Parkinson's Disease Detection

Team no.3
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Problem Definition

PD is an irreversible neurological disorder, This research focuses on developed a system using deep learning algorithms, specifically CNNs, to differentiate individuals with PD based on their sketching behavior

Literature Review

1. PD detection using ResNet50 with Transfer Learning:
   - The methodology employed CNNs, using ResNet50 model
   - Accuracy rate of 96.67%

2. Transfer Learning Based PD Detection Using Optimized Feature Selection:
   - Transfer learning models (ResNet, VGG19, InceptionV3), and employing KNN classification.
   - Accuracy 95%, precision of 98%

Transfer Learning Models

1. VGG-16

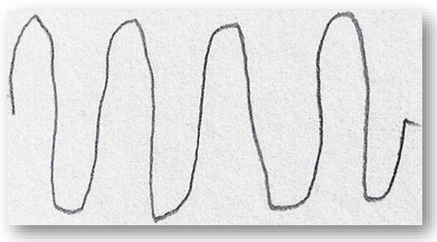
Augmentation	Epochs	Learning Rate	Hidden Layers	Accuracy (%)
Photometric, Geometric	5	0.001	None	70
Photometric, Geometric	10	0.001	None	80
Photometric, Geometric	10	0.001	1. 64 neurons 2. 32 neurons	86.6
Photometric, Geometric	10	0.01	1. 64 neurons 2. 32 neurons	50
Photometric, Geometric	20	0.05e-5	None	80
Photometric, Geometric	35	0.05e-5	None	80
Photometric	15	1e-5	None	86.6

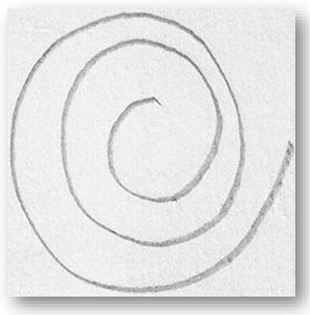
2. ResNet50

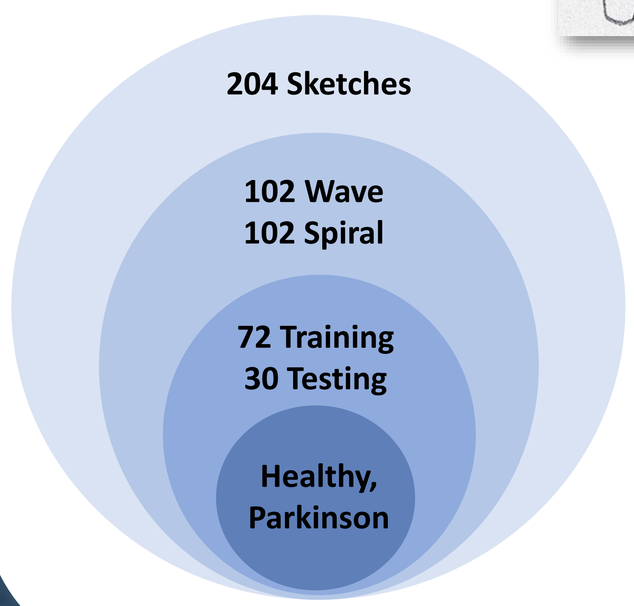
Augmentation	Optimizer	Epochs	Learning Rate	Accuracy (%)
Photometric	Adam	10	0.001	81.6
Photometric	Adam	20	0.001	81.6
Photometric	Adam	10	1e-5	83
Photometric	RMSprop	10	1e-5	80
Photometric, Geometric	RMSprop	20	1e-5	85
Photometric, Geometric	Adam	20	1e-5	73.3

Dataset

- The used data is the PD on Kaggle , which came from the paper: ZhamP, Kumar DK

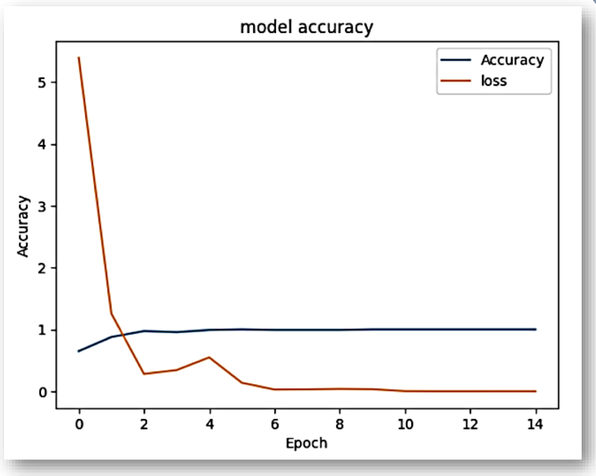




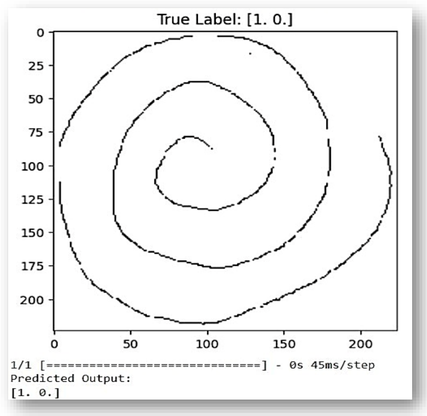


Best Model

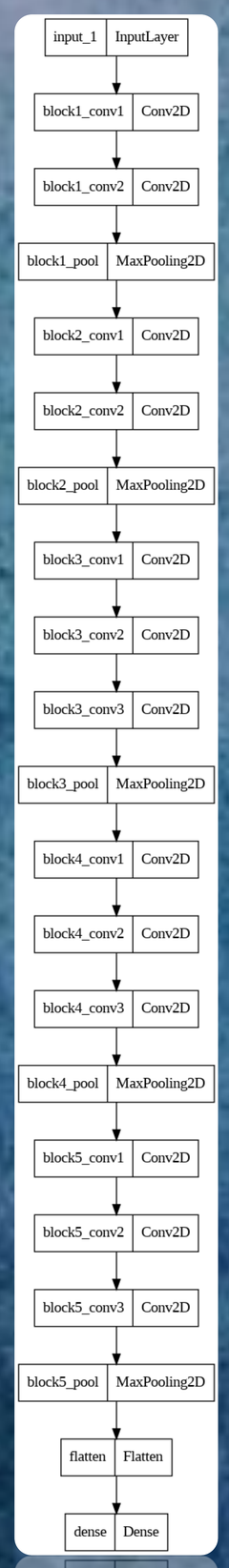
- It is found that the VGG-16 model for learning rate 1.0e-5 which provides 86.67% accuracy is the best transfer model for the problem of PD



- Since the predicted label [1. 0.], indicating healthy individuals, matches the true label, our model accurately predicts the classification for this instance

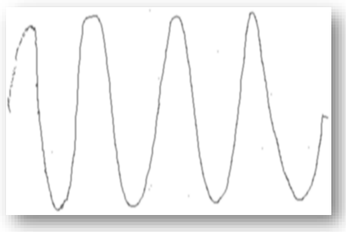


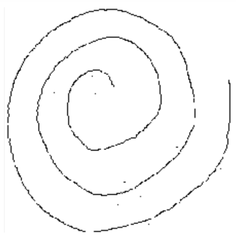
Schematic Diagram



Data Preprocessing

The Zhang-Suen thinning → Otsu Thresholding → Data Blurring → Data Augmentation





Summary

Data Gathering → Data Preprocessing → Pre-trained models → Model Selection → Prediction → Evaluation