CISTER Quicknews

NOVEMBER/DECEMBER, 2017

CISTER - Research Centre in
Real-Time & Embedded Computing Systems

isep Instituto Superior de Engenharia do Porto P.PORTO INESCTEC

activities in the centre

EUROPEAN ASSOCIATION ON HIGHER EDUCATION VISITS CISTER

In November, participants of the seminar 'Smart solutions for the regions: UAS applied R&I increasing regional cooperation', taking place in Porto visited CISTER.

The seminar, organized by the European Association of Institutions in Higher Education (EURASHE), offers professionally oriented programmes and are engaged in applied research within the Bologna cycles.

The group of participants, which included several members from the Portuguese ecosystem of polytechnic schools, were given an introduction to the core mission of our unit.

This discussion included the activities taking place, including ongoing projects and the knowledge-transfer initiatives to reinforce the role of Portuguese actors in embedded systems in the European panorama.

CISTER INDUSTRY SEMINAR WITH JOÃO RODRIGUES

As part of its seminar series, this time CISTER's stage was given to João Rodrigues, a senior engineer working for Critical Software in the embedded systems domain.

Based on his expertise on the development of operating systems, João gave a seminar entitled "Road to RTOS development" in which he presented the underpinnings of real-time operating systems from an industrial point of view.

In particular, João explained the modular approach used by operating systems developers to support low level aspects required by embedded systems, from ground-up up to the user space, or technically speaking, starting at the bootloader, passing through the kernel and ending up at the device drivers.

With over 10 years' experience, João Rodrigues is a "near the metal" software developer with extensive experience on a wide range of operating systems and programming languages. Throughout his career he has developed high performance, semiconductor manufacturing applications to embedded solutions and has been working recently on the development of a new multi-core, mixed-criticality real time operating system.

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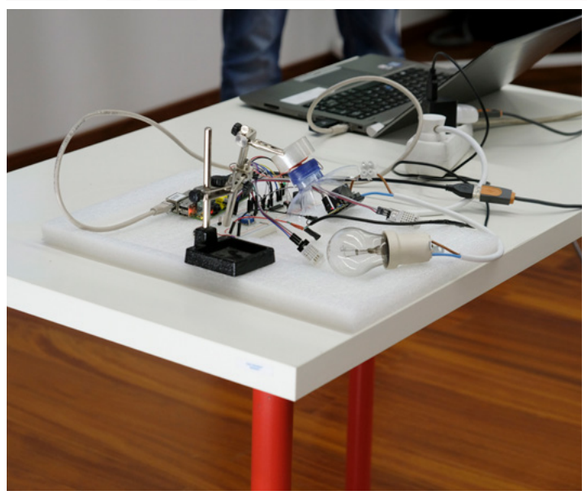
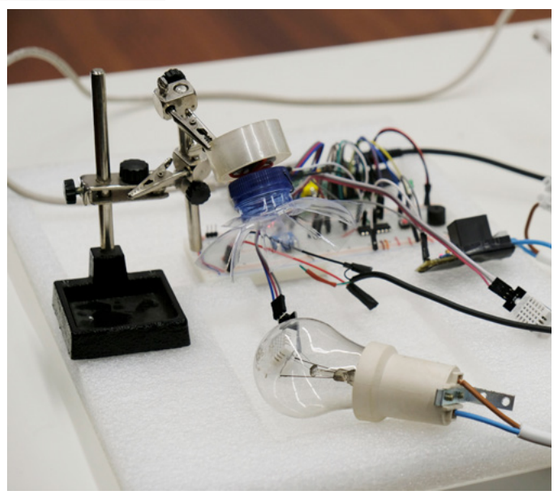
CONCLUSION OF THE 2017 SUMMER INTERNSHIP

The 2017 edition of CISTER's Summer Internship concluded with three interesting projects being delivered by six outstanding third-year students.

Bernardo Belchior and Beatriz Baldaia, under the supervision of Ricardo Severino, developed a project in the domain of Wireless Sensor Networks entitled "Building-Wide Smart Sensor Deployment". The project collected temperature data, measured via a wide range of sensor nodes deployed at CISTER, and acted upon the collected values to maintain the temperature of CISTER's facilities constant. The end goal of the project was to save energy and therefore energy costs.

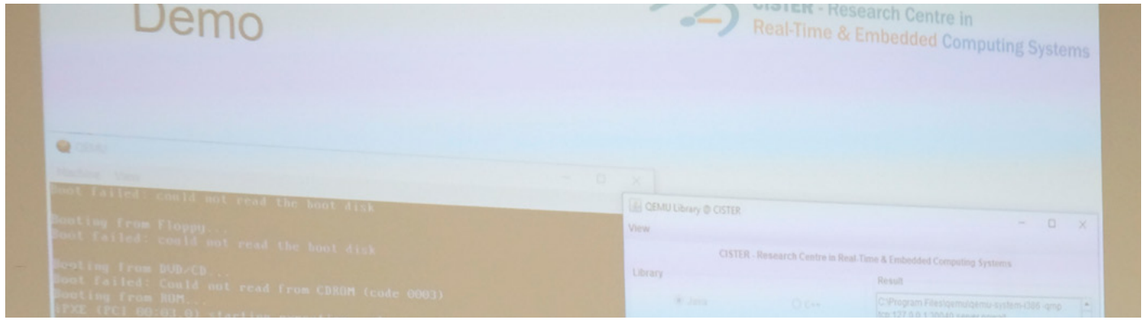
Henrique Reis and Rostyslav Khoptiy developed the project entitled "Real-Time Cyber Physical System with Raspberry Pi", under the supervision of Paulo Baltarejo. The two students developed a prototype of a cyber physical system using a Raspberry Pi board. In the prototype, several temperature sensors and motors were integrated in order to monitor and control the temperature of a closed environment. Their work can be seen at CISTER's YouTube channel.





