards and conventions, or manufacturers' protocols. Since proprietary solutions permeate the industry, total interworking is currently unattainable, but the future will require full interoperability, with information exchanged among all systems, hence we will need technologies that translate.

2. CEEX Project, Contract Nr. CEX 05-D8-77 / 19.10.2005, *Foresight Scenarios for the Romanian Economical Sectors with Innovation Potential in the View of the Year 2020 „INOVFOR",* **period 2005-2008, UPT coordinator**

Director: Assoc.prof.dr.eng. Marian MOCAN
Value 2008: 30,000 RON
Members: Prof.dr.eng. Radu VASIU
Prof.dr.eng. Corneliu TOMA
Assoc.lect.eng. Diana ANDONE
Lect.dr.eng. Mugur MOCOFAN
Assist.eng. Marian BUCOS
Assist.eng. Mihai ONITA
Eng. Marius CONDREA
PhD student Iasmina ERMALAI
PhD student Andrei TERNAUCIUC
PhD student Cristian TECU
Partners: I.N.C.S.M.P.S. Bucharest
I.P.A. SA Bucharest
CURS SA Bucharest
INOE Bucharest

FIELD AND GRANT DESCRIPTION: The main goal of the project is to elaborate a National Strategy for Research – Development – Innovation, and according to that to develop a R&D National Plan for the period 2007-2013. This plan will be correlated with:

- the general external and security policy objectives, aiming to asses Romania as a power and stability factor in the Black Sea and the Balcan Peninsula area;
- the necessity of European integration, with minimal costs, having in view the strengthening of the Romanian economy in order to face the competition on the new market;
- the strengthening of the functionality of the specific economical mechanisms of an emerging market;
- the creation of the premises to decrease the differences between Romania and the other members of the European Union;
- the move towards an economy based on knowledge;
- the necessity to create the premises for the development of the domestic market, the increase of the work opportunities and of the professional training, the amelioration of the working conditions, of the health and living conditions for the population, the creation of the local brands and trade marks;
- the creation of a scientific and technological stock, concentrated to the areas with good opportunities to make the most from the human capital;
- the design of the institutional system and of the regulations able to allow the sustainability, the development, the use and the efficiency of the scientific and technological capital, as determined;
- the coherent development of the resources and their correlation to the need of scientific and technological capital, for the areas with development potential.
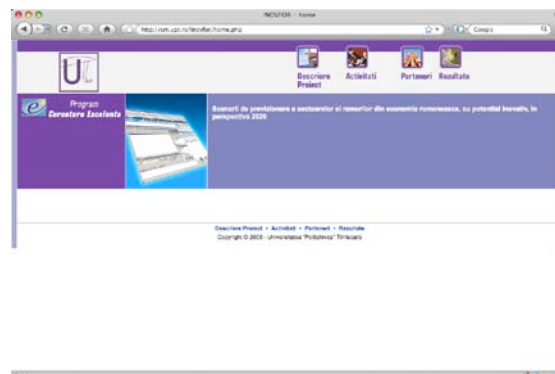
The project's objectives are:
- to make an analysis of the strong points, of the weak points, of the effective and potential opportunities, of the effective and potential

factors of risk resulting from the economical evolution on long term, medium term and short term
- to develop a strategy and a potential national plan for R & D
- to make proposals able to create the framework and the instruments needed for valorising the existing opportunities, for translating some potential opportunities into effective ones, for minimizing the existing risks and for preventing the identified potential risks
- to elaborate the main scenarios for the Romanian economical and social development until 2020, as a premise for the elaboration of a consolidated foresight endeavour, made up from „critical domains / technologies"
- to elaborate the National Plan for research – development – innovation, that will include the means and ways to encourage and support the critical domains / technologies, the modalities for their effective implementation, the monitoring and evaluation tools, the financing mechanisms and resource allocation principles, the modalities to promote excellence.

Project details can be found at:
www.cm.upt.ro/inofvor

3. CEEX Project, Contract Nr. CEX 05-D8-5/ 10.10.2005, *Development of the Concept of Social Responsability in the Romanian Companies, in the European Context „RSE & UE",* **period 2005-2008**
Director: Assoc.prof.dr.eng. Marian MOCAN
Value 2008: 25,000 RON
Members: Prof.dr.eng. Radu VASIU
Assoc.lect.eng. Diana ANDONE
Lect.dr.eng. Mugur MOCOFAN
Assist.eng. Marian BUCOS
Assist.eng. Mihai ONITA
Eng. Marius CONDREA
Eng. Iasmina ERMALAI
Coordinator: I.N.C.S.M.P.S. Bucharest
Partners: I.P.A. SA Bucharest
CURS SA Bucharest
INOE Bucharest

FIELD AND GRANT DESCRIPTION: The Lisbon Agenda (2000) establishes as the main strategic objective that „the EU should become the most competitive and dynamic knowledge based economy in the world, capable of sustainable economical growth, with more and better work places and with a bigger social cohesion". The project represents an effective contribution to the implementation of those desires.

The project objectives are:
- Realization of a report about the existing situation at international level, including in the EU, referring to the concept of social cohesion

- Design of information instruments for documentation, communication, collaboration and implementation of some activities
- Elaboration of some empirical analyses regarding the existing situation in Romania, including the external dimension (Corporate Social Responsibility – CSR)
- Elaboration of a methodology for the investigation of the internal dimension of IRS/CSR in Romania
- Elaboration of a methodology for the investigation of the dimension of IRS/CSR at the level of organisation in Romania
- Evaluation of the dimension of the economical, social and environmental aspects, at the elvel of organisation, in Romania
- Evaluation of the impact of IRS/CSR towards the competitivity, occupational quality, inclusion and social cohesion
- Determination of some directions of perspective in applying IRS/CSR in Romania, in European context.

Project details can be found at:
www.cm.upt.ro/rse&ue

4. PNCD II project nr. 11-057/14.09.2007: Bio-medical signal acquisition and remote transmission over mobile computing equipments BIOMED-TEL
Director: Prof.dr.eng. Radu VASIU
Value 2008: 75,000 RON
Members: Assoc.lect.eng. Diana ANDONE
Lect.dr.eng. Mugur MOCOFAN
Assist.eng. Marian BUCOS
Assist.eng. Mihai ONITA
Eng. Marius CONDREA
PhD student Iasmina ERMALAI
PhD student Andrei TERNAUCIUC
PhD student Cristian TECU
PhD student Bogdan Dragulescu
Partners: Transilvania University of Brasov
Technical University of Cluj-Napoca
Siemens PSE Brasov
IBCI – Institute for Cardiovascular Diseases Iasi

FIELD AND GRANT DESCRIPTION:
Cardiovascular affections are a prime cause of mortality and morbidity in Romania. The risk of cardiovascular morbidity and mortality remains high despite the attempts of correcting the cardiovascular risk factors. In the field of cardiovascular pathology the death risk by cardiovascular or vascular-cerebral accident persists even after the patients have left the hospital. Monitoring the health condition of these and the analysis of evolution trends of the biophysical and biochemical parameters represents an essential prevention factor.

The project envisages research, design and implementation of a flexible and self-adapting system for the monitoring of biological signals. Research and design activities will be oriented towards developing a system architecture and organization for remote monitoring and creating the interfaces for acquisition, monitoring and remote transmission to a hospital unit (hub). The signals acquired from the patient include: heart bio-potentials, blood pressure, blood O2 concentration, heart and breath rate, temperature, blood glucose concentration etc. The mobile computing equipments (MCE) integrated in the systems will be: Personal Digital Assistant (PDA), and/or „smart phones" (mobile phones MP).

