

DeepRob Discussion 3

2/4/2025



Session Agenda

- Running Locally
- P2 Kickoff
- NVidia NeRF Demo

Discussion Learning Objectives

- Environment Setup
 - Coding Environment
 - Required Libraries
 - Verify Operation
- Preliminary review of results
 - Demonstration Output
 - Submit for Points



Coding Environment

- Microsoft VS Code
 - Available at [Visual Studio Code - Code Editing. Redefined](#)



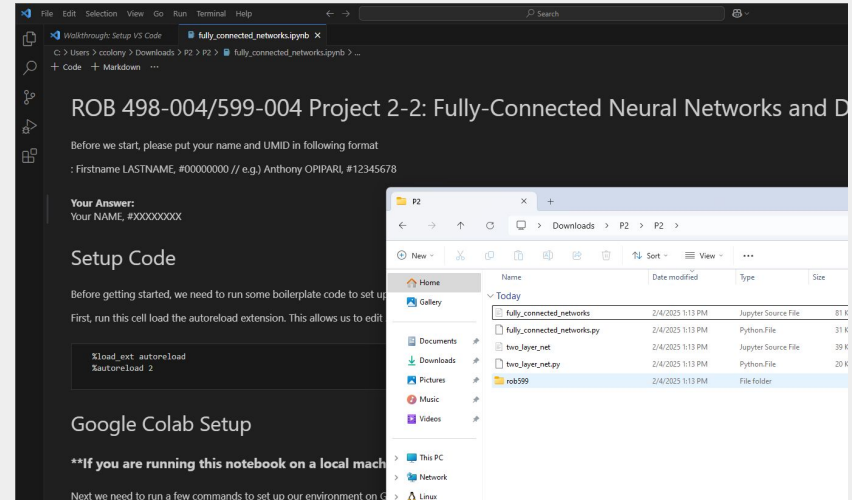
Coding Environment

- Add PATH Variables!
- Add Context Menus

Project File Requisition

[Project 2 | DeepRob: Deep Learning for Robot Perception](#)