Renato Oliveira and Manuel Meireles, along with Cláudio Maia and Luís Miguel Pinho as their supervisors, devoted their attention to "QEMU-Lib". QEMU is a well-known open source machine emulator. QEMU-lib is a library that allows one to dynamically create and interact with several QEMU instances. Along with the library, the students also developed demo clients that take advantage of the functionality provided by QEMU-lib.

CISTER is proud of the performance of the students. This has set new high stakes for the next year's edition!



CISTER RESEARCHER IS NOW AN ACM DISTINGUISHED SPEAKER

Association for Computing Machinery

ACM Speakers represent a broad range of companies, colleges and universities. They are thought leaders, speaking on important current topics in computing. CISTER researcher Anis Koubaa has now joined this list.

Along with his positions at CISTER and at Prince Sultan University, he also holds various advisory positions. He is the Editor in Chief of the Robotics Software Engineering topic of the International Journal of Advanced Robotics Systems, Associate Editor in the Cyber-Physical Journal (Taylor & Francis). He is the author of six books with Springer on robots, sensor networks and Robot Operating Systems (ROS). He is the author of more than 190 journal and conference publications, and one patent. He has also received several research grants as principal investigator.

His current research deals with providing solutions towards the integration of robots and drones into the Internet of Things (IoT) and clouds, in the context of cloud robotics.

His research interests also include Robot Operating System (ROS), Robotic Software Engineering, Wireless communication for the IoT, real-time communication, safety and security for cloud robotics, intelligent algorithms' design for mobile robots, and multi-robot task allocation.

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KEYNOTE GIVEN IN BRAZILIAN SYMPOSIUM ON COMPUTING SYSTEMS ENGINEERING

CISTER director Eduardo Tovar gave a keynote at the 7th Brazilian Symposium on Computing Systems Engineering (SBESC 2017), in Curitiba, Brazil.

SBESC

The Symposium is an initiative of the research community originally associated with three workshops on Operating Systems (WSO), Embedded Systems (WSE) and Real-Time Systems (WTR), acknowledging the strong synergy between these three areas. His talk "Information processing for extreme dense sensing - timeliness and scalability issues" was well received and ended with a lively Q&A.

He also presented the paper "Formal Verification of AADL Models Using UPPAAL", authored by Fernando Gonçalves (UFSC - Florianópolis, SC, Brazil), CISTER researchers David Pereira and Eduardo Tovar, and Leandro Becker (UFSC - Florianópolis, SC, Brazil).

CISTER SOON TO WELCOME NEW RESEARCH SCHOLARS

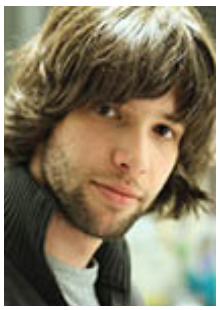
To maintain its pace and quality of research, CISTER regularly intakes high quality research students using competitive calls.

During 2017, CISTER launched multiple calls for PhD student positions in the area of Real-Time & Embedded Computing (RTES). The CISTER selection committee, made up of its research members, received over hundred applications from twenty countries spread all over world. Out of these, with a rigorous multi-stage evaluation process, five highly motivated candidates were selected.

The selected candidates are from prestigious institutions in Chile, Iran, Nigeria, Pakistan and Russia. CISTER intends to announce further calls this year for motivated research candidates in RTES.

ANOTHER STUDENT GRADUATES WITH HIGHEST HONOURS

Humberto Carvalho, advised by CISTER researchers Geoffrey Nelissen and Eduardo Tovar, successfully defended his Master thesis with a perfect grade of 20 (on a scale of 20).



Humberto's thesis was on the topic of "Scheduling High Criticality Real-Time Systems". Particularly, he focused on issues faced by the avionics industry. He proposed a new solution for a relevant problem in systems with stringent isolation requirements between applications, as is the case in aircrafts. The solution was to generate a cyclic executive schedule that optimizes the number of context switches between avionic partitions.

We wish the best to Humberto for his future career.

CISTER MEMBER PLAYS KEY ROLE IN SHAPING IEEE PROGRAM FOR YOUNG PROFESSIONALS

The IEEE Young Professionals program is run for members who are in an early stage of their career. It offers networking events with technical experts and industry leaders as well as a host of volunteering roles.

CISTER PhD candidate Shashank Gaur has been part of this leadership team for eight years. His role is to form partnerships across IEEE technical societies to find new opportunities for Young Professionals members. That includes helping develop micro volunteering roles for those who want to get involved with the organization but lack sufficient time.

At CISTER, Gaur's PhD work focuses on context-aware computing in wireless sensor networks and the Internet of Things.