DETECTION OF DEMENTIA USING MACHINE LEARNING

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ABSTRACT

Dementia is termed to be the early stage of Alzheimer’s which can be diagnosed. Dementia is a neurodegenerative disorder whose diagnosing starts with MRI (Magnetic Resonance imaging) scanning. Detection of dementia model helps in detecting a person is suffering from dementia or not with the outputs of MRI reports. We have created a model with machine learning which uses architecture of ANN which include voxel morphometry and image processing which helps us in minimizing the errors and predicting the result accurately.

Keywords: Voxel Based Morphometry, Diagnosis Of Dementia, Neurodegenerative.

I. INTRODUCTION

Dementia is a stage where group of thinking and social symptoms interferes with daily functioning. Dementia is not a specific disease it is a group of symptoms of cognitive impairment. Its symptoms include forgetfulness, limited thinking abilities. More than 10million cases being registered in India every year and due to which dementia is happened to be a common disease. Dementia detecting programs using AI & ML will detect this earlier before it becomes worse which helps in improving proper medication and therapy of this kind.

II. METHODOLOGY

The user must first log into his/her account. If he is a first-time user, he must register as a new user. Following his successful enrolment, the user inserts the data found in the patient’s MRI scan. The data is taken from the OASIS database. This data collection combines brain MRI pictures with demographic information of various patients.

Activity Diagram
The main tasks to accomplish are:

1) First step is dataset pre-processing. All inputs-targets were normalized in the bound (-1,1).

2) Next step is the division of the data. The dataset was divided into two groups, the first one was used in the training with 80% of the total sample and the second one is used in the testing with 20% remaining. This division of data was done randomly.

3) Perform Exploratory Data Analysis (EDA) on the model using various plots available in the python library.

4) The next stage is to train and test the network; this procedure is continued until the weights and biases that are most appropriate for minimizing the percentage of misunderstanding between the targets and the generated outputs are discovered. This phase also helps us to figure out which combination of factors is best for detecting dementia.

5) Post-processing of the outputs, the continuous values obtained as output were postprocessed to locate into any of the two classes (demented or not demented).

Data Flow Diagram:

III. MODELING AND ANALYSIS

A program's or computing system's system architecture is a representation of the system that assists in understanding how it will behave. The system architecture serves as a template for creating the project and its behaviour. Architecture is a method for determining if a design approach will result in a functional system. We tested our model using four different classifiers: logistic regression, Naive Bayes, k-Nearest Neighbour, and decision tree. To begin, we must determine whether the dataset is balanced. Each algorithm's confusion matrix is displayed. Then we plot classification reports for each classifier in the model. This aids us in determining the model's accuracy.
A high-level design document provides the necessary information to the project description to specify a feasible coding paradigm. Identifying software components, describing component relationships, defining software structure, and giving a blueprint for the document phase are all part of the design process. The structure of the program that will be implemented, as well as the data that will be included in the system, including interfaces between system components, and, in certain circumstances, the methodologies that will be utilized, are all described in a software design.

IV. RESULTS AND DISCUSSION

When we input the values of MMS examination, eTIV, CDR and nWBV, the model performs logistic regression or KNN algorithm or Naive based classifier or decision tree and tells whether the patient is suffering from Dementia or not with up to 96% accuracy.
The objective of this research is to find possible motor, sensory, and cognitive predictors so that a screening tool for dementia and its early stages may be developed in people aged 80 and higher. The findings of the MMSE, CDR, eTIV and nWBV tests will be used to establish whether or not someone has dementia. Despite the use of trustworthy and valid techniques to find predictors for an early screening tool for mental impairment, practice effects cannot be totally avoided. Regardless of these drawbacks, an ML design obviously outweighs the traditional method of identifying one.

V. CONCLUSION
VI. REFERENCES


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