Minister of Education and Science and Secretary of State of Science visited IT

Nuno Crato, Minister of Education and Science and Leonor Parreira, Secretary of State of Science, visited Instituto de Telecomunicações at Instituto Superior Técnico in Lisbon on April 8, to get a close look at the on-going research activities in this State Associate Laboratory. The visit started with a presentation by Carlos Salema, president of IT, who made an overview of the research strategy, management instruments and achievements that justify IT’s international recognition. IT is currently listed in ISI Essential Science Indicators and ranks in the 7th place in SIR Scimago Institutional Ranking report for Portugal. A visit to some of the key Labs followed, where the researchers answered interested technical questions from Nuno Crato and Leonor Parreira. At the end of the visit the Minister has acknowledged, in his address to the press, the importance of IT in the national map of science and technology, its international standing and self-funding capacity which has entitled IT for an Incentive Funding from FCT worth about 250 k€ in 2014.

The Minister Nuno Crato made also a detailed visit to the Aveiro site of Instituto de Telecomunicações on April 22 with the same motivation.

Editorial

Dear Colleagues,

A couple of months ago I criticized FCT project funding rules and demonstrated that, in the absence of loans, contractual funding could only be received after an infinite number of reimbursements. The minimum reimbursement condition $p_{min}$ worsens the situation and, again without loans, limits the received funding to well below its contractual value.

Apparently (or at least I would like to think so) my previous text reached its destination and a few days ago FCT changed, albeit slightly, its project funding rules. Now the first payment is at least 0.15 of the contract and reimbursements are 0.9 (instead of 0.85) times the eligible expense submitted.

Figure 1 (in page 3) shows the amount received according to the previous rules and with the new ones as a function of the number of payments $n$. It is pretty obvious that, whereas with the old funding rule an infinite number of payments would be required to receive the contractual funding, the new rule enables to reach the objective with a limited number of payments. This is indeed an improvement over the previous situation and FCT should be commended.

Things however could be further improved. The requirement for a minimum reimbursement, now at 0.1 of the contractual value, places a limit on the maximum number of reimbursements $n_{max}$ unless the research (continues on page 3)
PROJECT SNAPSHOT

GreenEyes – Networked Energy-Aware Visual Analytics

Visual sensor networks can be characterized by a large number of wireless low power sensing nodes that are empowered with sight and are capable of complex visual processing tasks. Since each node has to capture and process a large amount of information with limited energy and network resources, novel techniques to optimize the computation, coding and communication of visual data are much needed. Traditionally, a pixel-level representation of the visual data is acquired, coded and transmitted to a centralized and power-eager sink node where visual analysis is performed. However, high computational needs and data rates (energy resources) are required to transmit compressed data visual data to sink nodes when it only matters the high-level representation of the visual content (semantic concepts).

Therefore, GreenEyes is leveraging on the potential of the Internet of Things by proposing a change in the current paradigm with an ambitious long-term vision, in which battery-operated sensing nodes are capable of visual analysis tasks such as object recognition, visual tracking and event detection. Figure 1 shows the high-level system architecture proposed by the GreenEyes.

The key tenet is that most visual analysis tasks of the sensing nodes are carried out based on a succinct representation of the image, which entails both global and local features, disregarding the underlying pixel-level representation.
Editorial (continued from p. 1)

Figure 1. Fraction of budget received

unit makes use of (interest free) loans. Previously 0.15*0.85^{n_{\text{max}}} < p_{\text{min}}, where now 0.15*0.9^{n_{\text{max}}} < p_{\text{min}}. Figure 2 shows the maximum received funding as a function on the minimum reimbursement $p_{\text{min}}$.

The situation has definitely improved. Yet with no loans, (or extra funds), the maximum funding received is only about 0.5 of the contractual funding.

Figure 2 provides a simple suggestion for further improvement. Reduce the minimum reimbursement from 0.1 to 0.05, and research units will worry less about their bank accounts and devote more time and effort to their mission — research and development.

Carlos Salema

PROJECT SNAPSHOT — GreenEyes (continued from p. 2)

Nodes are equipped with low-power microprocessors and radio chips on board, so that they can communicate among each other and, whenever available, with a power-eager sink node. GreenEyes envisages a scenario in which sensing nodes do not transmit the underlying pixel-level representation to a powerful processing unit. Instead, each sensor node can acquire visual data, perform local processing to obtain features and attributes that are delivered to other network nodes to enable higher level visual analysis by means of either centralized or distributed processing. To this end, GreenEyes is developing a comprehensive set of new methodologies, practical algorithms and protocols, to empower visual sensor networks with vision capabilities. The key tenet is that most visual analysis tasks can be carried out based on a succinct representation of the image, which entails both global and local features, while it disregards the underlying pixel-level representation.

