*Novice Insights* in Electronics and Telecommunications. **SSET 2019** 

### Student Symposium on Electronics and Telecommunications

### Simpozionul Studențesc de Electronică și Telecomunicații

Cluj-Napoca,

Mai 2019

## *Novice Insights* in Electronics and Telecommunications. **SSET 2019**

Student Symposium on Electronics and Telecommunications

Simpozionul Studențesc de Electronică și Telecomunicații

EDITORS: Anca APĂTEAN Lorant SZOLGA Elena ȘTEȚCO

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Simpozionul Studențesc de Electronică și Telecomunicații

Facultatea de Electronică, Telecomunicații și Tehnologia Informației https://etti.utcluj.ro/ Universitatea Tehnică din Cluj-Napoca, Strada George Barițiu nr. 26-28, 400027









Simpozionul Studenţesc de Electronică și Telecomunicații







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EDITORS: Anca APĂTEAN, Lorant SZOLGA, Elena ȘTEȚCO

**PUBLISHER: UTPRESS** 

### Welcome SSET 2019

The Faculty of Electronics, Telecommunications and Information Technology has established a tradition, by organizing the Student Symposium on Electronics and Telecommunications (SSET), whose 15th edition is held on the 31<sup>st</sup> of May 2019.

The symposium aims to stimulate the creativity and originality of our students, providing them with a formal framework for presenting their most important achievements and results. It is also an excellent opportunity for students to practice and improve their presentation and communication abilities in front of a well-informed audience, as well as to promote their abilities and knowledge acquired during the years of study.

With every edition, this event strengthens the many existing links and generates new connections between the academic and the industrial environment, given the large number of representative companies that have become partners in the symposium.

Bringing together students, faculty, and representatives of the industry in such a high-quality professional environment is a key step in improving the quality of the educational process.

This scientific event is a complementary activity, besides the main didactic and research activities, directly contributing to the successful accomplishment of the mission of our faculty: "To contribute by advanced research to the knowledge development in electronics, telecommunications and information technology, as well as to train specialists able to develop, design, implement, and exploit electronics and telecommunications systems, with applications in the most various industrial, research, and domestic areas".

The high quality of the symposium cannot be achieved without the active involvement of the organizers: the SSET committee, as well as our industry partners, have made this event possible, and my thanks go out to them. I would also like to thank the faculty teaching staff who have encouraged the students to compete in this event and coordinated their scientific endeavours.

Good luck to all the students participating at the symposium!

Professor, Ph.D. *Gabriel OLTEAN* DEAN of ETTI, UTCN

Student Symposium on Electronics and Telecommunications

Faculty of Electronics, Telecommunications and Information Technology https://etti.utcluj.ro/ Technical University of Cluj-Napoca, 26-28 George Barițiu st., 400027



#### 



### ETTI Bachelor Programs (Programe Licență)

Electronică Aplicată,https://etti.Electronică Aplicată (engleză),https://etti.Tehnologii și Sisteme de Telecomunicații,https://etti.Tehnologii și Sisteme de Telecomunicații (engleză),https://etti.Inginerie Economică în Domeniul Electric, Electronic și Energetic,

https://etti.utcluj.ro/Fd/articles/EaFd.html https://etti.utcluj.ro/Fd/articles/EaEngFd.html https://etti.utcluj.ro/Fd/articles/TstFd.html https://etti.utcluj.ro/Fd/articles/TstEngFd.html i Energetic,

https://etti.utcluj.ro/Fd/articles/IEcon.html

### **ETTI Master Programs (Programe Master)**

Circuite și sisteme integrate, Inginerie electronică, Prelucrarea semnalelor și imaginilor (franceză), http://www.bel.utcluj.ro/master\_csi/index.php?lang=r https://etti-master.utcluj.ro/index.php/programe-de-studiu/#ie

https://etti-master.utcluj.ro/index.php/programe-de-studiu/#psi

https://etti-master.utcluj.ro/index.php/programe-de-studiu/#sicas

Sisteme integrate de comunicații cu aplicații speciale,

Tehnologii multimedia,https://etti-master.utcluj.ro/index.php/programe-de-studiu/#tmTehnologii, sisteme și aplicații pentru eActivități, https://etti-master.utcluj.ro/index.php/programe-de-studiu/#eactTelecomunicații,https://etti-master.utcluj.ro/index.php/programe-de-studiu/#tc

### **ETTI PhD Programs (Programe Doctorat)**

Principalele informații utile:

https://etti.utcluj.ro/scoala-doctorala.html

#### Principalele direcții de cercetare în ETTI

În cadrul facultății există o serie de direcții de cercetare, care sunt sintetizate după cum urmează:

- Analiza și sinteza circuitelor electronice
- Microelectronica circuite analogice și digitale VLSI
- Tehnici moderne de prelucrare a semnalelor
- Optoelectronică și comunicații optice
- Comunicații unificate în Internet

- Procesarea imaginilor și secvențelor video
- Recunoașterea automată a vorbirii, sinteza din text a vorbirii
- Prelucrarea și securitatea datelor
- Software pentru electronică și telecomunicații
- Radiocomunicații celulare și prin satelit
- Sisteme electronice de putere
- Sisteme electronice de monitorizare și control
- Energii regenerabile
- Senzori și sisteme de achiziție a datelor.



### Obiective

- implicarea studenților in activitățile de cercetare științifică
- crearea unui cadru stimulativ de interacțiune, schimb de idei și experiențe;
- afirmarea studenților cu preocupări deosebite pentru rezolvarea de probleme din domeniile electronică, telecomunicații și domenii conexe.







