Transfer Learning for Parkinson's classification

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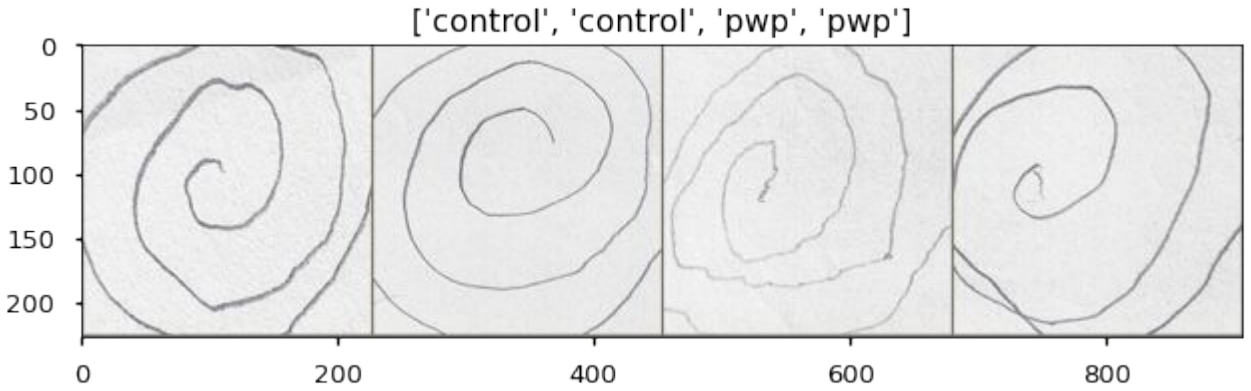
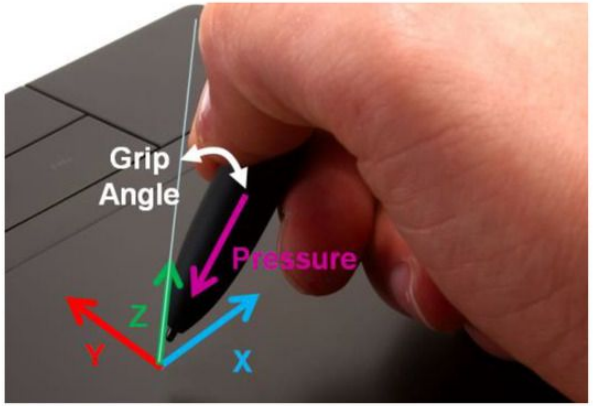
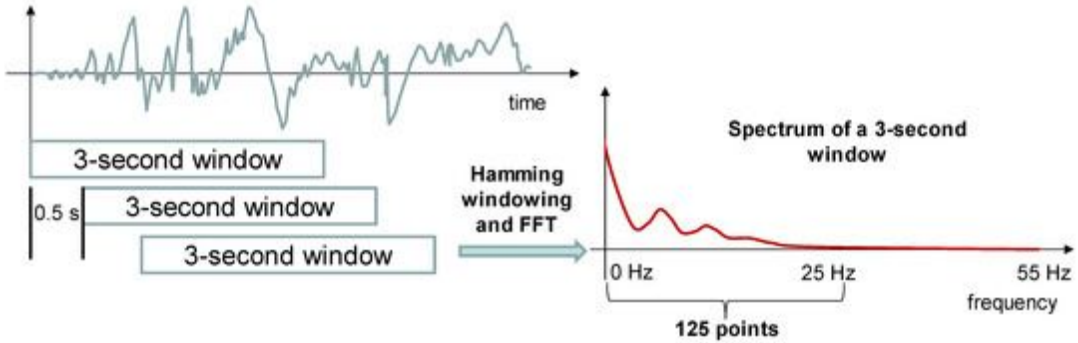
CSE 599 G1 20au

Parkinson’s disease can be classified from handwritten spirals



There are no good options for raw image input





https://www.mdpi.com/2079-9292/8/8/907

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!