IT celebrates 25 years with a proof of vitality

Celebrating a quarter of a century during Techdays 2017, IT showed a prolific body of work with one of the biggest displays of technology and R&D present at the event. Between 12-14 October, the Parque de Exposições of Aveiro was once again the home of Techdays, the event that started in 2015, and now, with only three editions, is already considered one of the largest national technology forums. In a organization that involves the City of Aveiro, IT, InovaRia, the University of Aveiro, the Cluster TICE and the Centro Habitat, this 3rd edition of Techdays was focused on Health, the Sea, Robotics and Gaming.

IT brought to the event a total of 28 research project results (more than double comparing to 2016), aiming to facilitate potential collaborations with the industry. With applications that range from the area of life support to smart cities, there were several IoT technology demonstrators on display, from multimedia apps and smart objects that support physical rehabilitation, to disease diagnosis systems, and a facial animation system designed for games. Also on display there were projects results involving the use and development of technology for vehicular networks, a wireless power transmission system, technology for the upcoming 5G networks, and a lot more. During the event, IT also revealed some results of the project Aveiro Open Lab, presenting measurements of environmental parameters - temperature, CO2, pressure and humidity - of the city of Aveiro, collected by sensors placed on moliceiros and tourist trains.

One of the highlights of the first day was the conference “IT 25 years”. After the opening speech by Carlos Moedas, the European Commissioner for Research, Science and Innovation, two panels debated about the path and history of IT and also about the future of Telecommunications.

Finally, also during Techdays, the City of Aveiro, together with IT and Altice Labs signed a Letter of Intent to turn Aveiro into a laboratory for the 5G technology, positioning the city on the front line to welcome the deployment and initial experimentation of the 5G.
The main motto of the Conference “IT 25 Years” was to review what IT achieved along these 25 years and trying to forecast what is ahead, what the next 25 years might bring, not just for IT, but for the world of telecommunications.

Carlos Moedas, the European Commissioner for Research, Science and Innovation, who gave the opening speech, picked up on this motto and first addressed the many IT representatives and researchers in the audience, “Looking at what you’ve done, what you have achieved in 25 years, you as an institution, have actually played an amazing role, not just for Portugal but for the EU”. An Europe that, according to him, now looking at the future, “needs to follow the rule of the three O’s: Open Innovation, Open Science and Open to the world” to be on the front line of the scientific and technological progress.

It was time to “have a little talk about the past”, said Carlos Salema, the President of IT, presenting two key figures in the growth of IT, Helena Nazaré and Paulo Nordeste, and also José Manuel Fonseca (President of INESC-TEC), to whom the President of IT thanked “for all the support since the beginning of IT”. For Helena Nazaré - former Rector of the University of Aveiro, one of IT´s first Associates - IT’s model was pioneer for its multipolarity, “for collaborating with other universities, incorporating knowledge, innovation and commercialization”. IT’s collaborative model was also praised by José Manuel Fonseca, for whom IT, by disseminating its good science and research practices with several national universities and polytechnics, also fulfilled “a missionary mission of great importance, having therefore a great dimension and a truly national expression”. In a time where “there was little collaboration between universities”, remembered Paulo Nordeste, the setting up of IT involved “a complex application process to the Programme Ciência” through the signing of three contracts with the first IT Associates, the University of Aveiro, the University of Coimbra and the Instituto Superior Técnico. Carlos Salema then remembered it was Paulo Nordeste - former CEO of PT Inovação - who first suggested that IT should have an Advisory Board, and also suggested the idea of an international telecommunications conference organized by IT, which, in a way, originated years later the Techdays.

Both Paulo Nordeste and José Manuel Mendonça referred to IT as an internationally recognized institution in the telecommunications world, “contributing not only for the international recognition of Portuguese science, but also of many companies. And more recently, a most relevant contribution for FCT’s international partnerships with US universities, in particular with Carnegie Mellon”, said the President of INESC-TEC.