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of the IT landscane	Cantare Storada & Cloud Santicas II in iv
	- Jervers, storage & obdu Jervices (Linux Red Hat. Unix. Windows. Azure. Symantec
	Netbackup)
	<ul> <li>Infrastructure monitoring (SolarWinds)</li> </ul>
	- Database (Oracle, SOL, SAP HANA)
Steelcase	Application administration
Cluj Business Center	- MS 0365
	- Salesforce
Maestro	- ServiceNow
Bucinoco Contor	<ul> <li>In-house apps: Hedberg and EasyComS</li> </ul>
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	America (English, French/ German)
1989, nr. 104	Product Graphics & Data
Ciuj-Napoca	- 3D modeling in 3ds Max, Revit and AutoCAD
	- Rendering with V-Ray
www.steelcase.com	<ul> <li>Unreal Engine for VR and other applications</li> <li>Surface Materials (maps for PBR systems)</li> </ul>
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### **Previous Edition (SSET 2018)**



USUT



#### **Volunteer Students**

Alexandra Ioana Florean (III<sup>rd</sup> year, TSTengl) Alexandru Benea (III<sup>rd</sup> year, TSTengl) Radu Gavrilescu (III<sup>rd</sup> year, EA ro) Oana Felicia Buciu (II<sup>nd</sup> year, ro) Andrei Cristian Coman (II<sup>nd</sup> year, ro) Gabriel Popan (I<sup>st</sup> year, ro)

#### SSET 2018 Organizers

Prof. Gabriel OLTEAN Assoc.Prof. Nicolae CRIŞAN Assoc.Prof. Anca APĂTEAN Assist.Prof. Lorant SZOLGA Admin. Angela RUSU

#### SSET 2018 Scientific Committee

#### <u>ORAL Presentations: Bachelor Student – IET / IM</u> <u>Session Committee</u>

#### Chairman: Professor Virgil DOBROTĂ, PhD

Professor Mircea VAIDA, PhD Professor Radu ARSINTE, PhD Associate Professor Doris CSIPKES, PhD Associate Professor Liviu VIMAN, PhD

#### ORAL Presentations MASTER/DOCTOR and POSTER Presentations: Bachelor Student – IET / IM

Session Committee

Chairman: Professor Mircea GIURGIU, PhD Professor Corneliu RUSU, PhD Associate Professor Marius NEAG, PhD Associate Professor Cristian FĂRCAȘ, PhD Assistant Professor Camelia FLOREA, PhD

#### **SSET 2018 STUDENT Competitions:**

Section 1 - ORAL Presentations:
Section 2 - POSTER Presentations:
Section 3 - ORAL Presentations:

Bachelor Student – IET / IM Bachelor Student – IET / IM Master/Doctor (PhD) Student – IET / IM

#### **SSET 2018 Winners**

#### IET/ IM Bachelor Student (Student în domeniul Inginerie Electronică și Telecomunicații / Inginerie și Management) : ORAL Presentations

1st Prize	Cezar CHIRILĂ	"Thermal Imaging Camera Using a Low Noise High Speed Far Infrared Sensor"	Lorant Szolga
2nd Prize	Toma TELEMBICI	"A Way to Detect Indoor Sound Events"	Lăcrimioara Grama
3rd Prize	Danut VĂSC	"Monitoring and Alerting System using Grafana and Raspberry Pi"	Iustin Ivanciu
Honorable mention 1	Paul IVAȘCU, Ana M. NICA,	"Diagnosis in Electric Power Steering Systems using UDS Protocol and Simulated Vehicle Environment"	Dorin Petreuș
Honorable mention 2	Petru PLEŞ	"Modified Dijkstra's Algorithm Managed by OpenDaylight Controller"	Virgil Dobrotă
Honorable mention 3	Ana M. NICA, Paul IVAȘCU, Daniel LUPAESCU	"Control loops in automotive systems"	Dorin Petreuș
Special Prize	Dan Andrei MARGIN	"Network Disaster Recovery: A LISP Approach"	Virgil Dobrotă

#### IET/ IM Bachelor Student (Student în domeniul Inginerie Electronică și Telecomunicații / Inginerie și Management) : POSTER Presentations

1st Prize	Anamaria OARA	"Smart System for Incubating Eggs"	Lorant Szolga
2nd Prize	Adriana NEAMŢU	"Home Watch System using RFID sensors on Arduino"	Nicolae Crișan
3rd Prize	Madalina GORGAN, Cosmin MUNTEA	"Maximum Power Point Tracking Algorithm"	Dorin Petreuș
Honorable mention 1	Diana ALUNGULESEI	"Proximity Sensor for People with Visual Disabilities",	Nicolae Crișan
Honorable mention 2	Daniel LUPAESCU, Ana M. NICA, Paul IVAȘCU	"Setting Virtual End Stops for an Electrical Power Steering System Through XCP"	Dorin Petreuș
Honorable mention 3	Ciprian FARCAŞ	"Indirect Vector Control of Three-phase Induction Motor"	Dorin Petreuș
Special Prize	Ana Maria NEAMȚU	"Smart Global Positioning System"	<b>Robert Groza</b>

#### <u>IET Master/Doctor (Masterand/Doctorand în domeniul Inginerie Electronică și Telecomunicații) :</u> <u>ORAL Presentations</u>

1st Prize	Endre SANDY	"Real time video-based car tracking for smart parking monitoring"	Camelia Florea
2nd Prize	Roxana BUHUŞ	"Histograms and Supervised Learning for Facial Recognition Applications"	Corneliu Rusu
3rd Prize	Vlad VOICU	"Data Acquisition System for Photovoltaic Panels"	Dorin Petreuș
Honorable mention 1	Lucia Maria NEAMȚU	"Design and implementation of a portable and low- power ECG monitoring system"	Toma Pătărău

### **Present Edition (SSET 2019)**

### **SSET2019 Sections**

Section 1 - ORAL Presentations: <u>Bachelor Student – TST</u> Dedicated to papers from *IET* domains, with Bachelor authors;

Section 2 - ORAL Presentations: <u>Bachelor Student – EA</u> Dedicated to papers from *IET* domains, with Bachelor authors;

Section 3 - ORAL Presentations: <u>Bachelor Student – IEDEEE</u> Dedicated to papers from *IM* domains, with Bachelor authors;

Section 4 - ORAL Presentations: <u>Master/Doctor (PhD) Student – IET / IM</u> Dedicated to papers from *IET* and *IM* domains, with Master and PhD Students;

### **ETTI Scientific Committee**

#### **SSET Chairman:**

Prof. Gabriel OLTEAN, PhD Scientific committee:

