Setting up Jupyter Notebook

COMPSCI 389

Introduction

Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations, and narrative text. It is widely used for data science, scientific computing, and machine learning. We will be using it for CS 389 extensively. Unlike a traditional programming environment, you can run code one block at a time. This saves you from rerunning the program every time you make a change.

Prerequisites

Before setting up Jupyter Notebook, you need to have python installed. You can check if you have Python installed by running the following command in your terminal:

```
python --version
```

If you don't have Python installed, you can download and install it from the official Python website: `https://www.python.org/`. Pip comes installed during the installation process. It is a popular python package manager for installing libraries. Alternatively, you can use conda, a system package manager that also handles library dependencies outside of python packages. You can find more information about the installation process for conda here.

Installing Jupyter Notebook

There are several ways to install Jupyter Notebook, including using pip or conda (you just need to choose one).

To install with pip, run the following command in the terminal:

```
pip install notebook
```

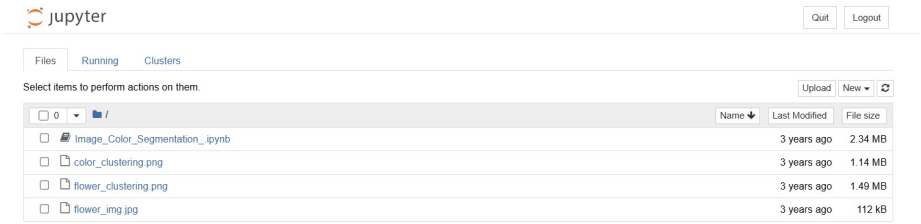
If you are new to conda, check out this guide for getting started. Make sure you create and activate an environment before installing any packages. You can install Jupyter using the following:

```
conda install -c conda-forge jupyter
```

After the installation is complete, head over to the folder you are working on and open the terminal in that directory. You can start Jupyter Notebook by running the following command:

```
jupyter notebook
```

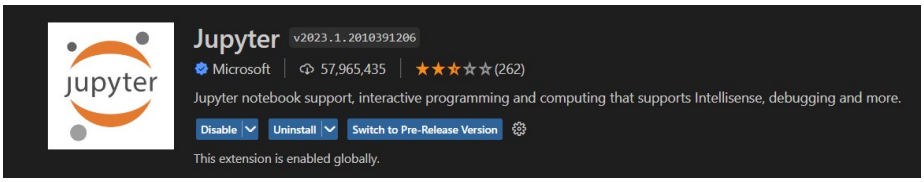
This will launch a new web browser window and open the Jupyter Notebook dashboard, which allows you to create new notebooks and manage existing ones. It will look something like this:



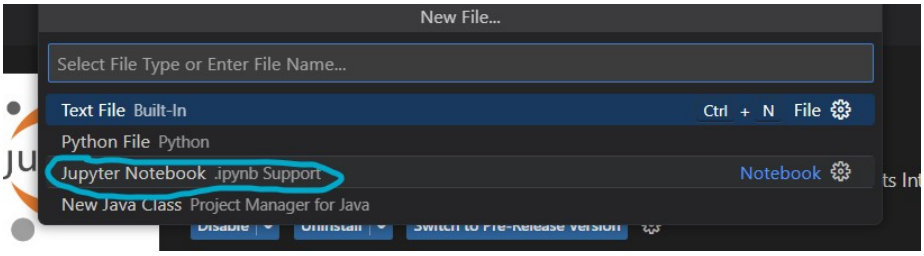
Notice that Jupyter notebooks have the file extension of .ipynb. This type of file can be easily shared and is accessible from Google Colab, an online notebook environment with support for GPU acceleration. This will be useful when we are training larger neural network models that require more computing resources.

Jupyter Notebook in Visual Studio Code

VS Code is one of the most popular text editors out there. You probably used it in past cs classes. The good news is that you can run Jupyter notebooks right from VS Code. To get started, install the Jupyter extension here. It should look something like this:

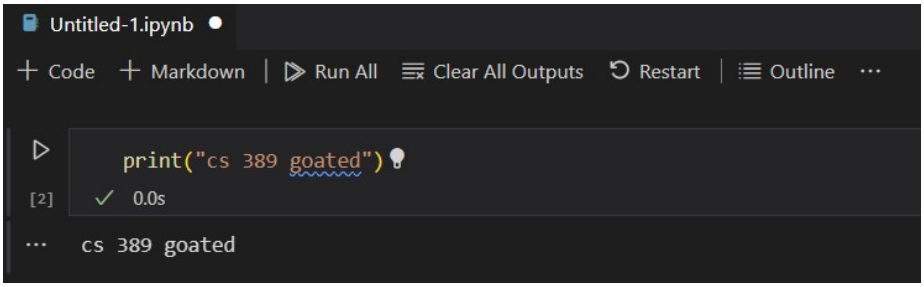


Once you install the extension, make sure it is enabled. Now you should see the option for .ipynb support when you create a new file.

