

## Technical Seminar on

# Seeing events in 2D pictures with deep learning applied to visual cortex neural architectures: a tool of the future for power system control centres

**Date:** 14 Sep 2017 (Thursday)  
**Time:** 18:30 – 20:00  
**Venue:** Room V302, Main Campus, PolyU  
**Speaker:** Professor Vladimiro Miranda (IEEE Fellow)

### Abstract

PMUs are being installed and then control centers are becoming flooded with a tsunami of data. The information contained in such big data environment is largely left unused, but the PMU data contain signatures of dynamic events and the prompt recognition of such events could lead to better alarm processing, more accurate event diagnosis and possibly to preventive problem detection. The talk will reveal the most recent advances in dealing with this big data problem through deep learning with CNNs (Convolutional Neural Networks), whose architecture mimics the visual cortex of the human brain, and computing with GPUs (Graphic Processing Units). PMU real data from Brazil will show how the transformation of PMU time domain measurements of system frequency into 2D colour pictures allows a 100% success, with a CNN, in recognizing and classifying dynamic events such as, for example, generator or line tripping, load disconnection of inter-area oscillation.

### Speaker

**Professor Vladimiro Miranda** holds a Ph.D. degree (1982) from FEUP, the Faculty of Engineering of the University of Porto, Portugal. He has been a lecturer at FEUP since 1980, holding presently the position of Full Professor (Professor Catedrático) in the area of Power Systems, and President of INESC P&D Brasil, São Paulo, Brazil.

Since 2000 he has been serving as a Member of the Board of Directors of INESC Porto - a private, nonprofit R&D institute, declared of public interest. INESC Porto is now the coordinating entity of INESC TEC – INESC Technology and Science, appointed as Associated Laboratory by the Ministry of Science of the Government of Portugal. He is presently appointed as President of INESC P&D Brasil. He has previously been President of the Board of Directors of INESC Macau, China. He has been always a researcher in the Power Systems Unit of INESC TEC.

He was Visiting Professor in the Federal University of Pará, Brazil, in 2005. Previously, he had been Professor in the University of Macau, China (1996 and 1997). He has been serving in the Administration board of companies incubated by INESC. He also acted as consultant for industrial companies and for companies and agencies devoted to innovation and technology.

He has been serving as Project evaluator for the Foundation of Science and Technology in Portugal, as well as for similar governmental organizations in Norway, Croatia, South Africa, Chile and Argentina, for whose Ministry of Science and Technology he has also served as evaluator of research institutions.

His expertise areas are in planning and operation of power systems including large scale integration of conventional and new renewable energies and in the application of a Computational Intelligence approach to models.

He has authored a large number of publications in the most prestigious international journals in his area of expertise, mainly in the IEEE Transactions in Power Systems. He is recognized as an international expert in Computational Intelligence in Power Systems and for this motive he was elevated to the degree of Fellow of the IEEE (USA). He is the recipient in 2013 of the IEEE PES Rumakumar Family Renewable Energy Excellence Award.

**Note**

The seminar is jointly organized by the IEEE-HK Joint Chapter of PES/IAS/PELS/IES and EE Dept of PolyU. No pre-registration is required. Certificate of attendance will be issued.

For enquiries, please contact Professor XU Zhao at eezhaoxu@polyu.edu.hk.

**Venue Location:**