Prof. Virgil Dobrotă, PhD
Prof. Sorin Hintea, PhD
Prof. Dorin Petreuş, PhD
Prof. Aurel Vlaicu, PhD
Prof. Monica Borda, PhD
Prof. Vasile Bota, PhD
Prof. Marina Țopa, PhD
Prof. Mircea Giurgiu, PhD
Prof. Corneliu Rusu, PhD
Prof. Victor Popescu, PhD
Prof. Niculae Palaghiță, PhD
Prof. Eugen Lupu, PhD
Prof. Petre Pop, PhD

#### **SSET 2019 Scientific Committees**

#### TST STUDENT ORAL Presentations Committee

*Chairman:* Professor Virgil DOBROTĂ, PhD Professor Mircea VAIDA, PhD Professor Eugen LUPU, PhD Associate Professor Doris CSIPKES, PhD

#### **EA STUDENT ORAL Presentations Committee**

*Chairman:* **Professor Dorin PETREUŞ, PhD** Associate Professor Marius NEAG, PhD Associate Professor Cristian FĂRCAŞ, PhD Associate Professor Liviu VIMAN, PhD Prof. Romulus Terebeş, PhD Prof. Ovidiu Pop, PhD Prof. Stefan Oniga, PhD Assoc.Prof. Albert Fazakas, PhD Assoc.Prof. Gabriel Chindriş, PhD Assoc.Prof. Nicolae Crişan, PhD Assoc.Prof. Mihaela Gordan, PhD Assoc.Prof. Marius Neag, PhD Assoc.Prof. Ceuca Emil, PhD Assoc.Prof. Liviu Viman, PhD Assoc.Prof. Emanuel Puschiţă, PhD Assoc.Prof. Ligia Cremene, PhD

#### **Organizing Committee:**

Prof. Gabriel OLTEAN, PhD Assoc.Prof. Nicolae CRIŞAN, PhD Assoc.Prof. Anca APĂTEAN, PhD Assist.Prof. Lorant SZOLGA, PhD Master student Elena ŞTEȚCO

#### IEDEEE STUDENT ORAL Presentations Committee MASTER/DOCTOR ORAL Presentations Committee

*Chairman:* Professor Corneliu RUSU, PhD Professor Monica BORDA, PhD Professor Ioan CIAȘCAI, PhD Associate Professor Emanuel PUȘCHIȚĂ, PhD

### **Symposium Program**

The event takes place on Friday, 31<sup>st</sup> of May, according to the below detailed timetable:

<b>Starting Time</b>	Events	Room D21	Room D22	<b>Room 368</b>
07:30	Registration	x		
07:45	Opening Speech	x		
08:00	ORAL	8:00 – 11:45 <mark>S2</mark>	8:00 – 10:00 <b>S3</b>	8:00 – 11:00 <b>S1</b>
10:00	Presentations		10:00 – 11:45 <b>S4</b>	
12:00	<b>Partners Presentations</b>	x		
13:00	Award Ceremony	x		
	Closing Word	x		

#### Presentation Room 368 – Section 1 (Student TST)

8:00 - <i>S1.1</i>	"Vulnerability Exploitation of Web Servers Using Kali Linux"		25
	Silviu Ebinca, Iustin Ivanciu	Coordinator: Iustin Ivanciu	pp. 25
8:15 - <i>S1.2</i>	"Malware Detection Using TensorFlow, Artificial Neural Networks and Google Colab"		27
	Andrei Popa, Iustin Ivanciu	Coordinator: Iustin Ivanciu	pp. 27
8:30 - <i>S1.3</i>	"Rubik Look@App: Rubik's cube solver using Open	CV and Unity"	20
	Cristian Luca, Adriana Stan	Coordinator: Adriana Stan	pp. 29
8:45 - <i>S1.4</i>	"Digitally sign and verify JAR and Binary files"		21
	Dragoș Moca	Coordinator: Cosmin Strilețchi	pp. 31
9:00 - <i>S1.5</i>	"Deploying a Dockerized Application with Kubernet	es on Google Cloud Platform"	22
	Robert Botez, Virgil Dobrotă	Coordinator: Virgil Dobrotă	pp. 33
9:15 - <i>S1.6</i>	"Experiments with Open Baton for Network Functio	on Virtualization"	25
	Robert Burian, Virgil Dobrotă	Coordinator: Virgil Dobrotă	pp. 35
9:30 - <i>S1.7</i>	"Network Function Virtualization with Docker and Open Baton for Network Overlays"		27
	Răzvan Oneț, Virgil Dobrotă	Coordinator: Virgil Dobrotă	pp. 37
9:45 - <i>S1.8</i>	"Traffic Sign Recognition: A Deep Learning Approa	ich"	20
	George Grosu	Coordinator: Romulus Terebeş	pp. 39
10:00 - <i>S1.9</i>	"Smart Surveillance Systems Using M to M Technol	ogy"	4.1
	Maria Popescu, Romulus Terebeș	Coordinator: Romulus Terebeş	pp. 41
10:15 - <i>S1.10</i>	"Virtualized Testbed with OpenDaylight Controlle Approach", Cosmina Gavriloae, Virgil Dobrotă	r and Open vSwitch: A Container Coordinator: Virgil Dobrotă	pp. 43
10:30 - <i>S1.11</i>	"Preliminary Evaluation of the Cisco TRex Network	Traffic Generator"	
	Daniel Lukacs, Virgil Dobrotă	Coordinator: Virgil Dobrotă	pp. 45
10:45 - <i>S1.12</i>	"Autonomous Navigation in Driving Simulations"	č	
	Bogdan Vâjdea	Coordinator: Bogdan Orza	pp. 47
		C C	

