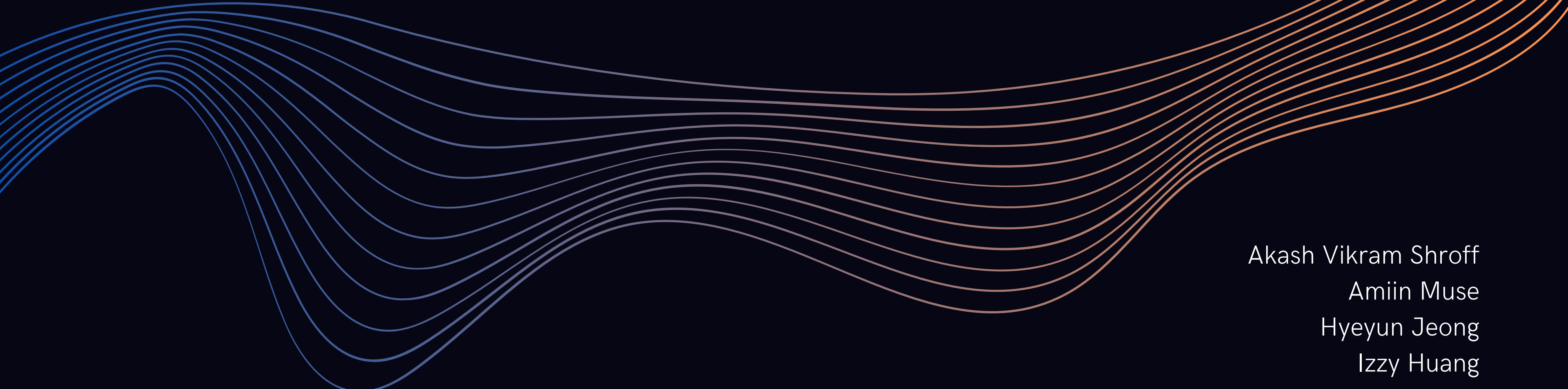


NeuroNet

A Deep Learning Model for Alzheimer's Diagnosis



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THE PROBLEM

The challenge of Alzheimer's diagnosis from Brain MRIs with Machine Learning.

02

DATA & PROCESSING

Data processing techniques used and the methods of image preprocessing.

03

MODEL & TRAINING

Using a Convolutional Neural Network (CNN) to analyze the MRI information from the ADNI study.

04

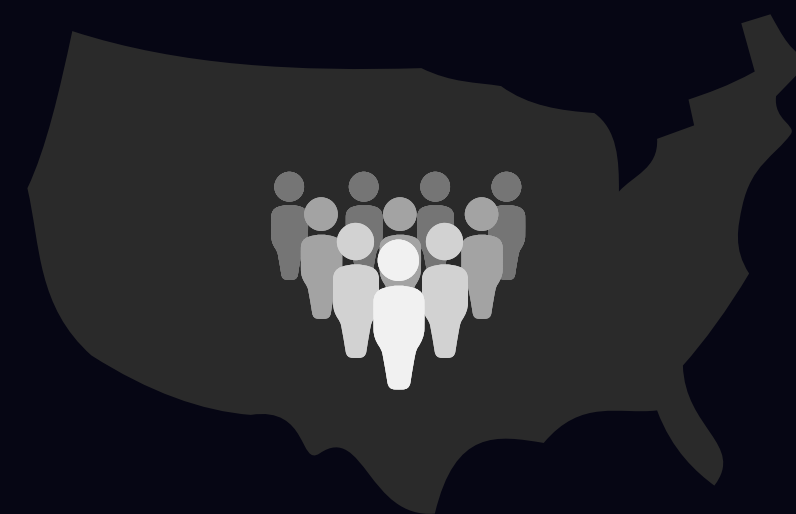
MODEL DEPLOYMENT

Building a lightweight module Streamlit to deploy our model to a client web app.