The project will use hard – and software platforms (PDA and MP) of broad usability, which correspond to the requirements of the application in terms of computing power and also by their low price. Based on intelligent interfaces that will be designed, the system will automatically integrate the sensors in „plug & play" mode and also adapt its communication strategy with the hub/dispatcher for cost minimization and for ensuring the reliability and availability of the data link. It cannot be neglected, that this system development strategy will offer high versatility and scalability and will allow for expanding project results beyond the field of remote medicine.

The project will develop and integrate two categories of **intelligent interfaces**: 1. specific to signal **acquisition** from sensors placed on the patient and 2. **communication** – dedicated (by wire or wireless) necessary for warning/alert messages transfer and also for data transfer to the hospital hub. Remote data-transmission will allow for communication technologies, like: Near Field Communication (RFID, ZigBee, RuBee, Bluetooth), remote wireless: GSM/GPRS, EDGE, UMTS, Wi-Fi, WiMax as well as the wire based ISDN and Ethernet.

The project is relevant to research direction *"1 – Information and communication Technology"*, theme priority: "*1.6. Technologies for distributed systems and embedded systems",* aimed at developing of new technologies for integrated systems based on biomedical sensors networks (specific objective 1.6.14). The project objectives envisage also the development of applications for communication and computing embedded systems (specific objectives 1.6.17 and 1.16.16) ensuring local data processing and transmission to the hospital hub.

The purpose is to develop new technologies for integrated systems based on intelligent sensor networks for monitoring biological signals, remote transmission and processing for prevention and diagnosis. Envisaged are both theory development of architecture and organization of the systems for intelligent sensor networks (wire based or wireless) as well as practical implementation and testing of the mobile monitoring system carried by the patient. The proposal has innovative characteristics: the architecture and organization; the „plug&play" interfaces in compliance with the IEEE 1451 standard; the integration based on widespread platforms (PDA, MP); processing, analysis and detection of alerts using also „artificial intelligence" methods, development of strategies allowing for high reliability of the data link with the hospital hub, all these are characteristics of a modern and extremely useful solution for the developments in the field of bioengineering. The project will create the conditions for radically improved material bases required for the monitoring of the main biological parameters of the patient in the ambulatory which will increase the efficiency of the medical art, especially prevention, reduce the costs of medical assistance and extend the experimental base, very necessary in the field. Also, the formative component, especially by integrating young researchers in a field with real prospects contributes to the relevance of the project.

MAIN ACTIVITIES:

- Analysis of the current world wide developments in the field of ambulatory monitoring of biological parameters acquired signals of processing techniques and methods, instrumentation and dedicated sensors. The stress will be laid on advanced signal processing techniques for preventing or early detection of the patient's health state deterioration;
- Definition of the full specifications – hardware and software for the monitoring application;
- Development of system architecture and organization, adequate for monitoring;
- Design of acquisition and communication interfaces at MCE in accord with the

specification including those regarding energy consumption minimization;

• Development of acquisition, processing, analysis, storage/archiving, alert and communication MCE programs with the hub for the acquired signals;

• Training of the young researchers, result dissemination and increase of team visibility for attracting new partners and creating accession conditions to European funds;

• Development of the material research bases of the partners and subsequently of interdisciplinary research laboratories: electronics, medicine, telecommunication in the four university centers. It is envisaged that these will function financially autonomous which will allow for the permanent updating of the proposed system.

5. PNCD II project nr. 3598 / 2007 "Efficiency Increasing of the Support Processes for International Transfer on Managerial Know-How in the Applicative Research and Innovation Field" WINMAN

Director: Prof.dr.eng. Radu VASIU
Value 2008: 38,000 RON
Members: Prof.dr.eng. Corneliu TOMA
Assoc.lect.eng. Diana ANDONE
Lect.dr.eng. Mugur MOCOFAN
Assist.eng. Marian BUCOS
Assist.eng. Mihai ONITA
Eng. Marius CONDREA
PhD student Iasmina ERMALAI
PhD student Andrei TERNAUCIUC
PhD student Cristian TECU
Partners: Academy of Economic Studies
Institute of National Economy
"Politehnica" University of Bucharest
Centre for Industries and Services Economy
Bridgeman SRL
Commercial Academy Satu Mare
Artifex University

FIELD AND GRANT DESCRIPTION:

The coherent contribution to the triangle competitivity – technological transfer – research-innovation supposes the elaboration of new methods and processes for knowledge management for the research activities. The recognition of the role of technology transfer mechanisms and / or of the know-how elements is more an more underlined by the academic areas, by the partnerships between research – industry – financial services companies. The role of the new technologies in improving the productivity and the competitivity of different economical sectors / economic clusters / or even national economies takes to the reconfiguration of the traditional relations between the research results suppliers and the final beneficiaries of those results.

The XXI-st century Romania is still characterized by significant gaps regarding the technical efficiency, delays and disfunctionalities in resource administration for the adoption of new technologies in the industry. It is absolutely necessary to correlate, on short term, the requirements related to the increase of the absorbtion capacity of the European founds and the necessity to increase economic performance. Consequently, new decision making models are required, to the benefit of the industrial companies in the field of human resources development for Romania as a whole.

The consortium of the WINMAN project has the purpose to elaborate and to propose models for managerial processes and practical methods related to different aspects of the research activities: managerial transformation based on innovation strategies, technological transfer as support for knowledge based developments, intellectual property rights implementation in the research strategy, innovation support as source of competitivity advantages, human resources management in R&D activities.

MAIN ACTIVITIES:

• Analysis of the risk factors in the evolution of the international technology transfers, especially at the level of small and medium enterprises in Romania;

• Realization of new models for the technology transfer processes in the field of international know-how management, according to the specific Romanian conditions (business intelligence)

• Re-engineering of the processes related to Intellectual Property, with the goal to involve universities as main actors in the field

• Creation of an intuitively and interactiv instrument on the web (e-business portal), able to support the use of the models of international know-how management

• Initiation of new collaborative business processes in the field of technological transfers, able to stimulate innovation in Romania.

6. CNCSIS grant TD, nr. 546/2007 *"Robust techniques in image registration"*
Value: 15.630 RON
Director: Drd.eng. Daniela FUIOREA

KEYWORDS: Image registration, robust estimation, mean shift, similarity transforms, video sensors.

FIELD AND GRANT DESCRIPTION:
The aim of this project is to propose and test a new method of feature based 2D image robust registration is proposed. The image distortion is modeled as a similarity transform with four parameters, estimated sequentially by 1D transforms, resulting in an increased sample density as compared to 4D space processing. By adopting a mean shift estimator, advantages of RANSAC and M-estimators can be combined within a single and sound theoretical framework. Based on this method, the projects is proposing to use image registration techniques to solve node localization problem in a Wireless Sensor Network based on video sensors. Moreover, the proposed solution adds video-field overlap estimation to classical spatial localization. Several registration algorithms are analyzed and tested for performance evaluation.

