Mansoura University

Faculty of Computer & Information Sciences

Computer Science Department

2022-2023

ACADEMIC YEAR

Neural Network Project

Alzheimer's Disease Detection system

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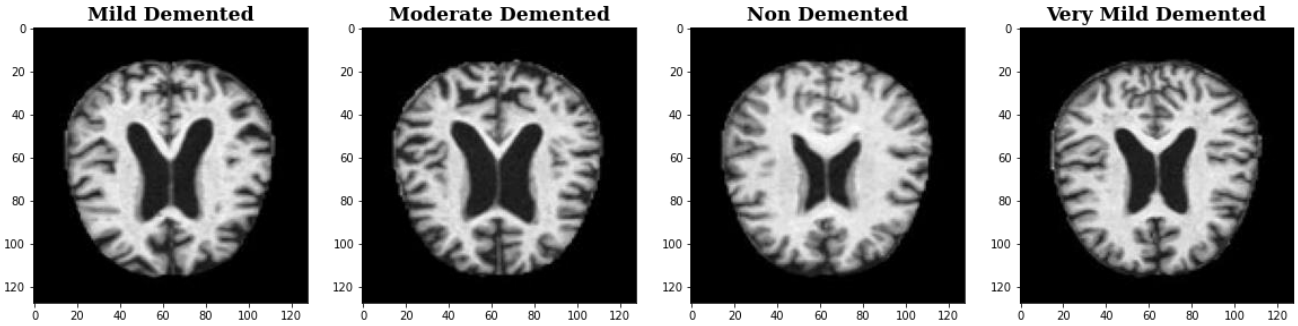
1. Dataset

The Dataset consists of Preprocessed MRI (Magnetic Resonance Imaging) Images.
All the images are resized into 128 x 128 pixels.
The Dataset consists of a total of 6400 MRI images with four classes as shown.



The Link for the Dataset

2. Project Idea

Alzheimer's disease is an irreversible degeneration of the brain that causes disruptions in memory, cognition, personality, and other functions that eventually lead to death from complete brain failure.

Alzheimer's is a progressive disease, which means the symptoms get worse over time. So, our project aims to detect this disease through MR scan data. You only need to enter the brain imaging and our AI system will classify this image into four categories:

1. Mild Demented
2. Moderate Demented
3. Non Demented
4. Very Mild Demented

3. Software Used

Inception V3 (2015)

The Inception V3 is a deep learning model based on Convolutional Neural Networks, which is used for image classification. The inception V3 is a superior version of the basic model Inception V1 which was introduced as GoogLeNet in 2014.

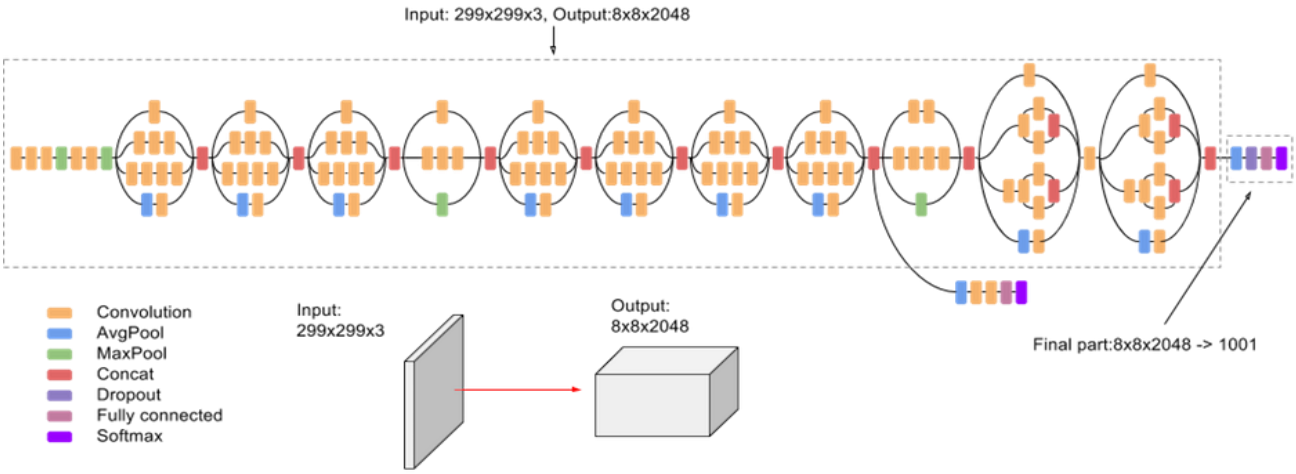


Figure 1 Inception V3 Architecture

Tensorflow

TensorFlow is an open-source library developed by Google primarily for deep learning applications. It also supports traditional machine learning. TensorFlow was originally developed for large numerical computations without keeping deep learning in mind.

Flutter

Flutter is a free and open-source mobile UI framework created by Google and released in May 2017. It allows us to create a native mobile application with only one codebase. This means that we can use one programming language and one codebase to create two different apps (for iOS and Android).

Figma

Figma is a powerful web-based design tool that helps you create anything, websites, applications, logos, and much more.

4. Related Papers

1. **Towards Alzheimer's disease classification through transfer learning** (**Link**).
   The authors of this paper attempt to solve the issues of building an AI algorithm for classifying MRI brain images using state-of-the-art architectures such as VGG and Inception.

2. **Convolutional neural networks for classification of Alzheimer's disease: Overview and reproducible evaluation** (**Link**).
   The authors of this paper aim to address the limitations of ML approaches for classifying Alzheimer's disease images through three main contributions: First, they performed a systematic literature review. Second, the extension of their open-source framework for the classification of this disease. Finally, they used this framework to compare different CNN architectures.

3. **Multi-class Alzheimer's disease classification using image and clinical features** (**Link**).
   In this paper, the authors presented an Alzheimer detection and classification algorithm.

4. **Deep ensemble learning for Alzheimer's disease classification** (**Link**).
   This paper presents a deep ensemble learning framework that aims to harness deep learning algorithms to integrate multisource data and tap the 'wisdom of experts'.