Alzheimer's Disease Detection using Deep Learning

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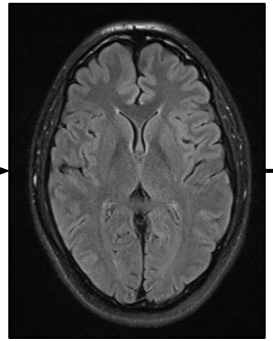
INTRODUCTION

Imaging Equipment



Dataset

Brain Image

Image Segmentation

Segmented Image

Feature Extraction

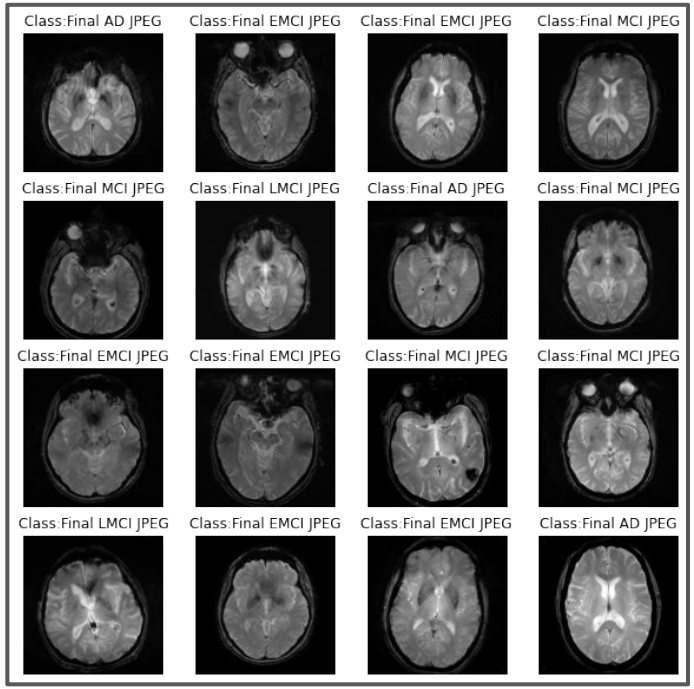
Extracted Features

Image recognition with AI technique

Recognised Image

Alzheimer's Disease Detection

DATASET



The dataset to be used is Alzheimer's Disease Neuroimaging Initiative (ADNI).

We are majorly classifying into 5 classes:

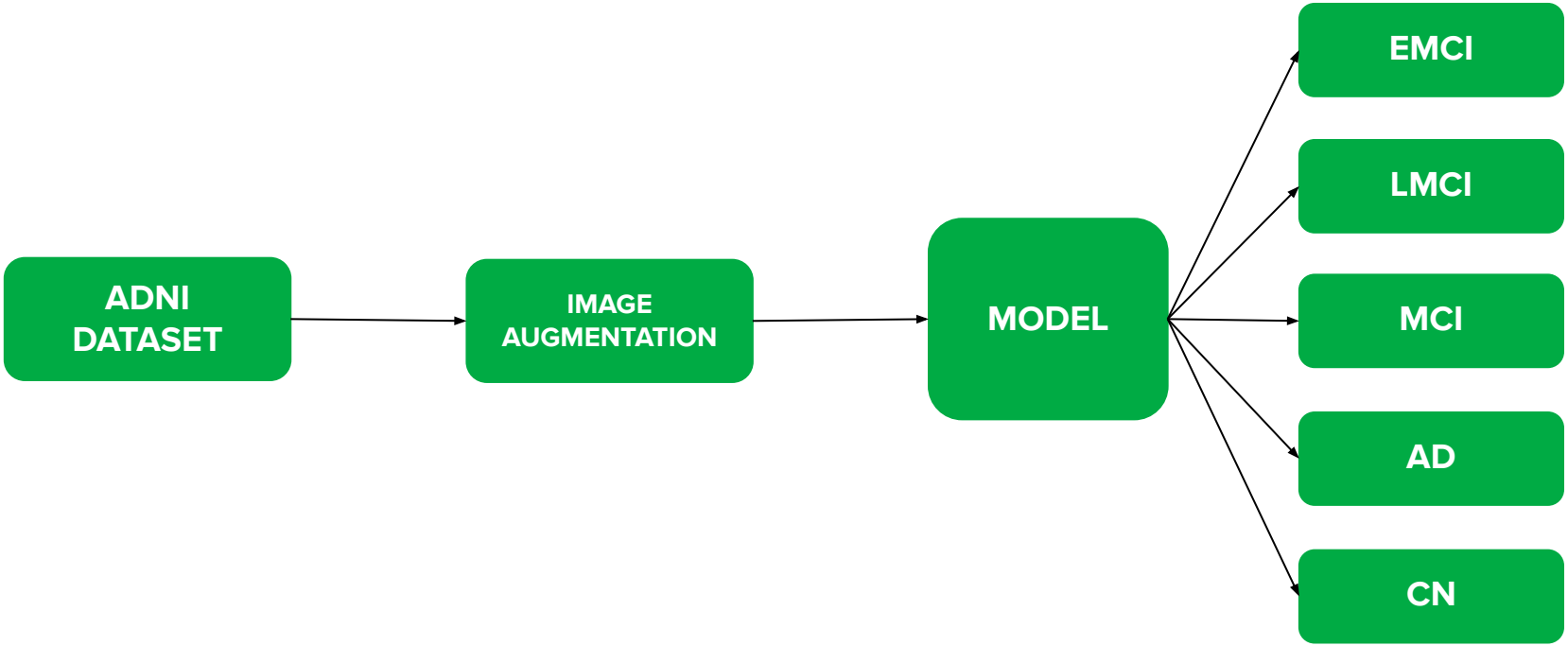
1. **AD (Alzheimer's Disease)**
2. **MCI (Mild Cognitive Impairment)**
3. **LMCI (Late Mild Cognitive Impairment)**
4. **EMCI (Early Mild Cognitive Impairment)**
5. **CN (Control Normal)**

A total of 1296 images were oversampled and class-balanced to 2900 images.

