ICT PHD

Research project for a PhD curriculum in ICT – Computer Engineering and Science

**Tutor**: Prof. Costantino Grana

**Proposed Title of the research**: 2D and 3D Medical Imaging with Deep Learning Techniques

**Keywords:**

medical imaging

image processing

computer-aided diagnosis

**Research objectives: (max 10 rows)**

Healthcare is one of the key sectors of the global economy. The use of technologies in health is a strong path to more efficient healthcare, benefitting both individual people and the public budgets. European public health systems are generating large datasets of biomedical images, as most medical examinations use image-based processes, which nowadays are generally performed manually. Within the DeepHealth project HPC infrastructures, Deep Learning and Artificial Intelligence techniques are combined to support biomedical applications that require the analysis of large and complex biomedical datasets. Thus, new and more efficient ways of diagnosis, monitoring and treatment of diseases are expected. The specific research objective is the study and realization of new Deep Learning based algorithms for the analysis of 2D and 3D medical images/volumes. This will be developed within the DeepHealth framework, which aims to increase the productivity of researchers working on biomedical images.

**Proposed research activity: (max 10 rows)**

Design and development of algorithms using both the European Computer Vision Library (ECVL) and European Distributed Deep Learning Library (EDDL). This activity includes the study of the most recent works on image processing applied to medical imaging, and the optimization of image processing and computer vision algorithms, in order to manipulate medical images in an efficient way. Besides research activities, the PhD student will attend classes on image and video processing, software optimization, and summer courses. Periods of activities in foreign labs are also possible.

**Supporting research projects (and Department)**

DeepHealth Project – Dipartimento di Ingegneria “Enzo Ferrari”

**Possible connections with research groups, companies, universities.**

Universitat Politècnica de València, Spain