**Dataset**

This research compares a DL model for Alzheimer's grading of severity across four benchmark datasets: Alzheimer's, PDAD, ADNI, and OASIS. The datasets contain MRI scans, neuroimaging information, and histopathological data to classify stages of AD. ADNI provides longitudinal MRI information for the diagnosis of early-stage diseases, while OASIS is suitable for the evaluation of cognitive decline. Alzheimer's contains case classification as Normal, MCI, AD, and pMCI. PDAD contains histopathological data with three AD levels of severity. Even though there are variations in class distribution, the model works well for all datasets.

The link of ADNI (Alzheimer’s Disease Neuroimaging Initiative) Dataset will be as follows.

<https://www.kaggle.com/datasets/kaushalsethia/alzheimers-adni>

The link of AD (Alzheimer’s Disease) Dataset is as follows.

<https://www.kaggle.com/datasets/rabieelkharoua/alzheimers-disease-dataset>

The link of OASIS (Open Annotations of Single Image Surfaces) Dataset will be as follows.

<https://www.kaggle.com/datasets/abishekdaskhna/oasis-alzheimers-detection>

The link of PDAD (Parkinson's and Alzheimer’s Disease) Dataset will be as follows.

<https://www.kaggle.com/datasets/farjanakabirsamanta/alzheimer-diseases-3-class>

There are 4 classes in the Alzheimer’s dataset, as given in figure 2. The PDAD dataset has only 3 classes and hence, uniformity of classes in datasets is absent. However, proposed approach performs well on all the datasets.

A close-up of a skull

Description automatically generated

1. **Very Mild Demented Class (VMD)**

A close-up of a brain

Description automatically generated

1. **Non Demented Class (ND)**

A close-up of a brain

Description automatically generated

1. **Mild Demented Class (MD)**

A black and white brain with a black letter

Description automatically generated

1. **Moderate Demented Class (MoD)**

**Figure 2. MRI Brain Images**

Dataset used (A) The First case is VMD, which will be achieved when the Fuzzy Function value is high. (B) It is a case of ND. It is achieved when the Fuzzy Function value is very high. (C) It is a case of MD. It is achieved when the Fuzzy Function value is Moderate. (D) It is a case of MD. It is achieved when the Fuzzy Function value is Low.

Figure 2 shows MRI brain images, which are split into four classes corresponding to different levels of development of AD: VMD, ND, MD, and MoD.