ACTIVITIES AND RESULTS:
The research concentrated this year on the the features optimization selection, in order to realize the image registration. Sensor localization is required by most Wireless Sensor Networks applications. Considering application for video surveillance, localization includes not only spatial coordination but also cameras direction and video-field overlap estimation. The paper "D. Fuiorea, V. Gui, D. Pescaru, P. Paraschiv, I. Codruta, D, Curiac, C. Volosencu, Sensor node localization using SIFT algorithm, Proceedings of the 9th WSEAS Int. Conf. on AUTOMATION and INFORMATION (ICAI'08), Bucharest, Romania, June 24-26, 2008, pp.436-441, ISBN: 978-960-6766-77-0, ISSN: 1790-5117" presents a novel technique for localization in a Video-based Wireless Sensor Network using image registration that involves SIFT algorithm for automatic features selection. Experimental results show the estimation accuracy and time efficiency comparing with manual solution.
The next step is testing the performances of the proposed robust method in a wireless sensor network and finding sensors localization based on robust image registration and matching points. The paper "D. Fuiorea, V. Gui, D. Pescaru, C. Toma, Comparative study on RANSAC and Meanshift algorithm, Scientific Bulletin of the "Politehnica" University of Timisoara, Transactions on Electronics and Telecommunications, ISSN 1583-3380, sept. 2008" presents a comparative study between two important robust methods: the RANSAC algorithm and the mean shift algorithm.

These methods are used in an image registration technique. The purpose is to demonstrate that mean shift could replace with success the RANSAC algorithm. These techniques are analyzed and tested for performance evaluation. The articles published at conferences and the research papers presented in the department are reflecting the results in this domain.

7. CNCSIS grant TD, nr. 547/2007 *"Contributions to the use of new informational technologies in the e-learning process"*
Value: 15.630 RON
Director: Drd.eng. Iasmina ERMALAI

FIELD AND GRANT DESCRIPTION:
The TD grant offered by CNCSIS aims to support young PhD students in their research activity.
The project consists of integrating new informational technologies within the Distance Learning Center platform, viewed as an important source of eLearning at our university. Delivering educational content on mobile devices is the improvement brought to the existing platform.

ACTIVITIES AND RESULTS:
The first stage of the research concentrated on discovering the students' needs and their availability to the new internet technologies. Based on the results drawn from this study, a few solutions were proposed and integrated on the existing Distance Learning Center's platform. Podcasting, as a solution for delivering content to mobile students, was one of the technologies implemented. For a greater adaptability, a modular approach was chosen. Podcasting added a mobile component to the existing platform, transforming the process from eLearning to mLearning.
This work's results were validated by writing and publishing two articles at international conferences:
1. Publishing learning content on mobile devices, Iasmina Ermalai, Andrei Ternauciuc, Mihai Onita, Radu Vasiu, Virtual University 2008 Conference, Bratislava, Slovacia, December 11-12, ISBN-978-80-89316-10-6, INSPEC Accession Number: 10146005
2. Mobile Virtual Communities, Marian Bucos, Iasmina Ermalai, Mihai Onita, Andrei Ternauciuc, Radu Vasiu, ELSE "eLearning and Software for Education", Bucharest, April 17-18, 2008

8. CNCSIS grant TD, nr. 185/01.10.2007 *"Dynamic scenes' analysis using 3d sensors"*
Value: 15.630 RON
Director: Drd.eng Georgiana Simion

FIELD AND GRANT DESCRIPTION:

The TD grant offered by CNCSIS aims to support young PhD students in their research activity.
The project goal is to recognize hand gestures.

ACTIVITIES AND RESULTS:
First of all the hand must be detected and tracked. The Cam Shift tracker was optimized and more attention was paid to the features extraction. The challenge was to find the relevant features and how to use the information provided by them.

Using sparse features and compositional techniques hand gestures were recognized. Complex images can be represented as a composition of simple parts. Using sparse features and the relations between them it is possible to deal with occlusion. A model for the specific application was implemented.

This work's results were validated by writing and publishing two articles at international conferences:
1. Popa D., Simion G., Gui V., Otesteanu M. "Real Time Trajectory Based Hand Gesture Recognition", WSEAS Transactions on Information Science & Applications, Issue 4, Volume 5, April 2008
2. Simion G., Gui V., Otesteanu M., Popa D., David C., "Hand Edge Detection for Gesture Analysis in a Sparse Framework", Buletinul stiintific al Universitatii Politehnica din Timisoara, Tom 53(67), Fascicola 2, 2008, pp. 155-160, ISSN 1583-3380

PUBLICATIONS

BOOKS

1. Radu Vasiu, Muguras Mocofan, sa (Editor Aurel Vlaicu), *Cladiri inteligente. Sisteme. Tehnologii. Solutii integrate IT & C*, Monografie Editura U.T.Press, Cluj-Napoca, 2008, 412 pag., 62 pag, contributie UPT, ISBN 978-973-662-397-4

2. Mihai Onita, *Proiectare asistata de calculator. Manual pentru studenti*, anul 2 TST, ID - Invatamant la distanta http://csid.upt.ro/course_docs/2IDD_PAC.pdf, 35 pages, online publications

3. Mihai Onita, *Proiect de dezvoltare multimedia Manual pentru studenti*, anul 4 TST, ID - Invatamant la distant http://csid.upt.ro/course_docs/4IDD_PDM.pdf, 27 pages, online publications

4. Constantin Marian Bucos, *Programare orientata pe obiecte. Manual pentru studenti*, anul 2 TST, ID - Invatamant la distanta http://csid.upt.ro/course_docs/2IDD_POO.pdf, 56 pages, online publications

5. Constantin Marian Bucos, Baze de date. Manual pentru studenti, anul 3 TST, ID - Invatamant la distanta http://csid.upt.ro/course_docs/3IDD_BD.pdf, 43 pages, online publications

PAPERS

1. D. Fuiorea, V. Gui, D. Pescaru, P. Paraschiv, I. Codruta, D. Curiac, C. Volosencu, *Sensor Node Localization using SIFT Algorithm*, Proceedings of WSEAS International Conference on Automation and Information (ICAI'08), Bucharest, Romania, 2008, p.436-442, ISBN 978-960-6766-77-0

2. Mocofan Mugur, Vasiu Radu, Bucos Constantin Marian, Onita Mihai, Ermalai Iasmina, *Multimedia interfaces in the control process of smart buildings using 3D scenes, flash animations and relational databases*, Proceedings of the 11th International Conference on Optimization of Electrical and Electronic Equipment, Vol. IV, Brasov, Romania, 22-23 mai 2008 (Inspec: 10146005, IEEE Explore) p. 213-216, ISBN 978-1-4244-1544-1

3. K. Boehnke, M. Oteşteanu, *Progressive Mesh Based Iterative Closest Points for Robotic Bin Picking*, Proceedings of the IEEE International Conference on Informatics in Control, Automation and Robotics, Madeira, Portugal, 2008 pp. 469-473

4. K. Boehnke, M. Oteşteanu, *Progressive Mesh Object Registration*, Proceedings of IEEE/SICE International Symposium on System Integration, Nagoya, Japan, 2008, p. 22-28

5. D. Popa, G. Simion, V. Gui, M. Otesteanu, *Real time trajectory based hand gesture recognition*, WSEAS Transactions on Information Science & Applications, Vol. 5, p. 532-546, ISSN 1790-0832