01

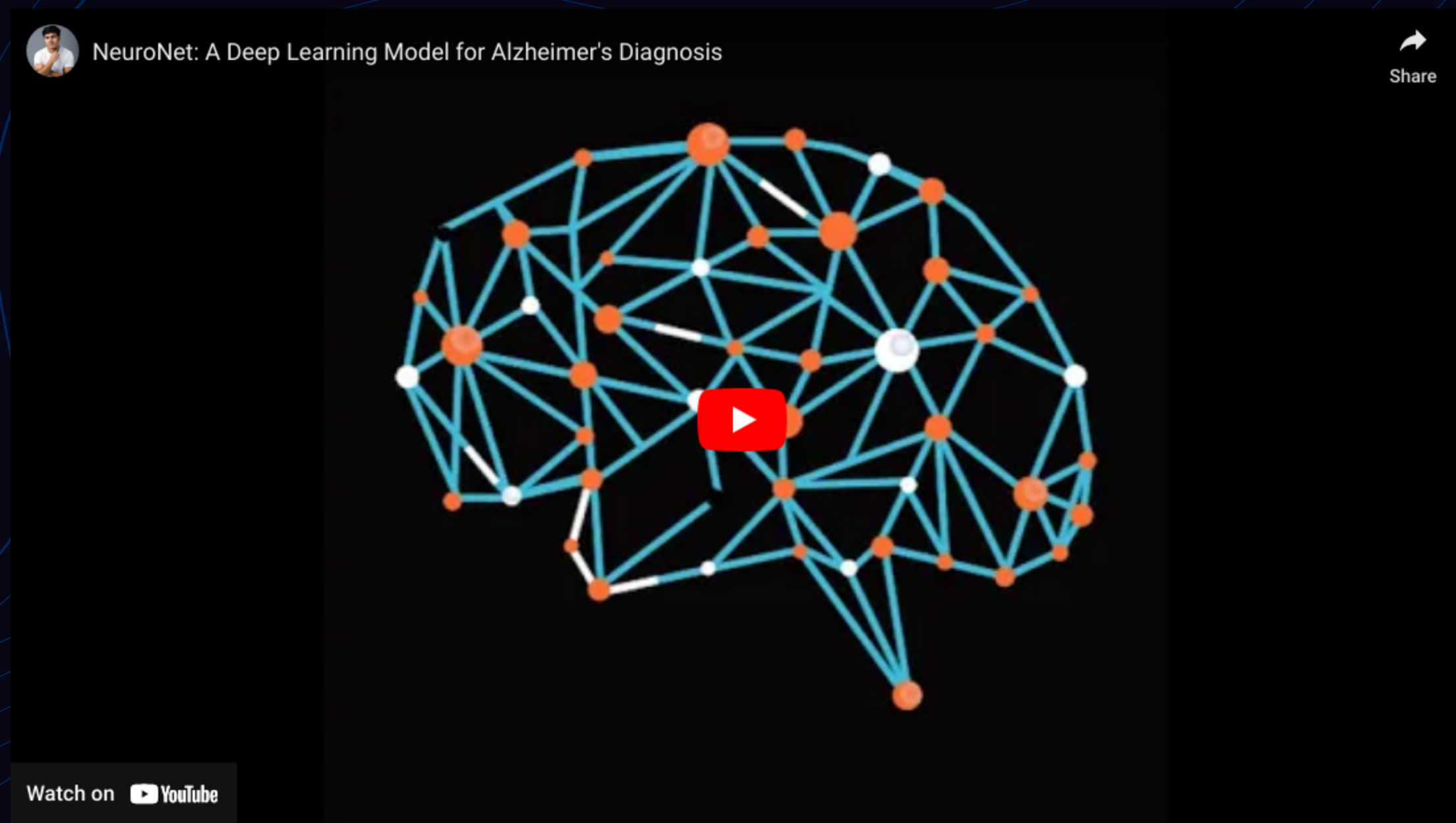
1/3

1 in 3 seniors dies with Alzheimer's or another dementia. It kills more than breast cancer and prostate cancer combined.



More than 6 million Americans are living with Alzheimer's. By 2050, this number is projected to rise to nearly 13 million.

01



01 Challenges

1. Labeled Data
2. Class Imbalance
3. Structural Variety
4. Prediction Quality

02 ADNI Database

A long-term research study to detect Alzheimer's disease early using brain imaging, genetic testing, and clinical evaluations.