“Until now we have been talking about history, and now we are going to make history for the future”, said Carlos Salema, inviting the audience to take a leap towards the future. And what better way to start a discussion about the future of telecommunications than to remember its biggest revolution, the mobile phone. Martin Cooper, the visionary “father of the mobile phone”, reminded the audience how, for 100 years, people were told by the phone companies that the only way to communicate from a distance was through a wire.
Somewhere in the 60’s, At&T announced that it was going to release us from that wire by using cellular phones in cars. But Martin, at the time the Motorola Corporate Director of R&D, believed that solution wouldn’t cut it. So, with one simple principle in mind, that “people are fundamentally and inherently mobile”, he and his team at Motorola created the first mobile phone. Ten years later and the first analog phones were commercialized. “A revolution is when the habits and activities of a large number of people, are changed in a meaningful way. We’ve created a revolution”, said Martin. Currently, about two thirds of the World population is connected by mobile devices, “and I don’t know of any other technology that has caused something like that”, he added.

With the arrival of the 5G, Martin forecasts that, within the next generations, we might be able to tackle people’s real problems by revolutionizing our Healthcare, our Education, as well as reducing the World’s economic disparities. He presents examples about how technology can help to prevent disease - “we will be able to sense a single cancer cell developing in someone’s body, know were it’s happening and zap it”; how games can benefit our education - “What I have observed is that the most effective way of learning happens when children play games on a computer, because the game engages you, you are entertained, you want to do it, it’s adaptive because it gives you an alternative when you run into a problem”; and how the new tools available are teaching us different ways to interact – “When you put them all together they are the elements of the collaborative process, and, over the next generations, that is going to change the world profoundly”. Hoping the 5G can represent the start of this necessary revolution, however he cautions to the dangers of falling in love with science and forgetting about the people. “Remember that everything you do has to be based upon on how people are going to benefit from it. My definition of 5G is to get more people, more benefits, to solve more problems”.

Nuno Borges de Carvalho, moderator of this second panel, then presented Upkar Dhaliwal, President of Future Wireless Technologies and an entrepreneur by excellence - “I think everything we imagine in technology he has been doing, or he has done or he will be doing in the future”. For Upkar, technology is enabling us to change our culture and our life style, the way we interact, the way our children think differently than we do. “Going forward it’s the rise of the machines, of the internet, of the matrix. We will be more and more connected. And how we, has engineers, influence our culture and society, because our culture and society are going to change rapidly”. The debate about telecommunications towards the future closed with Paollo Volloresi, from the Department of Engineering of the University of Padua addressing the scientific breakthrough that is quantum communications.

Finally, on his closing speech, Manuel Heitor, the Portuguese Minister for Science, Technology and Higher Education, highlighted the role of Carlos Salema as “the main figure of IT’s construction, and to all who contributed to make IT a truly European institution, for building bridges both inside and outside Portugal, connecting IT with other science and research institutions from all over the World”. Whereas 25 years ago, Portugal’s investment in R&D was equivalent to 1% of its GDP, Manuel Heitor says that now the investment has to rise up to 3%, which he believes is the only way we can converge to a Europe of knowledge. “And achieving that by 2030 must be clearly our goal. We cannot settle for what we’ve achieved, but today we have the ambition, with the experience of institutions like IT, that we can do more and better. And for this I thank everyone and I congratulate IT and in particular Carlos Salema, for these 25 years of continuous success, because the next 25 years are just ahead”. 

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The European Commissioner Carlos Moedas and the Minister Manuel Heitor gave the opening and closing speeches
A project from IT in Aveiro has been focused on finding the advantages of using plastic fibre for sensors and communications, instead of the commonly used fibreglass. “We try to find applications that are more beneficial, such as measuring the deformation with the plastic fibre, where we can reach much higher elastic limits than those obtained with fibreglass. We can also measure the humidity, which is not possible with fibreglass, and measure temperature with much greater sensitivity”, said Ricardo Oliveira, working on this project under the coordination of Rogério Nogueira. Being able to measure parameters like temperature, humidity, deflection index and others allows, for instance, to help determine the level of structural deformation of a bridge or a building.