#### Presentation Room D21 – Section 2 (Student EA)

"Sensors Interfacing ADuC812"		nn 40
Iulia Baginean	Coordinator: Dorin Petreuș	pp. 49
"Home Security System"		nn 51
Ramona Bodian, Tudor Gabriel Jorj	Coordinator: Dorin Petreuș	pp. 51
"Wirelles M-Bus data communication for Heat Cost Allocator	· devices"	
Ionuț Chirilus, Dorin Petreus, Marius Muresan, Irina Muresan	Coordinator: Dorin Petreuș	pp. 55
"Indirect Vector Control of Three-phase Induction Motor"		
Mirela Olteanu, Maria Călean	Coordinator: Dorin Petreuș	pp. 55
5 "Implementation of XCP in Next Generation of Steering Control Units"		
Robert Radu, Dorin Petreuş, Ştefan Daraban	Coordinator: Dorin Petreuş	pp. 57
	"Sensors Interfacing ADuC812" Iulia Baginean "Home Security System" Ramona Bodian, Tudor Gabriel Jorj "Wirelles M-Bus data communication for Heat Cost Allocator Ionuț Chirilus, Dorin Petreus, Marius Muresan, Irina Muresan "Indirect Vector Control of Three-phase Induction Motor" Mirela Olteanu, Maria Călean "Implementation of XCP in Next Generation of Steering Com Robert Radu, Dorin Petreuş, Ștefan Daraban	"Sensors Interfacing ADuC812"Iulia BagineanCoordinator: Dorin Petreuş"Home Security System"Coordinator: Dorin PetreuşRamona Bodian, Tudor Gabriel JorjCoordinator: Dorin Petreuş"Wirelles M-Bus data communication for Heat Cost Allocator devices"Ionuţ Chirilus, Dorin Petreus, Marius Muresan, Irina MuresanIonuţ Chirilus, Dorin Petreus, Marius Muresan, Irina MuresanCoordinator: Dorin Petreuş"Indirect Vector Control of Three-phase Induction Motor"Mirela Olteanu, Maria Călean"Implementation of XCP in Next Generation of Steering Control Units"Coordinator: Dorin Petreuş

9:15 - <u>S2.6</u>	"Cascaded FBGs Interrogated by a Phase-OTDR for Vibi	ration Sensing"	<b>nn 5</b> 0
	Alexandra Ciarnau, Ramona Gălătuş, Marc Wuilpart	Coordinator: Ramona Gălătuș	pp. 59
9:30 - \$2.7	<i>"Experimental models for SPR setup optimization",</i> Andreea Pop, R. Gălătuş, F. Arcadio, N. Cennamo, L. Zeni	Coordinator: Ramona Gălătuș	pp. 61
<b>9:45</b> – <i>S2.8</i>	" <i>Hair Dryer Glove"</i> Alexandru Melian	Coordinator: Liviu Viman	pp. 63
10:00 - S2.9	The embedded system for measuring the sensors with vil	prating wire using PSOC"	
	Andrei Sandu, Septimiu Pop	Coordinator: Septimiu Pop	pp. 65
10:15 - <i>S2.10</i>	"Electrocardiogram reading using ECG Click and heart r	ate computing"	
	Diana Borcea	Coordinator: Paul Faragó	pp. 67
10:30 - <i>S2.11</i>	"Implementation of a cochlear implant, using CY3210-PS	SoC Eval 1"	60
	Raluca Bogdan, Paul Faragó	Coordinator: Paul Faragó	pp. 69
10:45 – <i>S</i> 2. <i>1</i> 2	"High Power Laser Targeting System"		nn 71
11 00 00 10	Mihnea Covaci, Lorant Andras Szolga	Coordinator: Lorant Szolga	pp. / 1
11:00 - S2.13	"Jarvis, an intelligent assistant for visually impaired peop	le" Coordinatam Emilia Sinaa	pp. 73
10·15 – S2 <i>14</i>	Cosinin Cluciu Real-time Edge Detection based on a Zyna Platform"	Coordinator: Emina Șipos	
	Stanca-Florina Pop. Gabor Csipkes	Coordinator: Gabor Csipkes	pp. 75
10:30 - <i>S</i> 2.15	"Self Driving Car With Camera Line Detection Using Ra	spberry Pi"	
	Maxim Bzovii	Coordinator: Laura Ivanciu	pp. 77
Presentatio	on Room D22 – Section 3 (Student IE)		
8:00 - S3.1	Reduce the noise from the ECG signal with Empirical Mod	e Decomposition"	
	Emilia Surlin, Sorin Hintea, Paul Farago	Coordinator: Sorin Hintea	pp. 79
8:15 – <i>S</i> 3.2	"Modelling and testing measurement methods for RTD sense	ors"	nn 81
	Madalina Olariu, Liviu Viman	Coordinator: Liviu Viman	pp. 81
8:30 - \$3.3	"Automated smart parking system"		pp. 83
8.15 831	Petru Daramus	Coordinator: Emilia Șipos	11
0.43 - 55.4	<i>"A Truck Louding Mondoring System Using Lokaw Alv and</i> Ofelia Moisi Justin Ivanciu	Coordinator: Justin Ivanciu	pp. 85
<b>9:00</b> – <i>S3.5</i>	"Hosting a Web Application in Google Cloud Platform Using	g Docker and Kubernetes"	07
	Ioana Gherman, Iustin Ivanciu	Coordinator: Iustin Ivanciu	pp. 87
<b>9:15</b> – <i>S</i> 3.6	"Sports Monitoring Web Application Using ReactJS and Per	<i>l</i> "	nn 89
0.20 52.7	Iulia Cristina Papiu, Iustin Ivanciu	Coordinator: Iustin Ivanciu	pp. 05
9:30 - 53.7	"Hacking a Smartphone Using Evil-Droid"	Coordinator: Justin Ivanciu	pp. 91
9:45 - \$3.8	Cross-Site Scripting Attack Using Mutillidae"	Coordinator. Iusun Ivanciu	
	Dana Anca Somesan, Iustin Ivanciu	Coordinator: Iustin Ivanciu	pp. 93
Presentatio	n Room D22 – Section 4 (Master/Doctor)		
10.00 - 54.1	Parameters Extraction of Solar Colls using the Newton-R	anhson Mathod"	
10.00 54.1	Sergiu Ranga	Coordinator: Botond Kirei	pp. 95
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### **Paper Summary**

#### **Presentation Room 368 – Section 1 (TST)**

#### S1-1 "Vulnerability Exploitation of Web Servers Using Kali Linux", *Silviu Ebinca, Iustin Ivanciu*

Abstract— This paper presents a social engineering attack on a blog using the Kali Linux distribution and some of the programs that are available in it such as BeEF and Metasploit. Once the user is hooked, the attacker can start making social engineering attacks on the user's browser. Since the user doesn't know that he is clicking into a "trap", his machine can easily be taken over and used for unethical purposes.