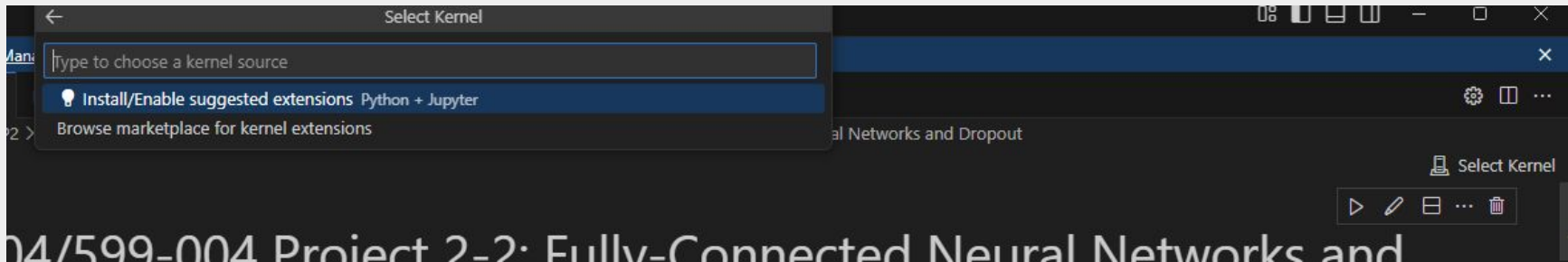
Drag notebook files to VS Code





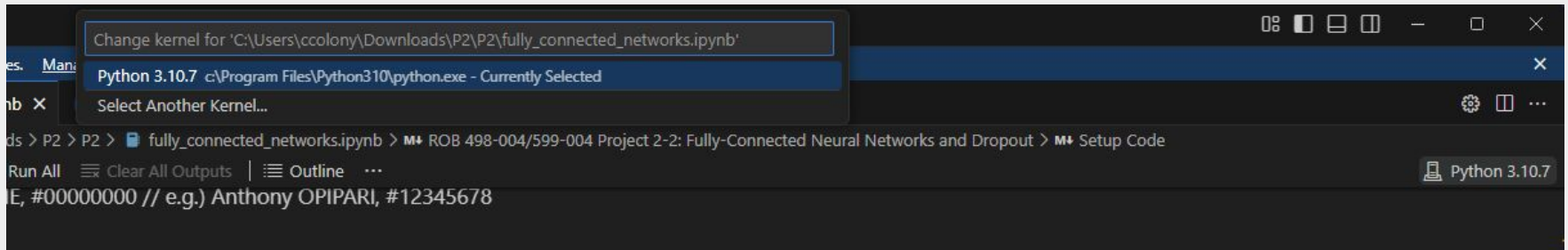
Install Python/Jupyter Extension

Should pop-up when opening notebook





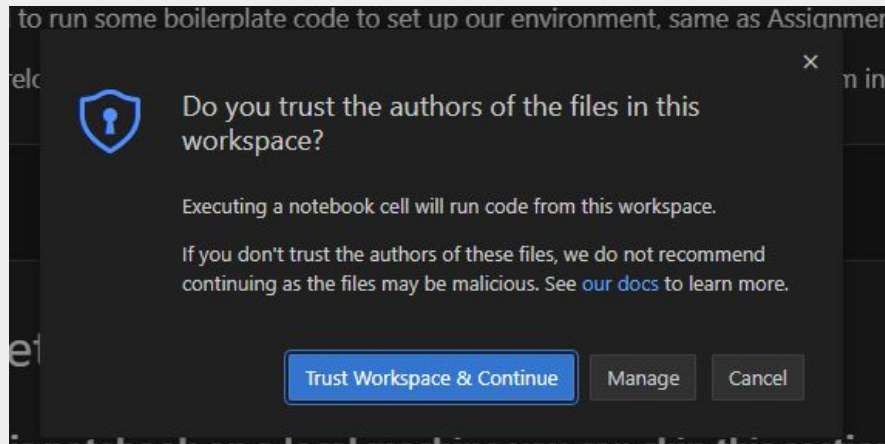
Select Python Environment





Trust the Workspace

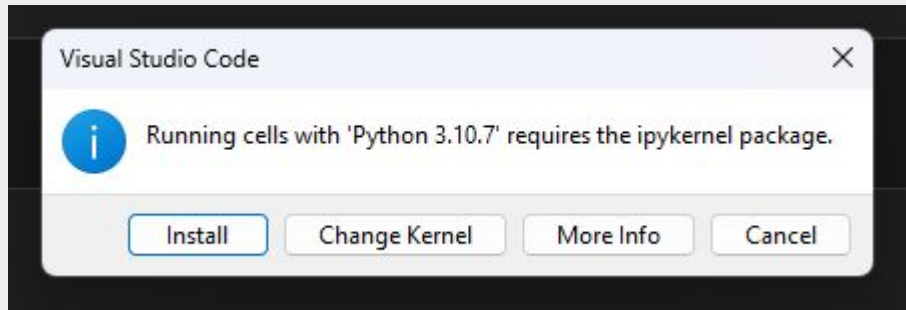
Select Trust Workspace & Continue





Install Kernel Package

Select Install





Skip Colab Specific Cells

This is not a problem

```
>
from google.colab import drive
drive.mount('/content/drive')

[3] 0.1s

...
-----
ModuleNotFoundError                                Traceback (most recent call last)
Cell In[3], line 1
----> 1 from google.colab import drive
      2 drive.mount('/content/drive')

ModuleNotFoundError: No module named 'google.colab'
```



Setup Project Path

```
import os
```

```
# TODO: Fill in the Google Drive path where you uploaded the assignment  
# Example: If you create a 2025WN folder and put all the files under P2 folder, then '2025WN/P2'  
# GOOGLE_DRIVE_PATH_AFTER_MYDRIVE = '2025WN/P2'  
GOOGLE_DRIVE_PATH_AFTER_MYDRIVE = r'C:\Users\ccolony\Downloads\P2\P2'  
#GOOGLE_DRIVE_PATH = os.path.join('drive', 'My Drive', GOOGLE_DRIVE_PATH_AFTER_MYDRIVE)  
GOOGLE_DRIVE_PATH = os.path.join(GOOGLE_DRIVE_PATH_AFTER_MYDRIVE)  
print(os.listdir(GOOGLE_DRIVE_PATH))
```

```
[4] ✓ 0.0s
```

```
... ['fully_connected_networks.ipynb', 'fully_connected_networks.py', 'rob599', 'two_layer_net.ipynb', 'two_layer_net.py']
```

