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Ph.D. School of Electrical and Electronics Engineering and Computer Science

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Quantum Machine Learning (QML) for Earth Observation (EO) – QML4EO

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May 3, 2024, 14:30 – 16:30
Zoom link: https://bit.ly/40HKCLn

Abstract: The intense use of ML-based methods has given rise to an escalation in the world of research for the observation of the Earth from space, leading scientists to develop increasingly sophisticated techniques. Moreover, considered the many remote sensing missions currently operative, carrying on board multispectral, hyperspectral, and radar sensors, and the improved capabilities in transmitting and saving a continuously increasing number of images, nowadays estimated in over 150 terabyte per day, the amount of data from EO applications has reached impressive volumes so that they are often referred to as Big Data.
The seminar will present some concepts on Quantum Computing (QC) to deepen some aspects related to Quantum ML (QML), representing a substantial advance in the research world applied to AI, where the employment of quantum computers is spreading quickly.
For ML applications, quantum computers provide important benefits since they can avoid getting stuck at relative minima in gradient descent, by quantum tunnelling through the "hills". Practically, quantum computers are likely to reach a better solution than classical computers. Moreover, QC provides other benefits for ML, such as fast linear algebra, quantum sampling, quantum optimization. Despite the still unsolved limitations, quantum resources are expected to provide advantages for learning problems.
After discussing the issues described above, the seminar will present some case studies where QML has offered solutions to Land Use Land Cover (LULC) classification problems in RS.

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