THERE IS A NEW METHOD FOR MONITORING THE ELECTRICAL GRID AND IT HAS RECEIVED THE REN AWARD

BRUNA TAVARES RECEIVED €12,500 FROM THE OLDEST EXISTING PORTUGUESE SCIENCE AWARD

There is a new method for monitoring the state of the national electrical grid and it has earned Bruna Tavares the REN award, amounting to €12,500. Imagine a robot with a path to follow. Along that path, the robot receives light and acoustic signals to guide it. It must combine these signals in order to form an internal map that allows it to understand the exterior reality. Let us now apply the same concept to the electrical system in order to understand the new method proposed by the researcher, which essentially consists of producing, in a similar manner, a sensor fusion of signals received by different devices in order to better understand the state of the national electrical grid. This was the prize winner of this year's edition of the oldest Portuguese award acknowledging scientific contributions.

What is the advantage of this new method? It will help the operator to control and to increase the quality of the grid service, which in turn will lead to a better performance in the service provided to the consumer.

“End-consumers take the availability of energy in their homes for granted. However, for that to be possible, with quality and accuracy, several processes have to be taken into account”, explains Bruna Tavares, researcher at the Centre for Power and Energy Systems (CPES) of the Institute for Systems and Computer Engineering, Technology and Science (INESC TEC).

But how is the current system? Throughout the electrical system, there are conventional sensors that measure the state of the grid. Most recently, in countries such as Brazil or Spain, more advanced sensors have appeared which collect measurements from the electrical system with time and GPS tags. These inexpensive sensors do not need to be placed along the entire grid, as long as they are correctly fused with the conventional sensors.

What has Bruna Tavares proposed? A fusion of the information from different classes of sensors, in a way that enables the coexistence of different types in the same system, which in turn leads to increased accuracy in the estimation of the grid state. In Portugal, these more advanced sensors do not yet exist. However, the method developed by the researcher proposes precisely a method that enables their inclusion, taking advantage of the different characteristics of the different types of sensors. Another fusion method has already been proposed. However, it does not take into consideration the fact that different properties exist among sensors, such as failure probability and accuracy.

"There are more advanced sensors with great capacity for collecting information. The inclusion of these sensors along the electrical grid, together with information from the conventional sensors, will have a great impact on the monitoring of the system. What is truly needed is to fuse these measurements with the conventional ones. Following the method that I have developed, it is possible to have a much more detailed and accurate visualisation of the grid state, which benefits everyone", says the INESC TEC researcher who received the REN award with the master's thesis developed within the scope of the Integrated Master in Electrical and Computer Engineering of the Faculty of Engineering of the University of Porto.

The work carried out by the researcher within the scope of the thesis was supervised by Vladimiro Miranda, member of the Board of INESC TEC and full professor at FEUP, and cosupervised by Jorge Pereira, INESC TEC researcher and professor at the Faculty of Economics of the University of Porto (FEP).

"The method I have developed together with researchers Vladimiro Miranda and Jorge Pereira presents not only the sensor fusion component, but also different criteria for the estimation of measures in the grid, which despite not being used by the industry at the moment, have a series of advantages, namely ignoring measurement errors", explains Bruna Tavares.

Some of the results reached by the researchers have already been presented in Texas and will now continue to be studied at INESC TEC, in cooperation with INESC P&D Brasil, in order to apply these methods to the industry.

The REN award was presented to the researcher from Porto and to other awardees this Friday, at 3.30 pm, at the Hotel Ritz Fundação Champalimaud, in Lisbon.

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