Bypass Timezones

```
os.environ["TZ"] = ""  
#time.tzset()
```



Start Installing Packages

```
ModuleNotFoundError: No module named 'torch'
```



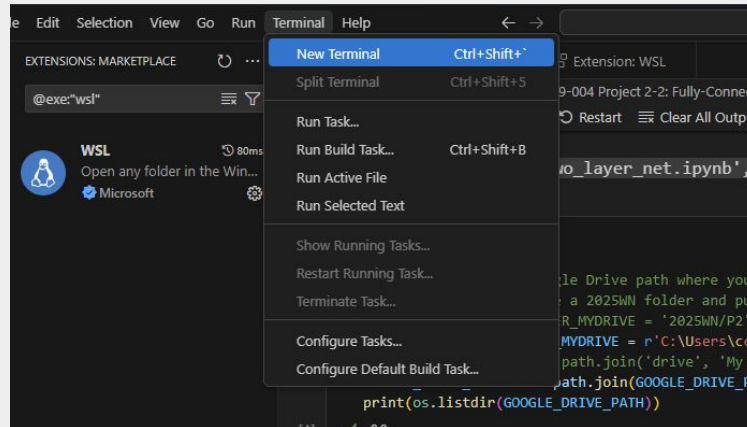

Start Installing Packages

Torch is from pytorch.org

PyTorch Build	Stable (2.6.0)		Preview (Nightly)		
Your OS	Linux	Mac	Windows		
Package	Conda	Pip	LibTorch	Source	
Language	Python		C++ / Java		
Compute Platform	CUDA 11.8	CUDA 12.4	CUDA 12.6	ROCm 6.2.4	CPU
Run this Command:	<pre>pip3 install torch torchvision torchaudio --index-url https://download.pytorch.org/whl/cu126</pre>				

Start Installing Packages

Install Packages from Terminal





Start Installing Packages

Install Packages from Terminal

```
PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL PORTS JUPYTER
PS C:\Users\ccolony> pip3 install torch torchvision torchaudio --index-url https://download.pytorch.org/whl/cu126
Defaulting to user installation because normal site-packages is not writeable
Looking in indexes: https://download.pytorch.org/whl/cu126
Collecting torch
  Downloading https://download.pytorch.org/whl/cu126/torch-2.6.0%2Bcu126-cp310-cp310-win_amd64.whl (2496.1 MB)
    1.1/2.5 GB 131.2 MB/s eta 0:00:11
```



Start Installing Packages

Torch Complete

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS JUPYTER
Collecting MarkupSafe>=2.0
  Downloading https://download.pytorch.org/whl/MarkupSafe-2.1.5-cp310-cp310-win_amd64.whl (17 kB)
Installing collected packages: mpmath, sympy, pillow, numpy, networkx, MarkupSafe, fsspec, filelock, Jinja2, torch, torchvision, torchaudio
WARNING: The script isympy.exe is installed in 'C:\Users\ccolony\AppData\Roaming\Python\Python310\Scripts' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
WARNING: The scripts f2py.exe and numpy-config.exe are installed in 'C:\Users\ccolony\AppData\Roaming\Python\Python310\Scripts' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
WARNING: The scripts torchfrtrace.exe and torchrun.exe are installed in 'C:\Users\ccolony\AppData\Roaming\Python\Python310\Scripts' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed MarkupSafe-2.1.5 filelock-3.13.1 fsspec-2024.6.1 Jinja2-3.1.4 mpmath-1.3.0 networkx-3.3 numpy-2.1.2 pillow-11.0.0 sympy-1.13.1 torch-2.6.0+cu126 torchaudio-2.6.0+cu126 torch
ision-0.21.0+cu126
WARNING: There was an error checking the latest version of pip.
PS C:\Users\ccolony> |
```



Start Installing Packages

Matplotlib: [matplotlib · PyPI](#)

```
File c:\Users\ccolony\Downloads\P2\P2\rob599\__init__.py:1
----> 1 from . import data, grad, submit
      2 from .solver import Solver
...
----> 4 import matplotlib.pyplot as plt
      5 import torch
      6 import torchvision
```

ModuleNotFoundError: No module named 'matplotlib'

Output is truncated. View as a [scrollable element](#) or open in a [text editor](#). Adjust cell output [settings...](#)

Start Installing Packages

Run in terminal

