The evolution of galaxy morphologies through deep learning convolutional neural nets

Supervision team:
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Project description:
Deep learning is steadily revolutionising complex classification and measurement problems in astronomy, such as the discovery and characterisation of strong gravitational lensing systems (in which we have a PhD student already using deep learning) and the classification and description of the structures and shapes of galaxies.

The forthcoming Euclid space telescope launching in 2020 will measure redshifts for tens of millions of galaxies and the shapes of over a billion galaxies. The galaxy morphologies in Euclid's imaging survey at redshift z=1 will be very similar to today's SDSS morphologies at z=0.1. This is the ideal data set to trace the origins of spirals and elliptical galaxies, and the roles of galaxy-galaxy mergers and environment, but the sheer size of the data set makes it problematic to mine.

The aim of this project is to create convolutional neural networks to characterise and quantify the morphologies of galaxies, and apply it to the CANDELS survey data from the Hubble Space Telescope and to (initially simulated) data for Euclid.

Qualifications required:
First class honours in a first degree or a Merit at MSc preferred, or 2:1 combined with relevant skills sets