### S1-2 "Malware Detection Using TensorFlow, Artificial Neural Networks and Google Colab", *Andrei Popa, Iustin Ivanciu*

Abstract— This paper presents the implementation of a malware detection mechanism using TensorFlow and an Artificial Neural Network with three layers. The application runs on an open-source research tool called Google Colab. The model is based on a data set that contains values from the 3 main features of a PC: CPU, RAM and HDD usage. The artificial neural network is trained with different sets of data to help identify regular or malware infected PC behavior.

### S1-3 "Rubik Look@App: Rubik's cube solver using OpenCV and Unity", *Cristian Luca, Adriana Stan*

Abstract— Solving a Rubik's Cube at first glance is not straightforward, as it involves a rather complex algorithmic thinking. Therefore, to help those who recently acquired or received a Rubik's Cube and are eager to learn its secrets, we developed a graphical application which guides them through the steps of a solving algorithm. Rubik Look@App is a cross-platform, offline application, able to detect the cube's real-time state, render it graphically and provide a step-by-step solving guide. The application can be easily extended to larger cube dimensions and configurations and deployed online. Some limitations were found at this point in the color detection part and cube rendering but are already under investigation.

### S1-4 "Digitally sign and verify JAR and Binary files" *Dragoş Moca*

Abstract—This paper describes three applications developed by the author, which can be used to prevent copyright violations for JAR and Binary files, using Digital signatures. Digital signatures enable the recipient of information to verify the authenticity of the information's origin and to verify that the information is intact. A digital signature also provides non-repudiation, which means that it prevents the sender from claiming that he or she did not actually send the information. A digital signature serves the same purpose as a handwritten signature. However, a handwritten signature is easy to counterfeit. A digital signature is superior to a handwritten signature in that it is nearly impossible to counterfeit, plus it attests to the contents of the information as well as to the identity of the signer.

### S1-5 "Deploying a Dockerized Application with Kubernetes on Google Cloud Platform", *Robert Botez, Virgil Dobrotă*

Abstract— This paper presents the implementation of a web application based on microservices, each of them running in a dedicated Docker container. These standalone executable package of software are orchestrated by Kubernetes and hosted on Google Cloud Platform. The data used during the execution of the project is stored into a Cloud SQL instance. All the necessary resources in order to build the project can be monitored with Stackdriver.

### S1-6 "Experiments with Open Baton for Network Function Virtualization", *Robert Burian, Virgil Dobrotă*

Abstract— This paper presents preliminary results of Open Baton to orchestrate and manage Docker containers. The selected use case refers to the Storing Comments tool, using MongoDB and a Mongoclient. They are added in Kitematic (a GUI for Docker) where the images for Open Baton functionality already exist.

#### S1-7 "Network Function Virtualization with Docker and Open Baton for Network Overlays", *Răzvan Onet, Virgil Dobrotă*

Abstract— This paper presents a use case to illustrate the concept of network function virtualization, as a new paradigm in designing the telecommunications networks. The implementation of an overlay network was based on distributed Docker containers, orchestrated by Open Baton. This solution uses TOSCA YAML as data model and descriptor language. The performance of the container-to-container connectivity was evaluated with iPerf.

#### S1-8 "Traffic Sign Recognition: A Deep Learning Approach" George Grosu

Abstract—A driving assistant can be a game changer in many real life situations, reducing risks and the need of a driver more and more as the process becomes automated. Traffic sign recognition represents an important component of such automated system [1]. This paper proposes a deep learning-based solution for a driving assistant system capable of recognizing traffic signs within captured sequences using convolutional neural networks for features extraction and region proposal networks for regions of interests (ROIs) extraction. The results of the paper show that a proper management of the datasets, combined methods of transfer learning with custom classifiers and the right configuration of the hyper parameters can lead to performances up to 95%.

#### S1-9 "Smart Surveillance Systems Using M to M Technology" Maria Popescu, Romulus Terebeş

Abstract— Smart Surveillance Systems Using M to M Technology defines the need that modern society expresses upon some basic concepts, such us security and safety. The system is built from several Arduino modules which are interconnected with the help of a breadboard and several wires and jumpers. The camera (OV7670) is responsible for the the acquisition part, being conditioned by a PIR sensor. Once a motion is detected, the camera takes a caption and a SMS will be automatically delivered thru a GSM module. Almost in the same time, the caption is uploaded on a server (thru an ethernet module). The user is free to access the data and further on to send back a command over a pre-designed Android application.

**S1-10 "Virtualized Testbed with OpenDaylight Controller and Open vSwitch: A Container Approach", C. Gavriloae, V. Dobrotă** Abstract— This paper presents the virtualized testbed with four Open vSwitches working with OpenFlow protocol and an OpenDaylight Software-Defined Network controller. The version Oxygen R4 features a P4 plugin-in and a Kubernetes plug-in for mixed virtual machines-container environments. The topology is emulated in GNS3 version 2.1.16 which allows the container-based approach.

### S1-11 "Preliminary Evaluation of the Cisco TRex Network Traffic Generator", *Daniel Lukacs, Virgil Dobrotă*

Abstract—The aim of this paper is to present the implementation of a new Layer 4 - Layer 7 traffic generator developed by Cisco. The majority of traffic generators on the market are proprietary software, really expensive, usually not scalable nor flexible. To tackle this problem, we looked at the open source realistic traffic generator TRex. The main idea was to setup a network in which we generate traffic directed towards a host and this traffic is monitored on the devices through the SNMP protocol. The monitoring was realized by an open source program LibreNMS. The experiments showed that TRex is a powerful tool, generating 100 Mbps-traffic with a simple UDP segment.

#### S1-12 "Autonomous Navigation in Driving Simulations" Bogdan Vâjdea

Abstract— Modeling traffic dynamics in experimental scenarios represents a key contribution at both levels of: service – oriented

enhancement, such as Intelligent Transportation Systems development or citizens – oriented enhancements, such as traffic rules knowledge retention or awareness. To achieve a similar complexity to the real-world, vehicle movements along road networks have been mainly described using Reinforcement Learning algorithms, where the Policy Proximal Optimization (PPO) family, allows a high degree of optimization steps, while presenting a good sample efficiency. The objective function has been modeled based on policy positive and negative rewards, where the car agent reaches a final destination, from a predefined start position, while adapting to the route line. Results validate the applicability of implementing the simulation within a generic game environment, proposing a further extension towards experimental learning of traffic signs.

