Jupyter Notebook Basics

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August 13, 2018

The lecture notes on face detection and recognition for COSC470 are presented as Jupyter notebooks. Jupyter is almost an acronymn for Julia, Python, and R, which are the most common languages used in the notebooks. Jupyter runs as a web application, and Jupyter notebooks are documents that contain a mix of different types of markup and code. The code in the documents can be run interactively, allowing for a mix of documentation, description, and executable code.

Jupyter in the Labs

There are a number of ways to launch Jupyter, but one of the easiest is through the Anaconda python environment, and Anaconda Navigator in particular.

This software is installed on the machines in Lab B, but is freely available if you wish to install it on your own computer. To view a notebook follow the following steps:

1. Start *Anaconda Navigator* (command-space will bring up Finder's search tool and just start typing)

2. You should see the home screen shown below. Note the drop-down box in the top centre – select *COSC470* from the list of environments.
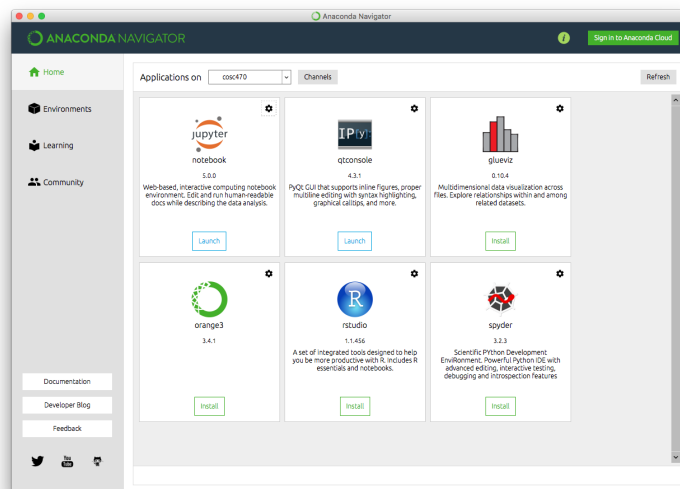
3. Click *Launch* on the Jupyter notebook panel

4. Your default browser should launch,a nd the Jupyter server will start running. In the browser window you will be able to navigate to, and open, the notebooks.

Jupyter at Home

Anaconda is a free python environment, which you can download and install from https://www.anaconda.com/. To use the notebooks for COSC470 you will also need to install a couple of additional packages. These are the OpenCV libraries for computer vision and TensorFlow for deep neural networks. You can find out more about these libraries and the installation process at the following links:

- https://anaconda.org/conda-forge/opencv

- https://www.tensorflow.org/install/ (follow the link for your OS and look for Anaconda)

There are a number of other libraries used, such as `matplotlib` for plotting and `numpy` for numeric computations and data structures, but these should be included in the Anaconda installation. Note, however, that I have set this up exactly once, so can only offer sympathy and generic advice if this proves more difficult than expected.

Jupyter Basics

A Jupyter notebook consists of *cells* which contain code that can be run from the browser. These cells can contain different languages, but the notebooks for COSC470 include either Markdown or Python. Markdown is a mark-up language similar to (but simpler than) HTML that lets you do basic formatting of text, and also supports mathematics via LaTeX syntax. Python is used to script the executable code in the notebooks, as it supports both computer vision (OpenCV) and deep network (TensorFlow) libraries.

You can edit and run cells interactively, which should be fairly straight forward. Note, however, that the state of variables in code snippets is shared globally, so what matters is the order in which code is run, not where it appears in the document.