6. D. Fuiorea, V. Gui, D. Pescaru, P. Paraschiv, I. Codruta, D. Curiac and C. Volosencu, *Video-based Wireless Sensor Networks Localization Technique Based on Image Registration and SIFT Algorithm*, WSEAS TRANSACTIONS on COMPUTERS, Issue 7, Vol.7, p. 990-999, ISSN 1109-2750

7. M. Otesteanu, V. Gui, *3D image sensors, an overview*, WSEAS Transactions on Electronics, Vol. 5, March 2008, p.53-56, ISSN 1109-9445

8. Cristian Tecu, Radu Vasiu, Cristian Gotiu, *Contributions to the Use of the New Computer Technologies in the Digital Slideshows*, IADIS Multiconference on Computer Science and Information Systems, Proceedings of Computer Graphics and Visualization 2008, organised by IADIS (International Association for Development of the Information Society), Amsterdam, the Netherlands, 22-27 July 2008, IADIS Press, p.311-314, ISBN 978-972-8924-64-5

9. Radu Vasiu, Diana Andone, Nicolae Robu, *The Experiences of e-Learning in Romania*, World

Conference on E-Learning in Corporate, Government, Healthcare & Higher Education, organised by AACE (Association for the Advancement of Computing in Education), Las Vegas, Nevada, USA, 17-21 November 2008, p. 1329-1334, ISBN 1-880094-66-5

10. Diana Andone, *Web 2.0 Technologies for Digital Students*, IADIS Multiconference on Computer Science and Information Systems, Proceedings of e-Learning 2008, organised by IADIS (International Association for Development of the Information Society), Amsterdam, the Netherlands, 22-27 July 2008, IADIS Press p.287-294, ISBN 978-972-8924-58-4, **paper receiving the** *Best Practical Paper Award*

11. Diana Andone, Jon Dron, Lyn Pemberton, *The Usability of DIMPLE - Digital Internet and Mobile Phone E-Learning Environment*, World Conference on E-Learning in Corporate, Government, Healthcare & Higher Education, organised by AACE (Association for the Advancement of Computing in Education), Las Vegas, Nevada, USA, 17-21 November 2008, p.245-251, ISBN 1-880094-66-5, **paper receiving** *The Outstanding Paper Award*

12. G. Simion, V. Gui, M. Otesteanu, D. Popa, C. David, *Hand edge detection for gesture analysis in a sparse framework*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc.2, p. 155-160, ISSN 1583-3380

13. D. Fuiorea, V. Gui, D. Pescaru, C. Toma, *Comparative study on RANSAC and Mean Shift algorithms*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc.2, p.80-84, ISSN 1583-3380

14. V. Gui, J. Laitinen, F. Alexa, *Image filtering and segmentation using kernel density estimation*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, vol. 53 (67), fasc.2, p.177-182, ISSN 1583-3380

15. K. Boehnke, M. Oteşteanu, *Triangulation Based 3D Laser Sensor Accuracy and Calibration*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53 (67), Fasc 1, p.224-229, ISSN 1583-3380

16. L. Jurca, A. Gontean, F. Alexa, C. Vasar, *Hybrid Architecture for a Single-Precision Arithmetic Processor*, Proceedings of the 19th

International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Next Generation of Intelligent Systems and Solutions, Trnava, Slovakia, October 2008, p.344- 345, ISBN 978-3-901509-68-1

17. Ermalai Iasmina,Ternauciuc Andrei, Onita Mihai, Vasiu Radu, *Publishing learning content on mobile devices*, The 9th International Conference Virtual University, Bratislava, Slovacia, 11-12 dec. 2008, Proceedings of the 9th International Conference Virtual University, ISBN 978-80-89316-10-6

18. Vasile Gui, *Edge preserving smoothing by multiscale mode filtering*, Proceedings 16'th European Signal Processing Conference EUSIPCO 2008, http://www.eurasip.org/ Proceedings/Eusipco/Eusipco2008/papers/1569 104877.pdf

19. Marian Bucos, Iasmina Ermalai, Mihai Onita, Andrei Ternauciuc, Radu Vasiu, *Mobile Virtual Communities*, Proceedings of 4th International Scientific Conference ELSE "E-Learning and Software for Education" 2008, Bucuresti, 17-18 aprilie 2008, p.289-291, ISBN 978-973-749-362-0

20. Marian Bucos, Bogdan Dragulescu, Andrei Ternauciuc, Developing virtual labs at "Politehnica" University of Timisoara, Proceedings of the 9th International Conference Virtual University, Bratislava, Slovacia, 11-12 dec. 2008, CD 3 pag, ISBN 978-80-89316-10-6

21. Radu Vasiu, *Building ViCaDiS – a Virtual Campus for Digital Students*, International Scientific Conference *SynEnergy Forum (S.E.F.)*, the Conference for International Synergy in Energy, Environment, Tourism and Information Technology, Spetses, Greece, 28-31 May 2008, CD Proceedings of SynEnergy Forum, Piraeas, Greece pp. VI.6. 96-100 CD

22. Diana Andone, *The Ecology of eLearning – trends and directions for digital students*, International Scientific Conference *SynEnergy Forum (S.E.F.)*, the Conference for International Synergy in Energy, Environment, Tourism and Information Technology, Spetses, Greece, 28-31 May 2008, CD Proceedings of SynEnergy Forum, Piraeas, Greece pp. III.6. 27-32 CD

23. Cristian Tecu, Radu Vasiu, Critian Gotiu, *Contributions to the use of the new computer technologies in the digital slide shows*, 4th International Scientific Conference "eLearning and Software for Education", ELSE 2008, Bucharest, April 17-18, 2008 Proceedings of the International Scientific Conference

"eLearning and Software for Education", ELSE 2008 pp. 371-374   978-973-749-362-0

24. Diana Andone, Lyn Pemberton, Jon Dron, *The Desirability of Digital Students*, Proceedings of EDEN Annual Conference 2008: New Learning Cultures, Lisbon, Portugal, 11-14 June 2008, p.192-198, ISBN 978-963-06-5132-5

25. F. Alexa, V. Gui, C. Caleanu, Corina Botoca, *Lossless Data Compression Using Neural Networks*, Proceedigs of the 7th WSEAS International Conference on Circuits, Systems, Electronics, Control & Signal Processing (CSECS'08) Tenerife, Canary Islands, Spain, December 15-17, p.128-132, ISSN 1790-5117, ISBN 978-960-474-035-2

PhD RESEARCH ACTIVITIES

1. *Prof. dr. eng. Corneliu I. TOMA*

    PhD students:

➢ Andreea GĂLEANU: *Contributions at the performance improvement of the GSM system*

➢ Artur MULLER: *Contributions in implementing of the multimedia databases, with local and remote access*

➢ Mirela L. IOANEŞIU: *Contributions at the network security by the using of the virtual private networks (VPN)*

➢ Daniel C. HAIDUC: *Contributions in the color digital reproduction field*

➢ Radu TĂNASE: *Ultrasound electronic systems for the movement evaluation in the fluid environment*

➢ Mihai I. ONIŢĂ: *Video communications in multimedia applications.*

➢ Mircea TOMOROGA: *Contributions at the conception and design of the analogue integrated circuits in CMOS technology*

➢ Florin-Josef LĂTĂREŢU: *Contributions at the intelligent telecommunication network achievement.*

➢ Daniela Narcisa FUIOREA – BULUCEA

➢ Alin SCOROŞANU

➢ Radu CLESIU

➢ Gheza Dohi TREPSZKER

2. *Prof. dr. eng. Marius Oteşteanu*

    PhD students:

➢ Georgiana SÂRBU-DOAGĂ, first year student

➢ Hay BOENKE, *Hierarchical object localization for robotic bin picking*

➢ Daniel POPA, first year student

➢ Ion-Cosmin DITA,

3. *Prof.dr.eng. Radu VASIU*

    PhD students:

➢ Iasmina ERMALAI, *Contributions to the Use of New Information Technologies in e-Learning*

➢ Cristian TECU, *Contributions to the Use of Video, Photo and Audio Applications in Professional Presentations*

➢ Andrei TERNAUCIUC

➢ Virgil ROTARU

➢ Bogdan DRAGULESCU

➢ George MULEC

➢ Andrei RUSAN

➢ Michaela CALOTESCU

RESEARCH TEAM

➢ Prof. dr. eng. Corneliu TOMA: *Television, Analogue Electronics, Image Compression, Motion Analysis, Pattern, Recognition, Multimedia Technologies*;

➢ Prof. dr. eng. Marius OTEŞTEANU: *Television, Telephone Transmission Systems, Information Recording Techniques*;

➢ Prof. dr. eng. Vasile GUI: *Image Processing, Electronic Circuits and Devices*;

➢ Prof. dr. eng. Radu VASIU: *Multimedia, Image Compression, Digital Television, Interactive Multimedia Applications, Web Services, E-learning*;

➢ Assoc. prof. dr. eng. Florin ALEXA: *Image and Sound Processing*;

➢ Lect. dr. eng. Mugur MOCOFAN: *Machine Vision and Pattern Recognition, Multimedia, Studio Equipment, Video Production*;

➢ Assoc. lect. eng. Diana ANDONE: *Multimedia Applications, E-learning, Adaptive and Adaptable Technology, Media Research*;

➢ Lect. dr. eng. Constantin Marian BUCOS: *Multimedia Databases, Object Oriented Programming*;

➢ Assist. eng. Mihai ONITA: *Audio-video Compression, Digital Television, Multimedia Applications.*

Contact Person

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RESEARCH CENTER IN INSTRUMENTATION, MEASUREMENT AND ELECTROMAGNETIC COMPATIBILITY – *I.M.C.E.M.*

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GENERAL PRESENTATION

The Director of the IMCEM research center is **Prof. dr. eng. Alimpie IGNEA**.

The center was created in 11 May 2001, in accordance with the CNCSIS certificate nr. 102/CC-C. IMCEM belongs to the Department of Measurement and Optical Electronics, Faculty of Electronics and Telecommunications. For the Electromagnetic Compatibility field, IMCEM is part of the Multi-User Research Base "National Interuniversity Centre for High Voltage Engineering and Electromagnetic Compatibility".

The main research and development fields are:

➤ *Electric and Electronic Measurement and Instrumentation*: improving measurement methods, sensors and transducers;

➤ *Electromagnetic Compatibility*: EMC measurements and tests at high frequencies, electromagnetic supervision;

Main activities since the creation of the centre:

➤ IMCEM endowment with high specialized equipment for measurements, tests, and education

through a TEMPUS programme, a Multi-User Research Base grant and other sources;

➤ the achievement of scientific and development research objectives through grants and scientific research contracts, consulting, technical expertise, technical assistance, design; ANTSI, CNCSIS grants were obtained and local collaboration with Siemens VDO Automotive and Solectron exist, to be continued and extended;

➤ Identification of new partners and research programs.

Researches in *SIGNALS SPECTRAL ANALYSIS AND SYNTHESIS WITH APPLICATIONS TO DIGITAL MEASURING SYSTEMS*

KEYWORDS
Data acquisition, spectral estimation, neural networks, digital synthesized AC calibrators

FIELD DESCRIPTION
Digital measuring systems standardization is one of the basic operations in measuring techniques. The standardization problem is more difficult when a higher resolution measuring device is used. Consequently, digital processed signals for standardization are frequently used. Their spectral content is revealed through spectral analysis.

RESEARCH TEAM

➤ Prof. dr. eng. Liviu TOMA: *Data Acquisition Systems. Microprocessor System Architecture, Digital Processing Structures*

➤ Prof. dr. eng. Traian JURCA: *Electronic Measuring Instruments. Structural Components of Precision Instrumentation, Programmable Measuring Systems*

➤ Prof. dr. eng. Dan STOICIU: *Electronic Measuring Instruments, Metrology, Quality and Maintenance, Measuring in Industrial Processes*

➤ Prof. dr. eng. Aldo De SABATA: *Adaptive Methods in Measurements, Signal Processing*

➤ Lect. dr. eng. Septimiu MISCHIE: *Electronic and Electric Measuring, Programmable Measuring Systems, Structural Components of Precision Instrumentation*

➤ Assist. dr. eng. Robert PASZITKA: *Microprocessor System Architecture, Data Acquisition Systems*

Researches in *ELECTROMAGNETIC COMPATIBILITY*

KEYWORDS

Electromagnetic compatibility, EMC directives, immunity to electromagnetic interferences, conducted and radiated emissions, shielding, grounding, site surveys

FIELD DESCRIPTION

Main research-development directions: improving measurement methods, sensors and transducers, EMC measurements and tests at high frequencies, electromagnetic supervision.

ACTIVITIES AND RESULTS

The research in this field provides means and equipments for EMC and educational improvement in EMC design. It is intended to minimize conducted and radiated emissions and to suppress electromagnetic interferences, performing the tests and verification concerned with the electric, electronic and radio equipments in accordance to EMC directives.

GRANTS AND CONTRACTS

1. *Platform for the Study of Electrical, Electronical and Chemical Concurent Phenomena that Occur in the Thermo-Solar Conversion Process and in the Photo-Voltaic Effect. Automation of Functioning and Exploitation of Solar Assets Based on Thermo-Solar and Photo-Voltaic Conversion*

Granted by the Ministery of Education and Research
Director: Prof. Dr. Eng. Nicolae Robu, Rector of the "Politehnica" University
Research Director: Prof. Dr. Eng. Aldo De Sabata
Duration: three years, 2006-2008
Total value: 4 232 764 RON
Total value from MEC: 3 385 000 RON
Total value from "Politehnica": 700 000 RON
Value for ETc Faculty, 2008: 407736.5 RON

