

Research Article

A Comparative Analysis of Machine Learning Algorithms to Predict Alzheimer's Disease

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Alzheimer's disease has been one of the major concerns recently. Around 45 million people are suffering from this disease. Alzheimer's is a degenerative brain disease with an unspecified cause and pathogenesis which primarily affects older people. The main cause of Alzheimer's disease is Dementia, which progressively damages the brain cells. People lost their thinking ability, reading ability, and many more from this disease. A machine learning system can reduce this problem by predicting the disease. The main aim is to recognize Dementia among various patients. This paper represents the result and analysis regarding detecting Dementia from various machine learning models. The Open Access Series of Imaging Studies (OASIS) dataset has been used for the development of the system. The dataset is small, but it has some significant values. The dataset has been analyzed and applied in several machine learning models. Support vector machine, logistic regression, decision tree, and random forest have been used for prediction. First, the system has been run without fine-tuning and then with fine-tuning. Comparing the results, it is found that the support vector machine provides the best results among the models. It has the best accuracy in detecting Dementia among numerous patients. The system is simple and can easily help people by detecting Dementia among them.

1. Introduction

Machine learning (ML) is defined as the study of computer programs that leverage algorithms and statistical models to learn through inference and patterns without being explicitly programmed [1]. ML algorithms learn over experience and improve automatically. It finds techniques, trains models, and uses the learned approach to determine the output automatically [2]. Machine learning systems can also adjust themselves to a changing environment.

A model is a machine learning system that has been trained to identify specific types of patterns using an

algorithm in a machine learning system [3]. That means it processes the data and finds out the hidden structures in a dataset [4]. The feature extraction and the known answers of a dataset determine the formula that relies upon the input and output functions and applies it to new data to predict the response [5]. Hence, the model's algorithm uses a collection of data for training and builds a way to predict the output and saves that procedure for future purposes.

A support vector machine (SVM) is a supervised machine learning model that uses classification algorithms for two-group classification problems. Support vector machine is a fast and dependable classification algorithm that