Berta Neto, also from IT in Aveiro, presented us a chip developed under the project COMPRESS, coordinated by António Teixeira. “The main goal is to do data compression fully in the optical domain. To do so, we implemented photonic integrated circuits on a chip”. This methodology of integrated optics may allow large energy savings and processing capacity relief in the current compression / decompression systems.

With 5G being one of the hot-topics of this event, Rafael Caldeirinha, from IT in Leiria, gave us a glimpse of the future, presenting two projects involving technology designed for the 5G.

Due to its potential for multi-gigabit and ultra-low latency links, mmWave technology is expected to play a central role in 5th Generation networks. On display at the IT stand, Rafaela Caldeirinha and his team from IT in Leiria had a complete multi-gigabit end-to-end 5G testbed at mmWave. This system allows testing the transmission performance in real-time, over-the-air (OTA) from the source to the receiver. This platform is reconfigurable in real time allowing on-the-fly selections of digital modulation of 256 QAM. Also, through the incorporation of digital signal processing advanced algorithms, the system is able to mitigate all of the system and channel imperfections. “We are proud to say this work was developed with PhD students, with a very low budget. It was developed in a partnership with TWEvo, a spin off from IT, the University of Vigo (Spain) and the University of South Wales (UK)”, added Rafael Caldeirinha.

From IT in Leiria, Rafael Caldeirinha also brought a technology for the 5G and future Radar systems. On display, a demonstration of a real time (electronically reconfigurable, compact, planar and low cost) beamsteering antenna that uses only one radiant element coupled to a meta surface. This technology can be used in the fast tracking of moving terminals (5G) or moving targets (Radar).

At the IT stand there were some examples of how information and communication technologies (ICT’s) and health are increasingly interconnected, and how this relation can benefit health in general.

Developed at IT in Porto, the digiscope systematically records and transmits heart sounds, enabling the automatic detection of heart murmurs and pulmonary hypertension. Licenced to IS4Health, an IT spin-off, this technology is used in an innovative simulator called IS4Learning, which allows teaching and training cardiopulmonary auscultation skills.

From IT in Lisbon, João Felício and Catarina Rebocho presented a new medical imaging application that uses Microwaves for mass population screening. This portable non-invasive technology can be used in the diagnose of bone fractures, allowing for first care attendance in ambulances on the way to the hospital. It can also be used in breast cancer screening, as a painless and low-cost alternative to Mammography.

JustPhysiokidding is a platform that can help in the physical rehabilitation of children suffering from brain paralysis. These games engage children in doing the repetitive movements defined by a therapist as necessary for their physical rehabilitation. “Using another interface, the therapist can analyze the collected data” – said André Antunes, one of the researchers involved in this project – which allows monitoring the rehabilitation and the patient improvements. The same group, coordinated by Octavian Postolache (IT in ISCTE-IUL), also brought a smart walker prototype. This device helps to guarantee the proper usage of mobility aiding devices. The prototype consisting of an instrumented walker is capable of detecting risky situations, classify steps and assess gait. The raw data is transmitted over a Bluetooth linked to a PC, where the “Spy walker” application computes risk indexes and estimates gate metrics. These measures are presented in real time to a physiotherapist and stored for further analysis.

Hugo Silva was in techdays displaying the work that the Pattern and Image Analysis (PIA) Group of IT in Lisbon has been developing with BITalino, using off-the-person physiological sensors that can be placed in everyday objects to acquire all kinds of bio signals. For instance, by using these sensors on a car wheel, it is possible to control factors like fatigue and cardiac abnormalities in an identified user. Hugo Silva revealed to us that Nokia has plans to the technology in some vehicles in India. Another example of the multiple applications of these sensors was presented to us by Pedro Esteves, from IT in Covilhã, where, under the coordination of Nuno Gracia, a research team has also used BITalino technology to develop a prototype that collects biosignals from swimming athletes. Using Bluetooth, the collected data is transferred to a computer and, with the help of software like the Open Signals and MATLAB, is transformed into graphs that allow the athlete to evaluate his performance.