PROJECT OUTLINE
Researches on the use of new sources of energy and quality of the environment are developing at a high pace in the European Union in the present. For example, a 5.5 million EURO Energetically Independent Solar House has been built in Germany, at Freiburg. In all countries of the EU, an intense campaign is directed for drawing attention and education of the public on energy problems such as decrease of home and industrial consumption and economy of classical energy resources.
In order for the know-how and experience gained at the "Politehnica" University of Timisoara in the field of alternate sources of energy to be effectively applied, it is necessary to educate students and staff in solar techniques. In this way, our research in this

inter- and multi-disciplinary field can be further developped, by taking advantage of oportunities provided by accessing the European Union.
Th efficiency of solar pannels varies between 30 and 50%, and it is considered good, the efficiency of photovoltaic pannels is between 9 and 24%, and it is considered satisfactory, the efficiency of thermal stocking is about 60%, the efficiency of electrical stocking is approximately 80%. The efficiency of stocking as hydrogen reaction heat is larger than 96%, and the efficiency of nanostructured cells is about 4%.
Consequently, it is necessary to create diatherman materials with very high transmittance in the visible domain, atherman materials with very high absorbtion properties on a large wavelength spectrum, insulating materials with very low thermal conductivity, selective layers, antireflection layers, semiconductor materials with 30% efficiency, nanostructured cells with about 12% efficiency.
The "Politehnica" University of Timisoara has built its Solar House as an energetic system in 1982-1986. The asset, built by self funding, has been designed by specialists from the Civil Engineering Faculty, and it contains two floors and underground. The best construction materials that could be found at that time have been used, in order to minimize thermal losses.
We want to create a platform of five integrated, electrnically connected laboratories around the Solar House, at five faculties: Energetics, Automatics, Electronics, Architecture and Civil Engeneering, and Physics. The purpose is to create, study, and measure new materials, measure solar radiation in our region, design new structures of solar architecture, find new ways of thermal and electrical stocking of solar energy, design and built home and industrial solar energy systems. We propose to introduce new subjects for license, master, and doctoral students.
These objectives can be realized by the rehabilitation of the Solar House and of its energetical chain based on thermo-solar conversion and photo-voltaic effect, by the creation and connection of the five laboratories, and acquisition of modern equipment.
The University might have financial benefits by providing spectro-photometric measurements and customized solar design.
We can introduce now 12 new license laboratory subjects, e.g. *Solar Energy Supplied Electrolysis.* We can introduce at this moment 14 master laboratory subjects, e.g. *Study of an Integrated Thermal-Photovoltaic System.* For the PHD school we can introduce now 4 themes, e.g. *Complete Analysis of the Energy Chain in a Photovoltaic Pannel.* We have now 13 research subjects pending by lack of financement, e.g. *Creation of New, High Transmittance Materials.*

The Platform facilities will be used for research, design of solar systems and buildings, publishing of books and papers in journals, organization and participation at national and international conferences and exhibitions, license, master, and doctoral schools on alternative sources of energy, public demonstrations, home and industrial solutions and design.

2. Contract *19496/18.11.08 Study of the renewable energy potential in the Department of Timiş,* **in the framework of** *PHARE CBC RO-HU 2006, contract RO-2006/018-446.01.01.01.07*
Value: 17017 RON
Members of the research group:
Prof. Dr. Eng. Aldo De Sabata, director
Prof. Dr. Eng. Ivan Bogdanov
Beneficiary**:** Town of Jimbolia, Mayor's Office

ACTIVITIES AND RESULTS
The requirements for a complete evaluation of renewable energy potential in jud. Timiş have been identified and stated.

3. Centrul National de Management Programe – CNMP, Programul 4 – Parteneriate in domeniile prioritare No: 2920/2007
Project: **Promotion of architectural solutions for building-integrated photovoltaic systems**
Acronym: **PASOR**
Coordinator: Societate Comerciala pentru Cercetare, Proiectare si Productie de Echipamente si Instalatii de Automatizare
Partners: P1/ Universitatea de Vest – Timisoara
P2/Universitatea Politehnica Bucuresti
P3/Universitatea Politehnica Timisoara
P4/ Universitatea de Arhitectura si Urbanism 'Ion Mincu"
Total project value 2007 – 2010:   2,000,000 RON
Total value for UPT 2007 - 2010:   360,000 RON
Value2008 for UPT: 113,.230 RON
Director: Prof.dr.eng. Traian JURCA
Members: Prof.dr.eng. Alimpie IGNEA
Prof.dr.eng. Liviu TOMA
Prof.dr.eng. Aldo DeSabata
Prof.dr.eng. Dan Stoiciu
Prof.dr.arhitect. Smaranda BICA
Conf. dr. eng Mihaela LASCU
Lector dr. Ioan LUMINOSU
As. eng. Ciprian DUGHIR
As. arh. Claudiu SILVASAN
As. arh. Razvan OPRITA
As. dr. eng. Robert PAZSITKA
As. eng. Gabriel VASIU
As. eng. Cora IFTODE

FIELD AND GRANT DESCRIPTION

The major purpose of the project is to demonstrate the efficiency of integrating various PV elements in buildings, to test them and to make them known so that they can be used on a large scale. The project is focused on the promotion of new architectural concepts which include active solar systems (photovoltaic generators) or passive solar systems (lighting systems). The proposed actions will contribute to the sustainable development of the national energy system by promoting the distributed photovoltaic systems, in accordance with the Government global objective to promote renewable energy sources in Romania. The advantages of using the distributed solar architecture are more conspicuous in the case of large network-connected PV systems, such as the PV systems in the urban area, installed on the buildings façades or roofs. These are complex installations with a high number of PV modules and they are incorporated under various angles and directions.

ACTIVITIES AND RESULTS
1. Surveys, research and solutions regarding the solar architecture in Romania.
2. Surveys, measurements and technical solutions for the pilot installations with integrated photovoltaic systems;
3. Construction of two demonstration pilot photovoltaic installations monitored at the West University Timisoara (UVT) and at the University of Architecture and Urban Planning "Ion Mincu" (UAUIM), Bucharest;
4. Experiments, tests and outcome analysis.
5. Large-scale dissemination, including: the development of a products presentation book, development of a market survey, short training activities for students and organisation of a competition, *"Solar House",* development of other dissemination materials, such as: brochures, posters, scientific articles presented at both national and international events, and last, but not the least, creation of a website by which all information activities, training and the promotion of the concept of solar architecture will be achieved.

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4. *Partnership grant for projects execution Nr.3/21039/2007, Researches concerning the elaboration and promotion for solar architectural solar solutions for PV systems integrated in buildings.*
Director: Prof.dr.eng. Traian JURCA
Finance: State Budget – Education, Research and Young Ministery, Partnership Programs in Priority Domains
Value: 360,000 lei
Duration: 36 months
Contractor: Trading Society for Research, Design and Equipment Production and Automatization
Partner P3: Politehnica University of Timisoara

FIELD AND GRANT DESCRIPTION

The photovoltaic system is regarded as the main electricity supply and is connected in parallel to the supply from the local grid. Energy from the solar array is consumed by the ac loads in the house, with any excess being exported to the local grid. Any shortfall in output from the array is made up by importing from the local grid. This is a fully automatic process, completely invisible to the householder. To spread the electricity requirements of the house, careful timing of the use of the electrical appliances is essential.

ACTIVITIES AND RESULTS

Installation on the rooftop photovoltaic system of a data acquisition system to measure ambient temperature, solar radiation, wind speed, and electrical power delivered to the grid. A silicon photovoltaic sensor provides the radiation measurement. Data is captured each minute and average or integrated, as appropriate, over 15-minute intervals. The amount of storage available for the minute and 15 minute data is limited to approximately two hours and two weeks, respectively.

