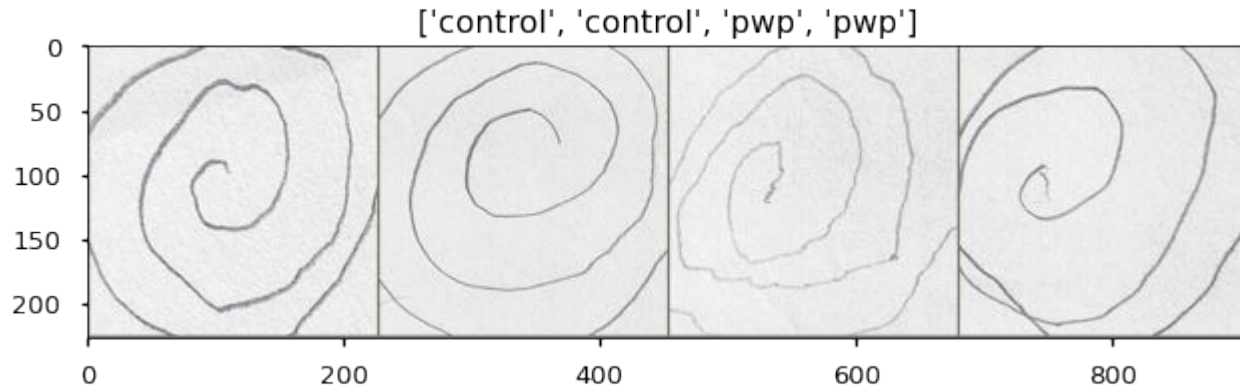




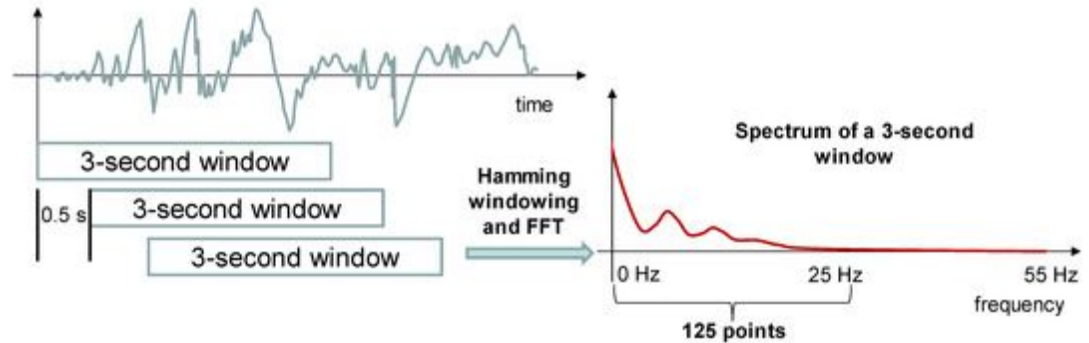
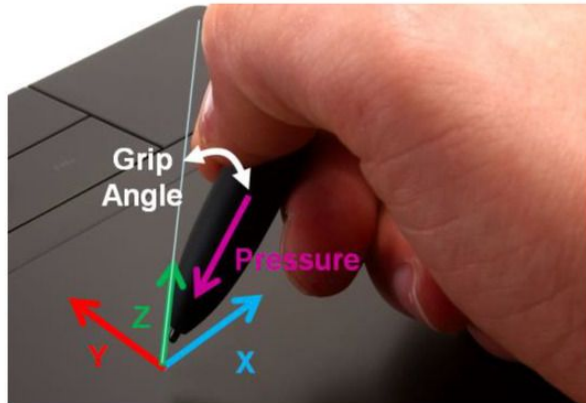
Transfer Learning for Parkinson's classification

Robert Minneker
CSE 599 G1 20au

Parkinson's disease can be classified from handwritten spirals



There are no good options for raw image input





Transfer learning as a solution to minimal data

- Commonly used in practice
- A way to get around not having large datasets




VGG-16, ResNet-50, and Inception_v3 weights for transfer learning

- VGG-16: deep CNN, great for it's time, heavy network
- ResNet-50: Residual connections, more efficient/deep networks
- Inception_v3: small convolutions, auxiliary classifiers overcome degradation



Evaluation: F1, accuracy, precision, recall

- Gathered data from the UCI machine learning repository and Kaggle
- Combined and split into 70/15/15 (%) train/validation/test
- Trained 2 variants of each network for 25 epochs, pick best model
based on validation accuracy to run against test data