3 diagnostic categories of ADNI data:

CN

Cognitively normal

MCI

Mild cognitive impairment

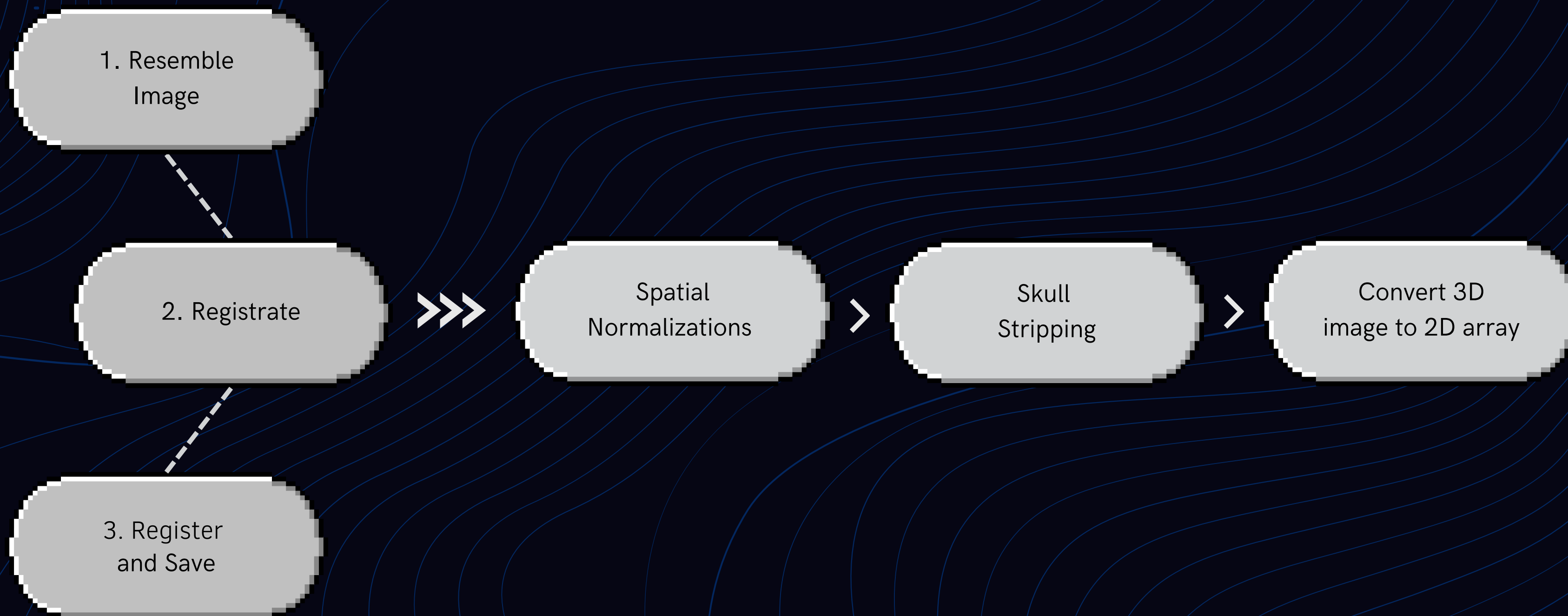