RESEARCH TEAM

➢ Prof.dr.eng. Alimpie IGNEA: *Electronic and Electric Measurements, Measuring in Industrial Processes, Measuring Systems in Electromagnetic Compatibility, Electromagnetic Supervising of sites, Antennas calibration, Nonlinearities study of high frequency devices*

➢ Prof.dr.eng. Mircea CHIVU: *Electronic and Electric Measurements, Measuring of the Electrical and Non Electrical Quantities, Television Channels Broadcasted Via Satellite*

➢ Prof.dr.eng. Aldo De SABATA: *Microwave and Optoelectronics Measurements, Antennas calibration*

➢ Assoc.prof.dr.eng. Mihaela LASCU: *Measuring of the Electrical and Not Electrical Quantities, Electrical Measuring of the Non Electrical Quantities, Measuring in Industrial Processes, Virtual Instrumentation*

➢ Lect.dr.eng. Daniel BELEGA: *Measuring Systems in Electromagnetic Compatibility, Instruments for Measurements, Digital Processing Structures*

➢ Assist.eng. Ciprian DUGHIR: *Electromagnetic Supervision of Sites, Antennas calibration*

Researches in *SENSORS AND TRANSDUCERS*

KEYWORDS

Piezoelectric sensors, optical crystals, optical effects, piezoelectric crystals, bulk waves, surface waves, sensor arrays

FIELD DESCRIPTION

Optoelectrical and piezoelectric crystals are frequently used in technique. Due to their property of converting optical and mechanical signals, these materials fit for transducers construction.

Theoretical and experimental approaches were made on current measuring and magnetooptic and piezoelectric sensors. An I^2C interface has been experimented.

RESEARCH TEAM

➢ Prof.dr.eng. Sever CRIŞAN: *Optical Electronics, Electrical Measurement, Sensors and Transducers*

➢ Assist.eng. Emil LUZAN: *Measuring of Environmental Factors, Measuring of the Electrical and Non Electrical Quantities*

➢ Lect.dr.eng. Adrian VÂRTOSU: *Microwaves, Microwaves and Optoelectronics Measurement, Television Channels Broadcasted Via Satellite.*

INTERNATIONAL PROGRAMMES

1. COST 2100 International Program
Prof. Dan STOICIU is representative of the "Politehnica" University of Timişoara.

PhD RESEARCH ACTIVITIES

1. Scientific Supervisor: Prof. dr. eng. Alimpie IGNEA

   PhD students:

➢ Liliana STOICA: *Contributions to Digital Signal Processing*

➢ Ciprian DUGHIR: *Contributions to anntenas calibration*

➢ Cristina VĂLIU: *Contributions to the nonlinearities study of high-frequency circuits*

➢ Cora IFTODE: *Electromagnetic field effects on living organism*

➢ Gabriel GĂSPĂRESC: *Perturbation monitoring in electrical networks*

➢ Adrian MIHĂIUŢ: *Contributions in anntenas calibration*

➢ Doru Lucian COCOŞ, *Neural Networks and Fuzzy Logic applications to electronic meter calibration*

➢ Teodor PETRIŢA, *Contributions to radiofrequency disturbances monitoring*

➢ Michael Kleinkes (Germany): *Mathematical analysis of off-line programmed robots in industrial application cells monitoring*

➢ Gheorghe Lupsa

PHD THESES SUSTAINED

➤ Raul Ciprian **IONEL,** *Contributions to noise sources detection algorithms using virtual instrumentation*, prof.dr.eng. Alimpie **IGNEA**.

PUBLICATIONS

BOOKS

1. Toma Liviu, VASIU Gabriel, MISCHIE Septimiu, PAZSITKA Robert, *Microcontrolere HCS12x. Teorie si aplicatii*, West Publishing House, 160 pp., ISBN 978-973-36-0481-5

2. Belega Daniel, Dughir Ciprian, Pazsitka Robert, *Circuite Integrate Analogice. Experimente si simulare*, Politehnica Publishing House, Timişoara, 2008, 73 pp. ISBN 978-973-625-639-4

3. Raul Ionel, *Contributions to noise sources detection algorithms using virtual instrumentation*, PhD Thesis, Politehnica Publishing House, Timişoara, 2008, 172 pp, ISBN 978-973-625-746-9

4. Trusculescu M., Vartosu A., Pascu R., Materalotehnica, vol III, *Materiale folosite in constructia de masini, instalatii si scule*, Politehnica Publishing House, Timişoara, 2008, 83 pp., ISBN 973-625-091-1, 973-625-240-x

PAPERS

1. F. M. Frigura-Iliasa, M. Frigura-Iliasa, L. Matiu-Iovan, D. Vatau, *A Few Aspects Concerning the Modelling of Thermal Stability Control for a Low Voltage ZnO Varistor*, Proceedings of the 10th WSEAS International Conference on AUTOMATIC CONTROL, MODELLING & SIMULATION (ACMOS'08) Istanbul, Turkey, pp.102-107, ISBN: 978-960-6766-63-3

2. R. Ionel, V. Tiponuţ, S. Ionel, I. Lie, *On Settling Time in Electrical Circuits with Deterministic and Random Inputs New Aspects of Circuits*, Proceedings of the 12th WSEAS International Conference on Circuits, Heraklion, Greece, July 22-24, 2008, pp.206-210, ISBN 978-960-6766-82-4

3. D. Belega, D. Dallet, *Influence of Systematic Errors on a Sine Wave Frequency Estimation by Means of Interpolated DFT Method*, 3th IEEE International Symposium on Communications, Control and Signal Processing (ISCCSP), Malta, March 12-14, 2008, pp. 1436-1439, ISBN 978-1-4244-1688-2

4. D. Belega, D. Dallet, *A New Weigthed Multipoint Interpolated DFT Approach for High-Accuracy Amplitude Estimation*, I2MTC 2008 - IEEE International Instrumentation and Measurement Technology Conference, Vancouver Island, Canada, May 12-15, 2008, pp. 200-205, ISBN 1-4244-1541-1

5. D. Belega, D.Stoiciu, D. Dallet, *Uncertainty Analysis of the Normalized Frequency Estimation of a Sine Wave by Three-Point Interpolated DFT Method*, IEEE Workshop on Advanced Methods for Uncertainty Estimation Measurement (AMUEM), Sardagna, Trento, Italy, July 22-23, 2008 pp. 84-89, ISBN 978-1-4244-2237-1

6. Mihaela Lascu, *Logging Airplane Sensors Measurements to a Remote Database Using LabVIEW and FieldPoint*, International Review of Aerospace Engineering, Vol. 1, N.1, pp.104-109, ISSN 1973-7459

7. Mihaela Lascu, *Finite Element Method Analysis of The Behaviour of A Multilayered Screen Polarizer*, International Review of PHYSICS, Vol. 2, N. 1, pp.36-41, ISSN 1971-6796

8. Mihaela Lascu, *Measurement Techniques for Determination of Shielding Effectiveness Characterizing Shielded Coaxial Cables*, The 11th International Conference on Optimization of Electrical and Electronic Equipment, Optim 2008, IEEE Catalog Number 08EX1996C, pp.59-64, ISBN 1-4244-1545-4

9. S. Mischie, L. Toma, *Behavior of the Lead Acid Battery after the Rest Period*, WSEAS Transactions on Power Systems Issue 3, Vol. 3, pp. 111÷117, ISSN 1790-5060

10. C Panoiu, M Panoiu, L Toma, R. Rob, *A Real-Time Identification Method of Slow Process Parameters Using Adaptive IIR-OSLMS Filters*, WSEAS Transactions on Systems, Issue 10, Vol. 7, pp. 1143÷1154, ISSN1109-2777

11. L. Toma, A. De Sabata, R. Pazsitka, L. Matekovits, *A Hybrid Single Tone Frequency Estimator*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53 (67), Fasc 1, pp.50-52, ISSN 1583-3380

12. A. De Sabata, L. Toma, R. Pazsitka, L. Matekovits, *Real Single Tone Frequency Estimation by PHD and Filtering*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53 (67), Fasc 1, pp.53-54, ISSN 1583-3380