```
Successfully installed MarkupSafe-2.1.5 filelock-3.13.1  
ision-0.21.0+cu126  
WARNING: There was an error checking the latest versi  
PS C:\Users\ccolony> pip install matplotlib
```



Start Installing Packages

Run in terminal

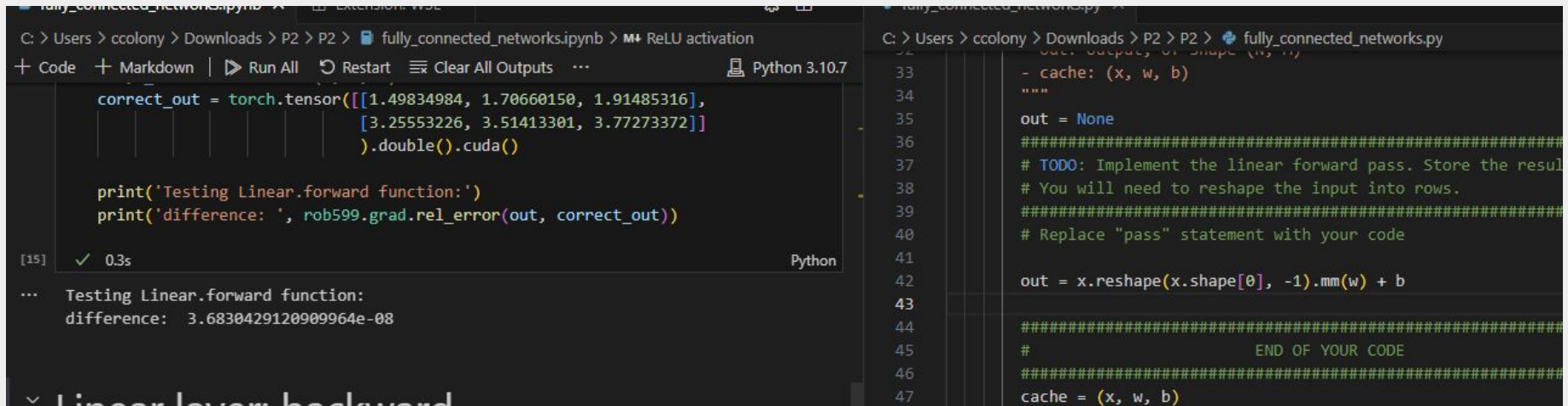
```
gdown 5.2.0
```

```
pip install gdown
```

```
Successfully installed contourpy-1.3.1 cycLER-0.12.1 fonttools-4.55.8 kiwisolver-1.4.5  
[notice] A new release of pip available: 22.2.2 -> 25.0  
[notice] To update, run: python.exe -m pip install --upgrade pip  
PS C:\Users\ccolony> pip install gdown
```


Start Coding!

Can Split Like Colab



```
C:\> Users > ccolony > Downloads > P2 > P2 > fully_connected_networks.ipynb > M+ ReLU activation
+ Code + Markdown | ▶ Run All ⏪ Restart ☰ Clear All Outputs ... Python 3.10.7
correct_out = torch.tensor([[1.49834984, 1.70660150, 1.91485316],
                             [3.25553226, 3.51413301, 3.77273372]])
                             ).double().cuda()

print('Testing Linear.forward function:')
print('difference: ', rob599.grad.rel_error(out, correct_out))

[15] ✓ 0.3s Python
... Testing Linear.forward function:
difference: 3.6830429120909964e-08

Linear layer backward
```

```
C:\> Users > ccolony > Downloads > P2 > P2 > fully_connected_networks.py
- cache: (x, w, b)
"""
out = None
#####
# TODO: Implement the linear forward pass. Store the result
# You will need to reshape the input into rows.
#####
# Replace "pass" statement with your code

out = x.reshape(x.shape[0], -1).mm(w) + b
43
44 #####
45 #                               END OF YOUR CODE
46 #####
47 cache = (x, w, b)
```

Discussion Learning Objectives

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 - Required Libraries
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VR NERF Demo