João Ascenso

URL: http://www.it.pt/project_detail_p.asp?ID=1662

Newsflash


The book presents a comprehensive analysis on D2D communication over LTE-A band. It considers 3GPP LTE -A as a baseline and explains all fundamental requirements for deploying D2D network under cellular systems from an architectural, technical and business point of view.

Best Paper Award at the IEEE WPTC 2014

Ricardo Fernandes, a PhD student at Universidade de Aveiro under supervision of IT researcher Nuno Borges de Carvalho, was awarded the Best Paper Award for his paper “Behaviour of Resonant Electrical Coupling in Terms of Range and Relative Orientation” at the IEEE Wireless Power Transfer Conference (WPTC) 2014 in Jeju Island, Korea, on May 8-9, 2014.

URL: http://www.wptc2014.org/main/

BiTalino awarded at the VII SAPO CodeBits

The toolkit developed by IT researcher Hugo Silva and his team has won the 2nd place in the Audience Awards at the VII SAPO CodeBits, that was held on April 10-12, 2014 in Lisbon, Portugal. CodeBits is a codefest held in Portugal annually, organized and sponsored by SAPO. This year it gathered 900 attendees from 10 countries.
Latest concluded PhDs hosted by IT

Nuno Alexandre Silva

Quantum Cryptography in Optical Fibers
PhD degree in Electrical Engineering by the University of Aveiro, December 2013, supervised by Armando Nolasco Pinto (UA).
The thesis addresses the key distribution problem in optical networks, proposing new methods to generate and transmit single and entangled photons over fibers mainly for quantum key distribution (QKD) applications. QKD systems allow to continuously exchange cryptographic keys improving the security of telecommunication networks. Nuno Silva is currently a Post-Doc researcher at IT, with a FCT grant.

Senka Hadzic

Cooperative Positioning for Heterogeneous Wireless Systems
PhD degree in Electrical Engineering by the University of Aveiro, February 2014, supervised by Jonathan Rodriguez (IT).
The thesis focused on localization in heterogeneous networks, in cases where conventional positioning techniques do not perform well due to lack of existing infrastructure. It concentrates on hybrid architecture where some nodes have points of attachment to an infrastructure, and simultaneously are interconnected via short-range ad-hoc links. Senka is currently working as a Post-Doc Researcher at the Fraunhofer Institute in Germany.

Samah A. M. Ghanem

Analysis, Modelling, Design, and Optimization of Future Communications Systems: From Theory to Practice
PhD degree in Telecommunications Engineering, December 2013 under MAP-Tele Doctoral program in Telecommunications, supervised by Miguel Rodrigues.
This thesis provides a novel framework based on multi-layer paradigms. With emphasis on precoding, cooperative diversity, and network coding, the work proposed novel models, designs, and transmission schemes to maximize data rate and minimize delay in future communications systems. Ghanem is currently a Post-Doc researcher at Eurecom Institute, France.

Munnujahan Ara

Reliable and Secure Wireless Communications System: A Physical-Layer Approach
PhD degree in Telecommunications under MAP-Tele Doctoral Program, October 2013, supervised by Miguel Rodrigues.
The thesis proposes a set of design methods and transmission strategies to secure wireless communication systems against eavesdropping and jamming attacks. The thesis builds upon information-theoretic security foundations to analyze, design and optimize schemes. Munnujahan Ara is currently an assistant professor at the mathematics department, Khulna University, Bangladesh.

Where are you now?

Matteo Naccari

I was born in Como, Italy in 1979. I studied Computer Science Engineering at the Technical University of Milan where I earned my M.Sc. and Ph.D. degrees in 2005 and 2009, respectively. In May 2009, I joined the Image Group lab (now Multimedia Signal Processing Group) in Lisbon as post-doc fellow.

My choice to work at the Instituto de Telecomunicações has been mainly motivated by the very positive experience I had in 2007 when visiting the same lab as Ph.D. student for 5 months. In the almost three years spent at IT, I worked on video coding techniques which exploit the features of the human visual system to increase the compression efficiency for the same perceived video quality. While working towards my day-by-day duties I could appreciate the good facilities, the nice and friendly environment IT provides to its people. I also followed the development from the early stage of the High Efficiency Video Coding (HEVC) standard which is now the state-of-the-art in video compression and will be massively adopted in new generation video coding applications.

The skills I developed during this research activity led me to apply and succeed in a job position at the R&D department of the British Broadcasting Corporation (BBC) in London UK. I joined BBC R&D in September 2011 where I started following and contributing to the MPEG standardisation process with focus on the HEVC standard. I must say that my post-doc experience at IT was absolutely positive and fundamental for the development of my professional career.