13. R. Ionel, S. Ionel, *Pipeline identification in a TDOA experiment*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53 (67), Fasc 1, pp.211-215, ISSN 1583-3380

14. R. Ionel, A. Ignea, *Automatic Selection of a Suitable Coherence Frequency Domain*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53 (67), Fasc 1, pp.172-177, ISSN 1583-3380

15. Vartosu A., Dughir C., *The electric properitesfor biological structures in the case of mobile telephony*, Annals of the University of Craiova, 2008

16. I. Luminosu, A. De Sabata, C. De Sabata, M. Nagy, *An energetic study of a small solar residence*, Bul. Pamm Budapesta No.CXII (Bam–2370), pp. 171-180, ISSN 0133-3526

17. I. Luminosu, A. De Sabata, C. De Sabata, M. Nagy, *Statistics on the availability of solar energy on the 45th Northern parallel*, Bul. Pamm Budapesta No. CXII (Bam – 2369), pp. 161-170, ISSN 0133-3526

18. G. Găşpăresc, *Virtual Signal Generator for Flicker Modeling wuth GUI*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53 (67), Fasc 2, pp.129-132, ISSN 1583-3380

19. A. Ignea, A. Mihăiuţi, *The Study of Radio Propagation Models for Urban Areas Prediction*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53 (67), Fasc 1, pp.97-102, ISSN 1583-3380

20. S.Mischie, L.Toma, *An Important Property of the Time Domain Interpretation for the LSF Parameters*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53 (67), Fasc 2, pp.55-60, ISSN 1583-3380

21. Pazsitka R., Gontean A., Mischie S., *PWM PLC Control of a DC Motor*, Scientific Bulletin of the „Politehnica" University of Timişoara, Romania, Transactions on Electronics and Communications, Tom 53 (67), Fasc 1, pp.133-136, ISSN 1583-3380

22. Vartosu A , Dughir C, *The Electric Proprties for Biological Structures in the Caseof Mobile Telephony*, Annals of the University of Craiova

23. C. Panoiu, L. Toma, M. Panoiu, R. Rob, *Properties of IIR-OSLMS Adaptive Filters*, Proceedings of the 27th IASTED International, Conference Modeling, Identification, and Control, pp.460-465, ISBN 978-0-88986-711-6

24. C Panoiu, M Panoiu, L Toma, *Temperature Adaptive Control based on Modeling the Heating Process of an Electric Resistance Furnace*, Proceeddings of International Conference Applied Simulation and Modelling, Corfu, Greece, pp. 277÷282, ISBN 978-0-88986-748-2

25. C Panoiu, M Panoiu, L Toma, R. Rob, *A Real-Time Identification Method of Slow Process Parameters Using an Adaptive Algorithm*, Proceedings of the 8th WSEAS International Conference on Systems Theory and Scientific Computation, Rhodes Island, Greece, pp. 148-153, ISBN 978-960-6766-96-1

26. S Mischie, L Toma, *A New Hybrid Vector Quantization of LSF Parameters*, Proceedings of the 8th WSEAS International Conference on Signal, Speech and Image Processing Santander, Cantabria, Spain, pp. 55÷60, ISBN 978-960-6474-008-6

27. F. M. Frigura-Iliasa, L. Matiu-Iovan, M. Frigura-Iliasa, D. Vatau, *A New Material Developed for Metal Oxide Varistors Applied in Electronics and Telecommunication*, Proceedings of the 10th International Symposium "Materials, Methods and Technologies", Sunny Beach Resort-Burgas, pp. 92-99, ISSN 1313-2539

28. F. M. Frigura-Iliasa, M. Frigura-Iliasa, L. Matiu-Iovan, D. Vatau, Al. S. Jude, *A Few Aspects Concerning the Thermal Finite Element Modelling of a Low Voltage ZnO Based Varistor with an Additional Mass*, Proceedings of 3rd International Conference "From Scientific Computing to Computational Engineering, IC-SCCE paper 078

29. R. Ionel, A. Ignea, S. Ionel, *Locating Noise Sources with the help of Virtual Instrumentation*, NI Days Worlwide graphical system design conference, Bucuresti, Romania, Noiembrie 2008

30. G. Găşpăresc, *Virtual Instrument for Sag Modeling and Analysis in Power Quality*, Proceedings of International Workshop – Control and Information Technology IWCIT 2008, Poland, Ostrava, pp. 50-53, ISBN 978-83-904-7438-0

31. D. Belega, *Windows for Dynamic Testing of High-Resolution A/D Converters by Means of the Energy-Based Method*, Scientific Bulletin of the „Politehnica" University of Timişoara,

Romania, Transactions on Electronics and Communications, Tom 53 (67), Fasc 1, pp.110-114, ISSN 1583-3380

32. D. Belega, C. Dughir, A. Ignea, *A System for Electric Field Measurement*, Proceedings of the 2nd IMEKO TC 19 Conference on Enviromnent Measurements, Budapest, Hungary, ISBN 978-963-9319-83-7

33. D. Belega, D. Dallet, D. Slepicka, *Some Aspects Concerning the Amplitude Estimation of a Sine Wave by Energy-Based Method*, Proceedings of the 16th IMEKO TC-4 International Symposium "Exploring New Frontiers of Instrumentation and Methods for Electrical and Electronic Measurements", Florence, Italy, September 22-24, 2008, pp. 205-210, ISBN 978-88-903149-3-3

34. C. Dughir, *Visual C++ Complex Mathematical Signal Generator*, Proceedings of the 16th IMEKO TC-4 International Symposium "Exploring New Frontiers of Instrumentation and Methods for Electrical and Electronic Measurements" and 13th Workshop on ADC Modelling and Testing, Florence, Italy, pp.635-638, ISBN 978-88-903149-3-3

35. L. Toma, A. De Sabata, R. Pazsitka, *Iterative Procedure for Real-Tone Frequency Estimation*, Simpozionul Naţional de Electrotehnică Teoretică, Universitatea Politehnica din Bucureşti, Volumul Conferinţei Electrotehnică Teoretică, SNET '08, pp.218-222, ISBN 978-606-521-045-5

36. A. Ignea, A. Mihăiuţi, L. Cincu, *Masurarea Radiatiilor Electromagnetice Neionizante*, Al-VII-lea Simpozion Interdisciplinar de Compatibilitate Electromagnetică SICEM 2008 Bucureşti, 21-22 Noiembrie, CD 6

37. A. Ignea, A. Mihăiuţi, M. Sebu, *Software pentru Colectarea Datelor de Monitorizare a Spectrului de RF*, Al-VII-lea Simpozion Interdisciplinar de Compatibilitate Electromagnetică, SICEM 2008, Bucureşti, 21-22 Noiembrie, CD6

38. Ioan Luminosu, Aldo De Sabata, Coleta De Sabata, Traian Jurca, *Simularea numerică a funcţionării unui boiler solar în condiţii cvasireale*, Lucrarile celei de-a VIII-a Conferinte Nationale Multidisciplinara cu participare internationala - "Profesorul Dorin Pavel - Fondatorul Hidroenergeticii Româneşti", Sebes, 30-31 Mai 2008, "Ştinţă şi Inginerie", Vol.14, pp.121-128, Ed. Agir, Bucuresti, 2008, ISBN 973-8130-82-4, 978-973-720-198-0