AD

Alzheimer's disease

1. Resemble
Image



02 Image Preprocessing



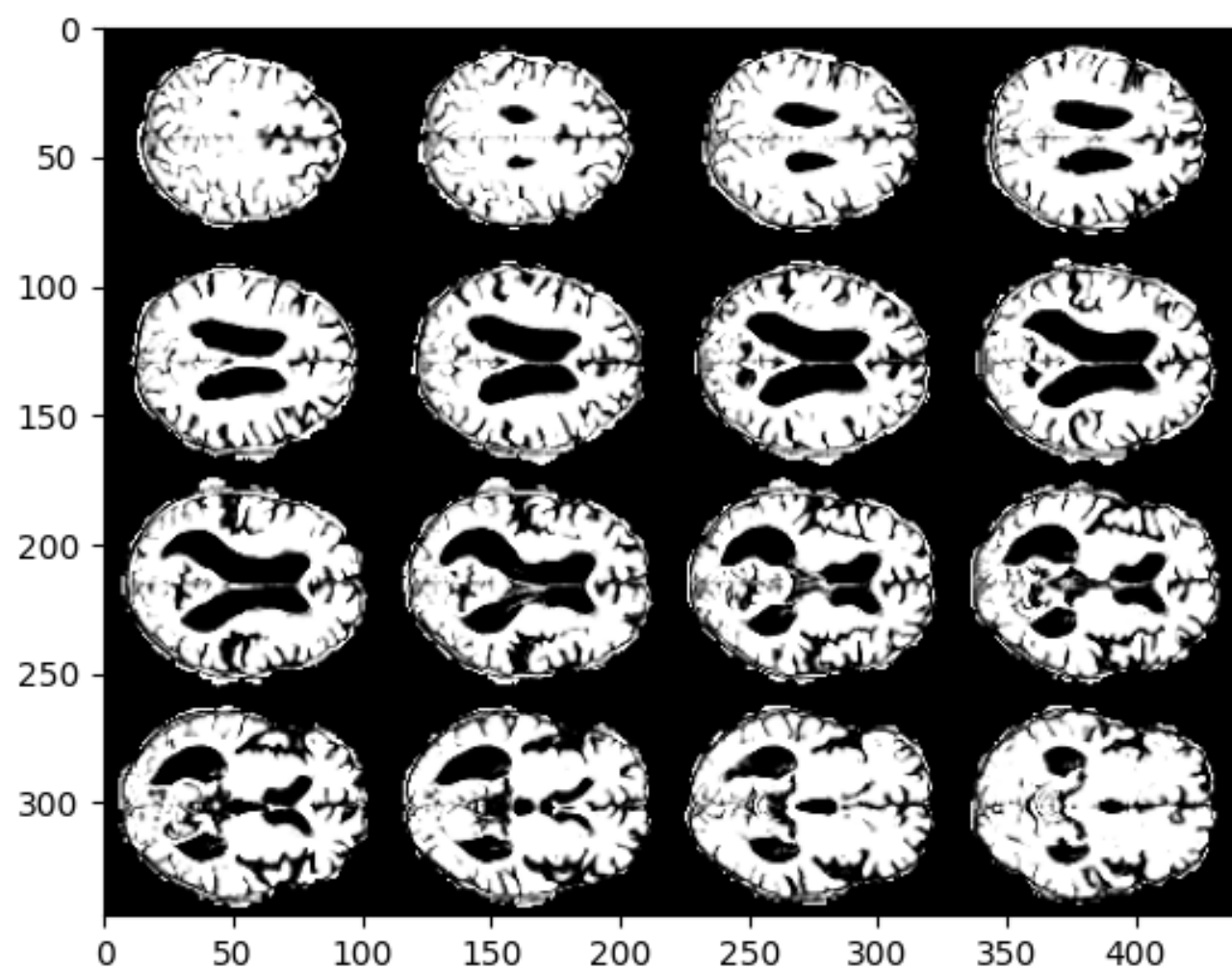
03

CNN Classification Model