#### **Presentation Room D21 – Section 2 (EA)**

#### S2-1 "Sensors Interfacing ADuC812" Iulia Baginean

Abstract- ADuC812 is a well know development system already used widely, as are the sensors used. Paper's main purpose was taking these components and interfacing together in a correct manner, understanding the steps and writing optimized code.

#### S2-2 "Home Security System"

#### Ramona Bodian, Tudor Gabriel Jorj

Abstract— Nowadays we are surrounded by technology, and the best way to benefit from what it can offer is by ensuring the safety of ourselves and our goods. Home security system is an embedded system specifically designed to meet this need. The main purpose of this paper is to avoid possible theft attempts and to keep the owner informed about the condition of his home. That is why we have implemented an access system based on both password and scanning of the RFID card allowing the access only to authorized persons. The system monitors whether the door has been forced while the owner is not at home or if a fire has been detected; if the answer to both or only one of these checks is positive, the system will alert the owner via a SMS on the mobile phone. We also want to make it easier to use the system via an Android application to allow the remote control of this.

### S2-3 "Wirelles M-Bus data communication for Heat Cost Allocator devices"

#### Ionuț Chirilus, Dorin Petreus, Marius Muresan, Irina Muresan

Abstract - The paper describes the implementation of an Heat Cost Allocator (HCA) system, which communicates the data measurements via Wireless M-Bus protocol.

An HCA is an electronic device attached to radiators for measuring the heat consumption ratio. Two electronic temperature sensors and a microcontroller are used to calculate the heat consumption of radiator by measuring the temperature difference between radiator surface and air in room.

Hardware design and implementation, as well as Firmware development were built from scratch in order to design a highly efficient circuit. This device was built using a low power RL78/G1H microcontroller from Renesas, programmed in C language.

#### S2-4 "Indirect Vector Control of Three-phase Induction Motor" Mirela Olteanu, Maria Călean

Abstract - This paper aims to present how to implement a speed controller of an induction motor using Indirect Field Orientation Vector Control method. Indirect vector control is very popular in industrial applications. This method of controlling an induction motor drive involve decoupling of the stator current in to torque and flux priducing components. This control method will be presented here.

#### S2-5 "Implementation of XCP in Next Generation of Steering Control Units", *Robert Radu, Dorin Petreus, Ștefan Daraban*

Abstract - This paper presents different methods for implementation of the XCP protocol on the new electric power steering systems. XCP (Universal Measurement and Calibration Protocol) standardized by ASAM working committee (Association for Standardization of

Automation and Measuring Systems) is a protocol used for optimization of algorithms during runtime, in development. XCP made possible the calibration of internal parameters or measuring signals from an ECU (Electronic Control Unit). Due to safety and security needs, hardware and software redundancy are introduced in the new power steering systems. Redundancy is achieved ensuring minimum system operation in case of a critical component failure. The need for redundancy and the need of warranting minimum system operation in case of a critical component failure led to the idea of Main-Backup system of controllers, where the Backup controller assure the basic functionalities of the Main controller. The implementation and testing of XCP protocol were made on development boards from Renesas, BSW (Basic Software) components defined in AUTOSAR (Automotive Open System Architecture) were configured in AEEE Pro and microcontrollers were programmed in C language.

### S2-6 "Cascaded FBGs Interrogated by a Phase-OTDR for Vibration Sensing"

#### Alexandra Ciarnau, Ramona Galatus, Marc Wuilpart

Abstract—Phase Optical Time Domain Reflectometry (Phase-OTDR) can achieve the characterization and localization of vibration from the measurement of backscattered signal. However due to the weakness of the Rayleigh backscattered signal, the vibration information may be lost in the signal noise. For this reason, the increasing of the signal-to-noise-ratio (SNR), the Fibre Bragg Gratings (FBG) can be used as scattering centers. The goal of the project was to develop a novelty equally distributed sensor configuration to optimize the sensing capabilities and to analyze the problem of spectral shadowing. Here, an algorithm is proposed and tested for eliminating this negative effect in the experimental setup.

#### S2-7 "Experimental models for SPR setup optimization"

#### Andreea Pop, Ramona Gălătuş, Francesco Arcadio, Nunzio Cennamo, Luigi Zeni

Abstract—This paper reports the testing of 3 setup configurations for characterizing optical sensors based on Surface Plasmon Resonance (SPR). The aim was to observe if different sources of light and setup arrangements have influence over the plasmonic effect present at the interface of a liquid sample and gold-coated optical fiber.

#### S2-8 "Hair Dryer Glove"

#### Alexandru Melian

Abstract — beginning with 1890, hair dryers or blow dryers started to be used by people to speed the evaporation of water to dry the hair. Even if they had only few major changes over the years, such as switching from seated version to a portable one and using plastic materials instead of metal, the basic principle remained the same. Once these features were included in hair dryers, their development has mainly focused on improving the wattage and aesthetical changes to give a good look of the hair.

### S2-9 "The embedded system for measuring the sensors with vibrating wire using PSOC", *Andrei Sandu, Septimiu Pop*

Abstract— The aim of the paper is to create an embedded system that can measure the sensors with a vibrating wire. This type of sensors are used in the monitoring process of the hydro-technic constructions due to their reliability in time. The way they function is similar to the guitar chords. When put under tension, it makes a sound, it vibrates. In this study we propose that this excitement of the wire and the measurement of the vibrating frequency to be measure electronically with as few components as possible. The electronic block of excitement consists of 2 microcontroller pins from the terminals to which the sensors are connected. For the excitement of the sensor is used a consecutive string of impulses in the antiphase with a sweep frequency from frequency range of the sensor. In this way, a peak-to peak voltage amplitude of 10V is obtained. The electronic block of measurement is consisted of the amplification and the filtration of the electrical signal provided by the sensor. This 2 functions have been implemented with the help of the analogical and digital block

software configurable from inside of PSOC's microcontroller. Using this type of microcontroller is possible to integrate on chip the entire electronics system (excitement and measuring), with a minimum number of external components, 3 resistors.