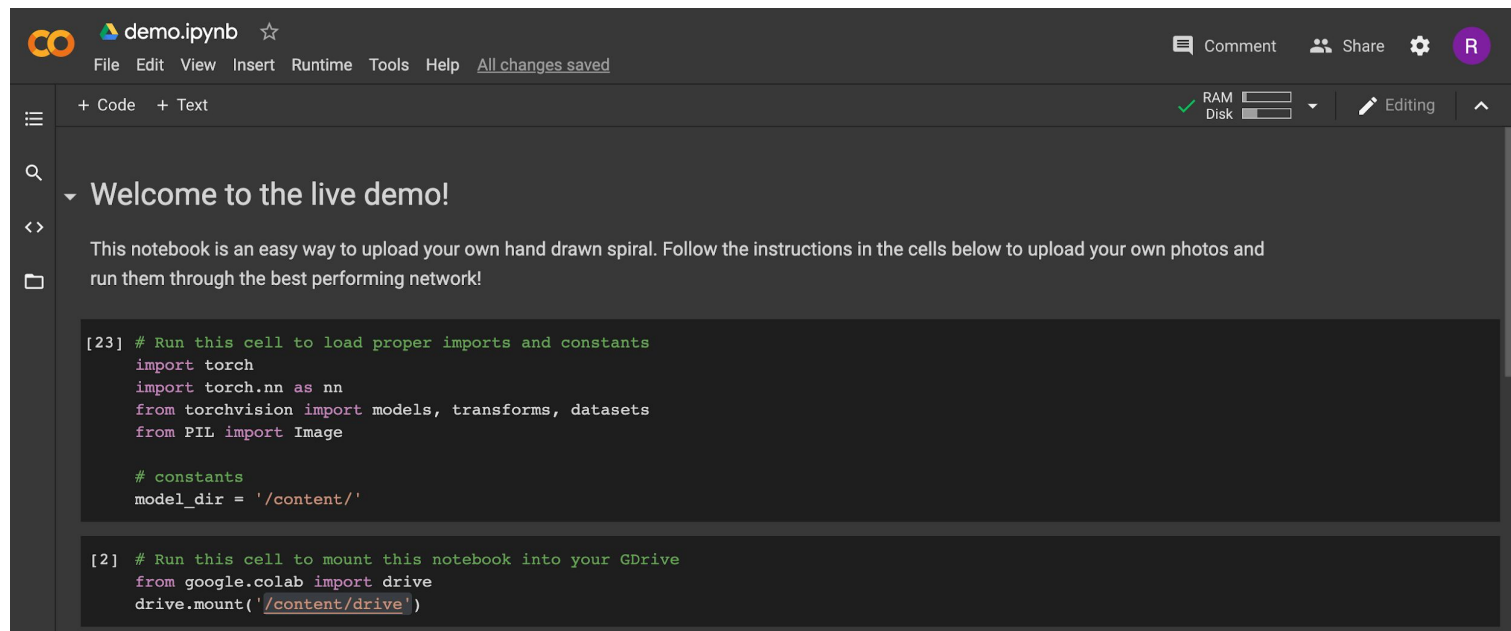


Results are promising but do not meet state-of-the-art performance

Model	F1	Accuracy	Precision	Recall
ResNet-50 (last FC)	0.7778	0.8000	1.0000	0.6364
ResNet-50 (last FC & layer 4)	0.7619	0.7500	0.8000	0.7273
Inception_v3 (FC)	0.8333	0.8000	0.7692	0.9091
Inception_v3 (FC and aux)	0.7097	0.5500	0.5500	1.0000
VGG-16 (last FC)	0.6316	0.6500	0.7500	0.5455
VGG-16 (last two FCs)	0.7407	0.6500	0.6250	0.9091



Go try it out for yourself in this Colab notebook!



The screenshot shows a Google Colab notebook titled "demo.ipynb". The interface includes a top menu bar with options like File, Edit, View, Insert, Runtime, Tools, and Help. Below the menu, there's a toolbar with icons for adding code or text cells, and status indicators for RAM and disk usage. The notebook content starts with a "Welcome to the live demo!" section, followed by a text block explaining the purpose of the notebook. Two code cells are visible, each with a green run button. The first cell (index 23) contains Python code for importing libraries and setting constants. The second cell (index 2) contains code for mounting the notebook to Google Drive.

```
[23] # Run this cell to load proper imports and constants
import torch
import torch.nn as nn
from torchvision import models, transforms, datasets
from PIL import Image

# constants
model_dir = '/content/'

[2] # Run this cell to mount this notebook into your GDrive
from google.colab import drive
drive.mount('/content/drive')
```