Queen Mary Summer School
SUM401N Practical Machine Learning
School of Physics and Astronomy

Course outline
Level: 5
Credits: 15 (Queen Mary credits)
Course leader: Dr Adrian Bevan
Assessment: in-class skills assessments (25%), portfolio assessment (50%) and oral assessment (25%)

Course description:
Machine learning influences modern life in many different avenues and is silently revolutionising the way we live and work. We can see the influence of machine-learning algorithms in social media, web search engines, mobile device spell checkers and self-driving cars. This course will give you an introduction to machine learning using the Python programming language and the TensorFlowTM programming toolkit from Google. No programming background is assumed, however if you want to take this course, you should be familiar with using computers.

This course is taught by scientists using machine learning for data analysis at CERN's Large Hadron Collider and will allow you to work on practical examples from both general and physics-based problems. Examples will be drawn from a variety of problems in order to allow you to build up an understanding of the tools and how to use them. This will prepare you for a mini-project analysing data from a particle physics experiment to complement the examples encountered earlier in the course.

Learning outcomes:
You will learn/develop:

- basic commands in Python and learn how to manipulate data using this programming language
- how to use TensorFlowTM tools to optimise neural networks and convolutional neural networks as examples of machine-learning algorithms
- a comprehension of machine-learning algorithms and their use.

Approximate cost:
All reading material is provided digitally so you are not required to purchase any books.

Assessments:
The course assessments are not compulsory, however, if you wish to transfer credit for this course to your home university it is essential to complete the assignments.
In-class skills assessments (25%), portfolio assessment (50%) and oral assessment (25%)

Preparation:
Before you arrive on campus, it is advised that you familiarise yourself with the course content before it begins. You will be given instructions for accessing our Virtual Learning Environment (QMplus) before you arrive on campus.

Teaching:
The course is taught in two two-hour sessions per day (10.00 - 12.00 and 13.00 - 15.00), held Monday to Thursday each week.

Please note that the information provided may be subject to change.