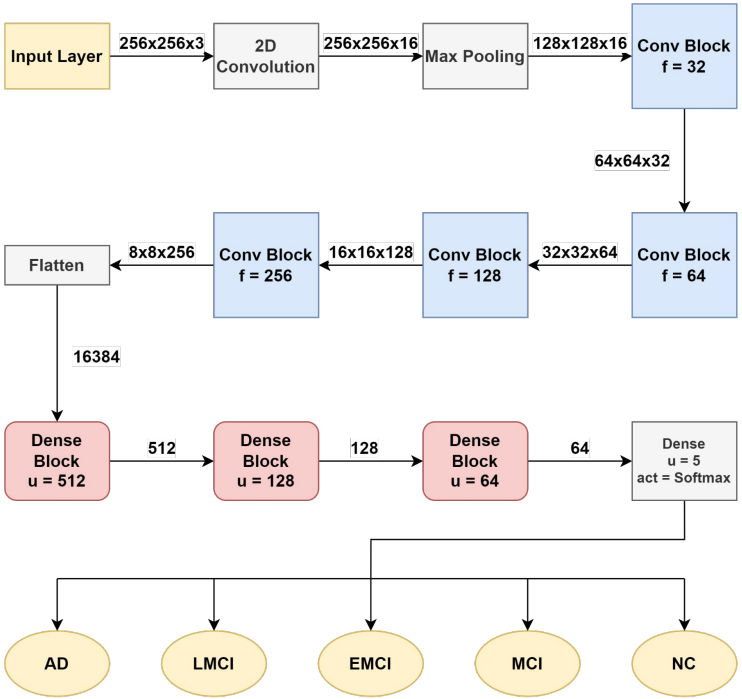
PROPOSED METHODOLOGY

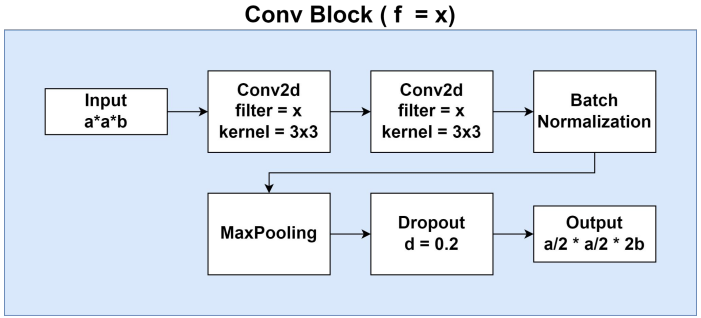
1. Propose a custom CNN model for classifying the images into 5 categories (AD, MCI, LMCI, EMCI, NC)
2. Train the model using the data from ADNI dataset.
3. Obtain various output parameters of the model like accuracy, loss, AuC, f1-score for the training and validation data.
4. Calculate scores like precision, recall, F1-score of the model for different classes using the testing data.
5. Generate a heatmap for visualising the scores of predicted vs actual classification.
6. Compare the results with other results published in papers.

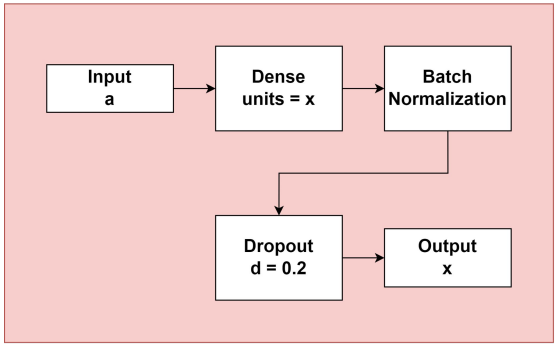
PROPOSED METHODOLOGY



BLOCK DIAGRAM





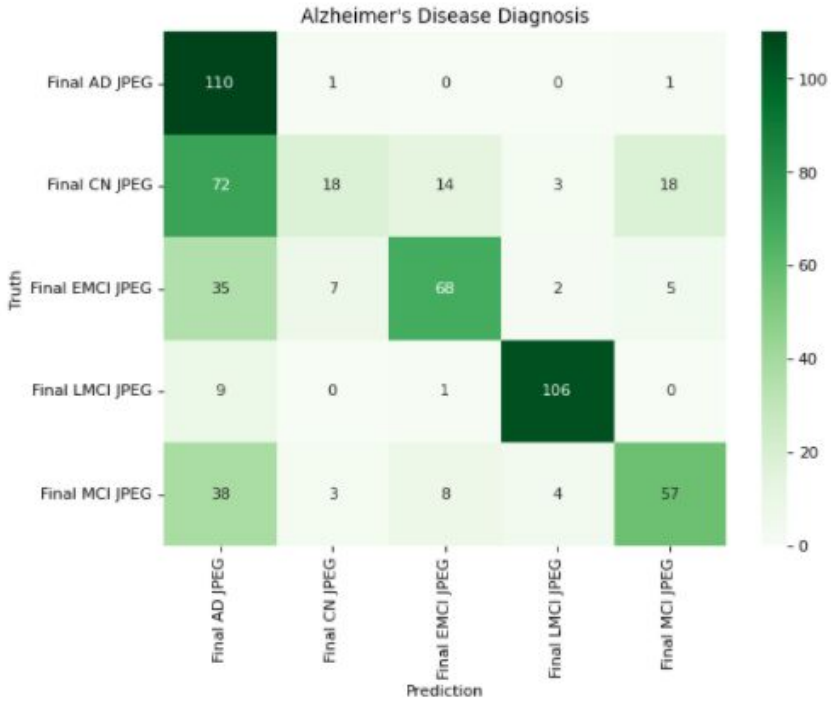


PRELIMINARY RESULTS

Training Accuracy: 83.78%

Validation Accuracy: 62.07%

Testing Accuracy: 61.90%



NEXT STEPS

Improving results by either:

1. Increasing sample size.
2. Adjusting layers of the model.
3. Trying different optimizers and activation layers.

THANK YOU