### S2-10 "Electrocardiogram reading using ECG Click and heart rate computing", *Diana Borcea*

Abstract— An electrocardiogram (ECG), is a simple method of monitoring heart activity and diagnose a series of diseases. At each beat of the heart, an electrical wave travels the heart, causing muscle squeezing and blood pumping from the heart. This medical element can be easily combined with electronics and telecommunications and a complex project is realized. EKG auto-monitoring is an important aspect and using wireless communication information is sent directly to the patient. The idea of self-monitoring allows people to identify their problems in a simple manner and avoid heart diseases.

#### S2-11 "Implementation of a cochlear implant, using CY3210-PSoC Eval 1", *Raluca Bogdan, Paul Faragó*

Abstract— Hearing loss is a major problem nowadays, whose compensation requires the use of an auditory prosthesis. Cochlear Implants (CI) are implantable electronic devices which create auditory sensations by directly stimulating the auditory neurons. Low-power operation and wide-range parameter programmability are key features of CIs. The novelty of this project is to implement the block diagram of a cochlear implant on a programmable system on chip, respectively using the CY3210-PSoCEval1 kit.

#### S2-12 "High Power Laser Targeting System" Mihnea Covaci, Lorant Andras Szolga

Abstract— The digital image processing domain has a great importance due to the number of applications, having a direct influence on certain automated processes. The development of certain targeting systems using image acquisition and processing represents a trend of evolution regarding to the previous industrial processes involving continuous manual operation. Hence, the work presented here involves the development of a targeting system using a high power laser. It also uses a webcam, two servomotors to guide the high power laser on its target, one microcontroller to send the command signals towards the servomotors and a computer used to process the output video sequence. The entire system is able to run continuously by using a temperature regulator in order to keep the temperature of the laser diode constant.

### S2-13 "Jarvis, an intelligent assistant for visually impaired people" *Cosmin Ciuciu*

Abstract: Nowadays, portable devices are largely used in all domains, having an increasing potential in helping visually impaired people. The paper presents an intelligent system, Jarvis, developed to improve day-to-day life of such people. Jarvis consists of a Raspberry Pi mini-computer, a smart cane, sensors, location and orientation modules. Communication between user and Jarvis is realized through an artificial intelligent voice.

#### S2-14 "Real-time Edge Detection based on a Zynq Platform" *Stanca-Florina Pop, Gabor Csipkes*

Abstract—Edge detection includes a variety of mathematical methods that aim at identifying points in a digital image at which the image brightness changes sharply. The result of applying an edge detection to an image may lead to a set of connected curves that indicate the boundaries of objects, as well as curves that correspond to discontinuities in surface orientation. The Sobel operator performs a two-dimensional spatial gradient measurement on an image and so emphasizes regions of high spatial frequency that correspond to edges. The following paper is a practical approach towards real-time edge detection using the Zybo Zynq-7000 ARM/FPGA SoC Trainer Board, CMOS Video Sensor OV7670 and a VGA monitor.

### S2-15 "Self Driving Car With Camera Line Detection Using Raspberry Pi", *Maxim Bzovii*

Abstract: A self-driving car is a vehicle that uses different type of sensors to perceive the environment and navigate without human implication. This paper presents a prototype of a self-driving car, built using a PiCamera module, a GPS module, crash sensors and a Raspberry Pi board. The car can follow a predefined white line with automatic direction control. In case of an accident, six crash sensors determine which side of the car was hit, whereas the GPS module returns the coordinates where the accident happened. Using an ultrasonic sensor and fuzzy logic, the vehicle maintains a preset distance until the front object.

#### **Presentation Room D22 – Section 3 (IEDEEE)**

### S3-1 "Reduce the noise from the ECG signal with Empirical Mode Decomposition",

#### Emilia Surlin, Sorin Hintea, Paul Farago

Abstract — Empirical Mode Decomposition (EMD) is an acknowledged procedure which has been widely used for nonstationary and nonlinear signal processing. The main idea of the EMD method is to decompose the processed signal into components without using any basis functions. This is a data driven representation and provides intrinsic mode functions (IMFs) as components. These are obtained through a so-called sifting process. This study presents an EMD decomposition based filtering procedure applied to ECG signals (from specific databases), the results are evaluated through signal to noise ratio (SNR). It also, implements the isolation of the QRS complex from the IMFs for calculating the intercorrelation, thus estimating the degree of resemblance with the initial signal (that is, the morphology of the signal was not distorted). The obtained results denotes that the EMD method is very efficiency.

### S3-2 "Modelling and testing measurement methods for RTD sensors", *Mădălina Olariu, Liviu Viman*

Abstract— Nowadays, temperature is one of the most widely measured phenomena. Even if the number of the temperature measurement systems has increased, the development of measuring methods plays a key role in technology improvement and efficiency. In the present paper are described three temperature measurement methods and also the ways to establish the most accurate one.

#### S3-3 "Automated smart parking system" *Petru Daramus*

Abstract—Given the increased sales in the automobile industry and therefore the increased number of car owners, we can notice an unbalance between supply and demand of parking places. This situation affects half of the global population, all the large cities facing problems regarding parking management electrical energy consumption and pollution, decreasing the quality of life. A change of perspective is possible through the introduction of logistics principles and automated parking systems that offer the possibility of collecting and centralizing live data. The present application represents a prototype, or more explicitly, a scale model of an autonomous parking system that allows for increased flexibility, requiring a small number of resources and being safe to implement.

### S3-4 "A Truck Loading Monitoring System Using LoRaWAN and Smart Parking Sensors",

#### Ofelia Moisi, Iustin Ivanciu

Abstract— This paper presents the implementation of a truck loading monitoring system. Smart Parking Sensors and the LoRaWAN technology are used to automatically detect when a truck is done loading and call the next one to the loading area. Precious time, resources and money are saved. Moreover, a web application is provided to display real-time information. The system was installed and tested on the Tenaris Silcotub Company premises.