03

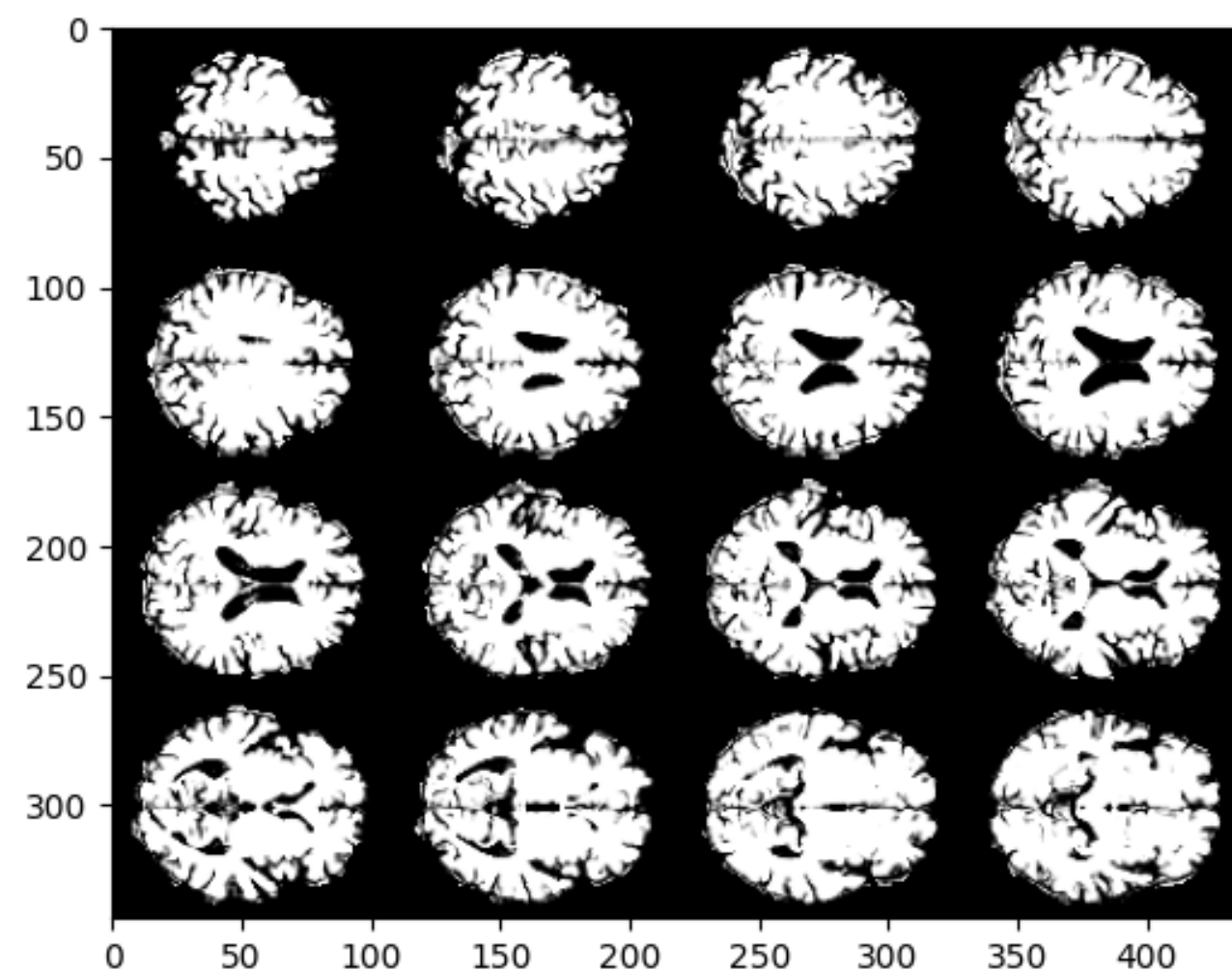
Classification

Input:



Output: 1

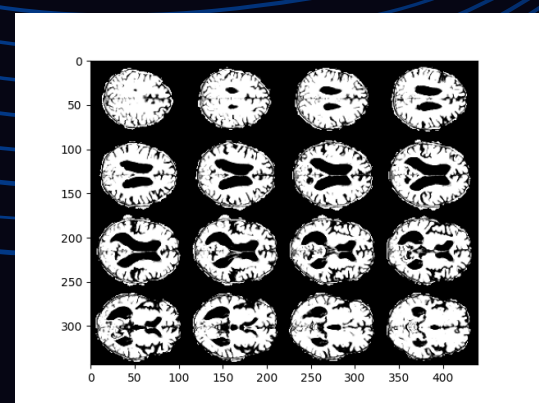
Input:



Output: 0

03

Convolutional Neural Network



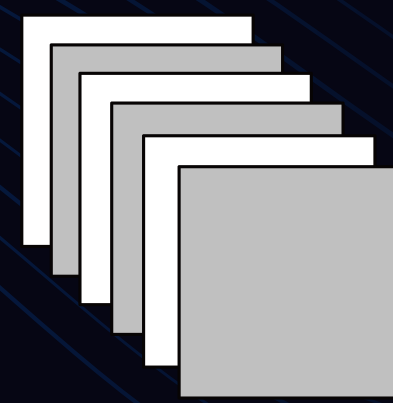
Input Image

Takes a 2D NumPy array as input



Conv2D Layer

Detect features in image data



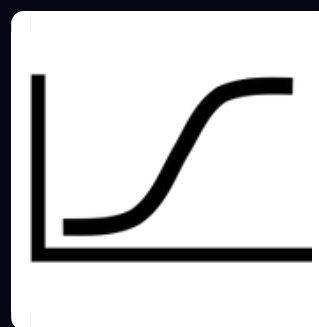
MaxPooling2D Layer

Reduces the spatial dimensions



Flattening

Convert layers to 1D vector



Sigmoid Classification

Outputs 1 for positive, 0 for negative



Validation

Check if model works for new data

03

Model Performance

2293

MRI Scans Tested On

70%

Training Data

15%

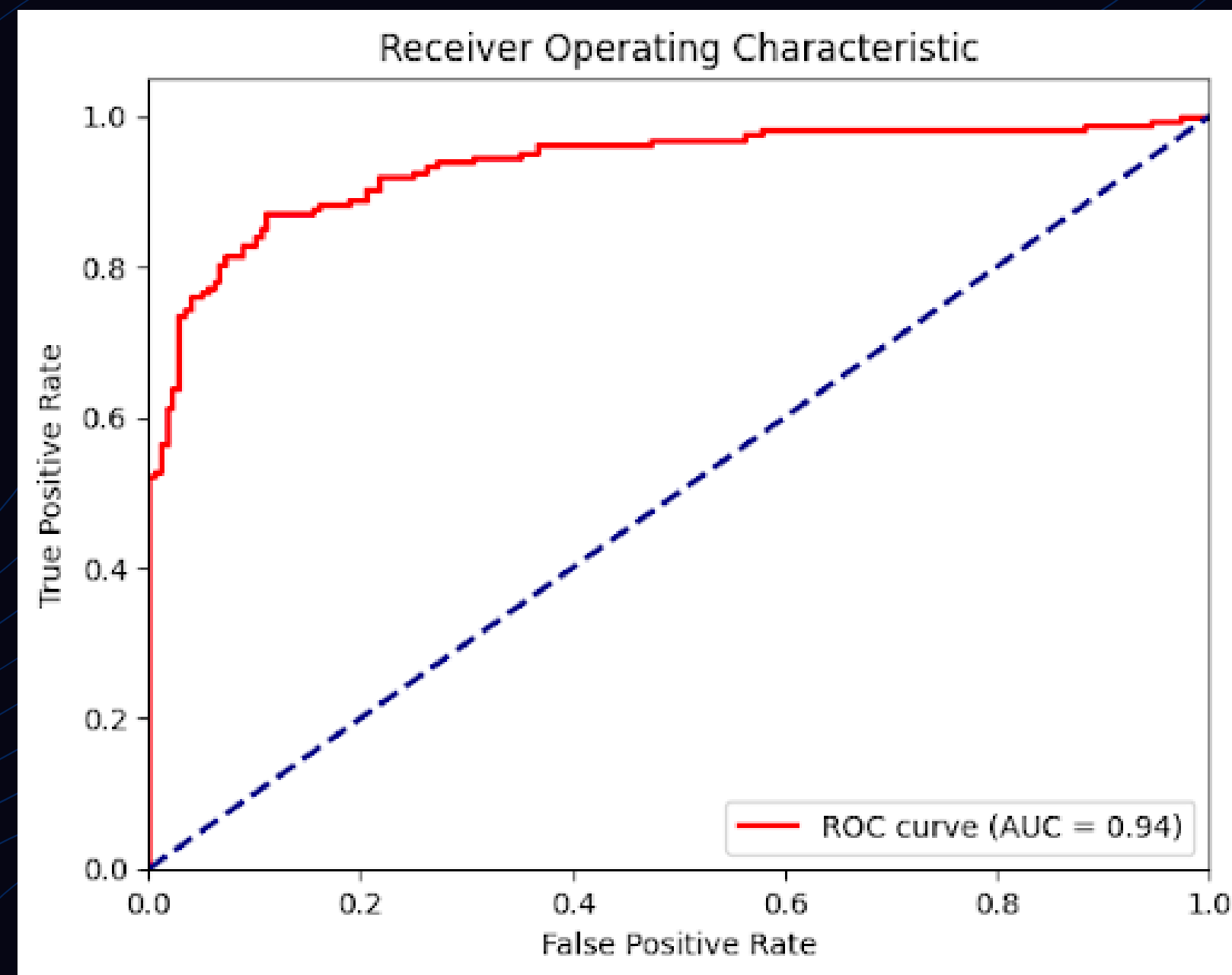
Testing Data

15%

Validation Data

03

Model Performance



0.94
Test Accuracy

04 Model Deployment



STEP 1
User uploads
3D MRI image

STEP 2
Image is processed

STEP 3
Model prediction

STEP 4
Classification

QUESTIONS?

THANK YOU!