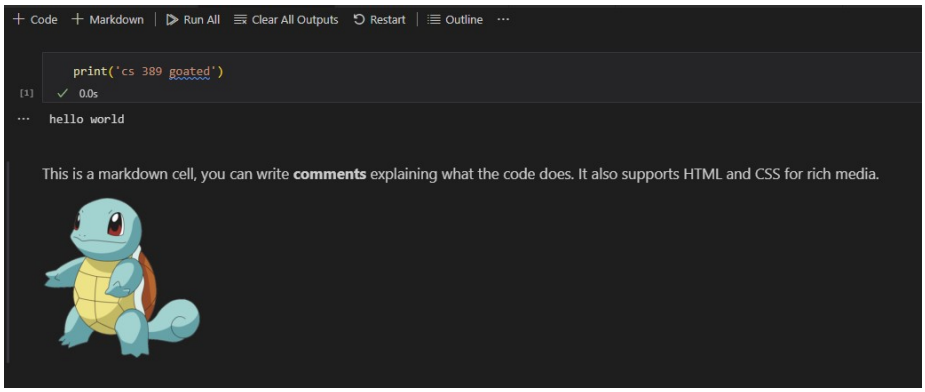


This should create a new notebook file. We can run the code cell by clicking on the play button. You can also add more code cells using + Code located in the top left corner.

In Jupyter Notebook, code is organized into cells, which can be executed independently of each other. Each cell can contain single or multiple lines of code, and the output of the cell is displayed directly below it.



We can also insert non-code cells, they are called markdown. You can write comments explaining what the code does. Notice how they don't have a play button, because you can't run them. What is neat with markdown cells is that you can embed rich media using HTML and CSS. Here I inserted an image using the image tag.



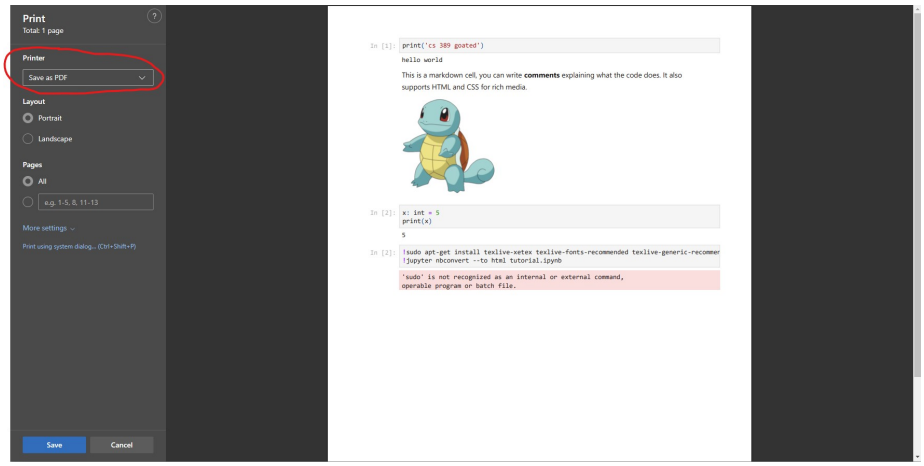
If you want to run all the cells, you can click on the Run All button. It saves you time from running all the code cells individually. However, it does not clear stored values. To do that, you need to restart the session. If you ever encounter some weird bug, try restarting the session. Sometimes, it could just be a stored variable that is messing up your program.

Submitting Notebooks

In this class, we will use Jupyter Notebook for homework assignments. To submit the work, you want to convert your notebook into a PDF. Open up Jupyter Notebook, and run this in a code cell.

```
!sudo apt-get install texlive-xetex texlive-fonts-recommended texlive-generic-recommended
!jupyter nbconvert --to html filename.ipynb
```

Replace filename with the name of the file itself. It should generate an HTML file in the same directory, which you can save it as a PDF. If you get any error with running the command, feel free to ignore it as long you see the generated file.



More Resources

We went over the steps to set up Jupyter Notebook on your local machine. If you want to learn more, you can check out the following resources:

Getting familiar with the Jupyter Notebook environment

Customizing themes

If you have any questions with the installation process, please make a post on piazza.