### S3-5 "Hosting a Web Application in Google Cloud Platform Using Docker and Kubernetes",

#### Ioana Gherman, Iustin Ivanciu

Abstract— This paper presents the main steps for the development and management process of a web application hosted in Google Cloud Platform. Docker containers are used to isolate and pack the software application with all its dependencies while Kubernetes is used to deploy and orchestrate the containers. The procedure is straightforward and user-friendly, as illustrated in the provided example.

### S3-6 "Sports Monitoring Web Application Using ReactJS and Perl", *Iulia Cristina Papiu, Iustin Ivanciu*

Abstract— This paper presents a sports monitoring web application that enables users to track their activities and the time spent performing each activity. This application was developed using ReactJS for the frontend and Perl and MySQL for the backend. Chart.js, an open-source frontend library, was used to help visualize data in a user-friendly manner. The application can be accessed from any browser, regardless of the device.

#### S3-7 "Hacking a Smartphone Using Evil-Droid" Andrei Vlad Pascalau, Iustin Ivanciu

# Abstract— This paper presents the implementation of ethical hacking by using Evil-Droid solely for testing purpose. All tests were performed on Kali Linux operating system in dual boot with Windows 10. It was proven that attackers may obtain sensitive information from smartphones by using a backdoor installed in an original application. Most importantly, this can be done without the

#### S3-8 "Cross-Site Scripting Attack Using Mutillidae"

#### Dana Anca Somesan, Iustin Ivanciu

user ever realizing it.

Abstract— This paper presents a Cross-Site Scripting attack that can affect a website. The testbed is deployed using the Mutillidae web application inside a virtual machine running in VirtualBox. The attack forces the browser to execute a script within the site instead of displaying the data as text.

#### Presentation Room D22 – Section 4 (Master/Dr)

### S4-1 "Parameters Extraction of Solar Cells using the Newton-Raphson Method", *Sergiu Ranga*

Abstract—This paper provides an easy to understand guide to parameters extraction for the single diode solar cell using the Newton-Raphson method. The extraction was done using a simulated I-V curve, containing no measurement errors. The method was implemented in an open source simulation environment, GNU Octave.

#### S4-2 "Environmental monitoring and control system" *Ioana-Adriana Potărniche*

Abstract—In this paper the author proposes an environmental monitoring and control system. The circuit is based on a microcontroller which processes data from various sensors. They can measure and detect temperature, gas concentration, light intensity, fire and raindrops. All data is analyzed and according to their values, the microcontroller controls the peripheral components (display, water pump, buzzer, fan, RGB LED). The system is controlled using a numerical keypad.

#### S4-3 "Capacitor multiplier with one transconductor cell" Paul Coste, Paul Martari, Marius Neag, Marina Dana Topa

Abstract—A new programmable capacitance multiplier implementation is presented in this paper. It is based on a current mode capacitance multiplier architecture that employs a linear transconductor (Gm cell). The performance of this new schematic is first analyzed mathematically, then it is demonstrated by means of two applications: the proposed capacitance multiplier is used to implement a triangular waveform generator and a fully differential

lossy integrator. These circuits were implemented in a standard 0.18-nm CMOS technology.

#### S4-4 "Low Dropout Voltage Regulator Able to Operate with Load Capacitors Ranging from 1pF to 1uF", *Alina-Teodora Grăjdeanu, Cristian Răducan, Marius Neag, Marina Țopa*

Abstract—This paper proposes a low dropout voltage regulator (LDO) able to operate with load capacitor, Cload, ranging from 1pF to 1uF. A novel frequency compensation ensures both the circuit stability over the wide range of Cload values and a fast-transient response to steep variation of the load current, Iload, varying from 0 to 100mA. The LDO requires only  $5.34\mu$ A of quiescent current while providing a steady 1V output, with the supply voltage varying from 1.1V to 1.5V. The circuit was designed and fabricated in a standard 0.13um CMOS technology.

### S4-5 "Spike cross-correlations - a method for the quantification of temporal coordination in neural circuits"

#### Ana Maria Ichim, Corneliu Rusu, Raul C. Muresan

Abstract—The classical approach for the measurement of functional interactions between extracellular recorded neurons consists in the cross-correlation analysis. Designed to make powerful inferences about synaptic connectivity, cross correlation analysis represents a reliable and useful tool in neuroscience, which has been used since 1967. Experimental and theoretical studies over the years have shown how simple features in the Cross-Correlation histogram (CCH) such as peaks, troughs, and satellite peaks reflect neural connectivity. In the present study, we computed cross-correlation analysis on multi-electrode mice data, in order to investigate the presence of such features. Our observations represent a mere summary of the studies conducted in the past years.

### S4-6 "Colour texture classification using improved noise robust LBP descriptors"

#### Stefania Ramona Barburiceanu, Romulus Terebes

Abstract—This paper presents extensions of the Local Binary Patterns texture descriptors for colour images and a study regarding the potential contribution of colour information for increasing the accuracy in the texture classification process. The proposed descriptors are labelled OCMRELBP (Opponent Colour Median Robust Extended Local Binary Pattern) and OCCBM3DELBP (Opponent Colour Colour-Block Matching and 3D Filtering Extended Local Binary Pattern). We tested the proposed operators on synthetic textures from a standard Outex database containing colour texture images. When compared to their grey-level versions, the proposed descriptors proved to improve the classification accuracy both in the absence and in the presence of noise by using appropriate filtering techniques for synthetic textures.

### S4-7 "Noise reduction techniques in hyperspectral imagery and their impact on image classification"

#### Andreia Valentina Miclea, Romulus Terebes

Abstract— In this paper we present an experimental evaluation of hyperspectral image classification and filtering methods. We show experimentally that both, the classification framework and the denoising step, can strongly influence the results. The main conclusions of the paper are drown from experiments carried out on the public Indian Pines database, under recent, controlled sampling strategies for partitioning the data into training and testing sets.

### S4-8 " Low cost telepresence robotics for education" *Paul Tota, Mircea Vaida*

Abstract — Some robotics companies have launched telepresence commercial robots with applications in education, management, conferences and workshops. This kind of robots have a simple design, with just one tablet, a robot car, a telescopic bar on the robot, a smartphone or a computer at the user, making a realistic remote communication that enable the user to interact effectively with the remote environment.