Prediction of Parkinson disease by methods using Machine learning approach

Chitra S.
chitrasampath24@gmail.com
Rajalakshmi Engineering College, Chennai, Tamil Nadu

Manisha R.
manisharavichandran22@gmail.com
Rajalakshmi Engineering College, Chennai, Tamil Nadu

Gayathri K.
gayathriHBK@gmail.com
Rajalakshmi Engineering College, Chennai, Tamil Nadu

ABSTRACT

Parkinson's disease is the neurodegenerative disorder by which more than 10 million people are affected. The dropping of dopamine level leads to Parkinson's disease. For diagnosing Parkinson's disease there is no medical tests are available. The doctors cannot detect the disease through any medical tests like blood test or Scan report. To prevent this problem in medical sectors, have to predict the problem in simplified way. The dataset is analysed by Supervised machine learning approach to identify various information. The data pre-processing techniques like data cleaning, data validation are done in the collected dataset to avoid noise and missing values. Data visualization is used to visualize the given dataset in different formats like graphs, charts, etc. Symptoms like speech and tremor are used to identify the disease by machine learning approach. With the best accuracy, Precision, Recall and Sensitivity, the Graphical User Interface (GUI) is used to show the predicted result.

Keywords— *Dataset, Machine Learning-classification method, Python*

1. INTRODUCTION

Parkinson's disease (PD) is a neurodegenerative disorder, and millions of people suffer from it all over the world. The incidence of PD increases with the age growth, about 6.3 million people are suffering from this disease. In the last few years the number of people affected by Parkinson's disease has increased remarkably. There is no test to predict Parkinson's disease in early stages. The first ever drug for Parkinson's disease was identified in the year 1967.

Parkinson's disease a long-term degenerative disorder of the central nervous system that affects the motor control of a patient by affecting predominately dopamine producing ("dopaminergic") neurons in a specific area of the brain. The main problem in detecting the disease timely is the visible symptoms appear mostly at the later stage where cure no longer becomes possible. There is no correct reason proved yet that results to cause of Parkinson's, hence scientists are still conducting extensive research to find out its exact cause. Though some abnormal genes that become prominent due to elderly appear to lead to Parkinson's in some people but there is no evidence to proof this. Though there are a couple of procedures for early Parkinson's detection. Dopamine transporter single-photon emission computed tomography can be used to effectively diagnosis Parkinson's by detecting amount of dopamine deficiency in the concerned patient's brain cell at a considerable early stage. Parkinson's disease can cause motor and non-motor symptoms. The motor symptoms are tremor, rigidity, slow movements and balance problems. Every patient with Parkinson's disease will differ in symptoms. Each patient experience different symptoms. Parkinson's disease causes changes in speech but not for all patients. Mostly one million Americans were affected by this disease. For those who are affected by this disease can cause difficulty in communication and decreased social interaction.

Breathy voices (dysphonia), Stress reduction, dullness of pitch, unsuitable silences, loss of intensity, short rushes of speech, variable rate are the main deficiency of Parkinson's disease. The main deficits of PD tremor are stiffness occurs when the nerve cells fire and there isn't enough dopamine to transmit messages. To adjust the level of dopamine, high level of glutamate and neurotransmitter are used in Parkinson's disease. PD is difficult to detect early because there is a no possibility of detecting PD disease through blood test or any other tests. PD is difficult to detect early because there is a no possibility of detecting PD disease through blood test or any other tests. These made the researchers to identify tools that depend on algorithms to find out who is healthy person and who is affected by Parkinson's disease. This prediction focus on differentiating people affected by Parkinson's disease and normal people primarily. The first step is to validate the digital biomarkers to distinguish disease from control. This model distinguishes Parkinson's disease with many other disorders based on the PD symptoms. The goal is to identify the affected people by using automated algorithms. Decision support algorithm is used for doctors to identify patients with PD while screening. In this paper, we apply few machine learning models to classify PD from controls using the Voice and Tremor dataset.

2. RELATED WORK

(a) Prediction of Parkinson disease by voice using machine learning technique.

In the early Parkinson's disease prediction, the primary and secondary movement disorders of motor pattern identified. Tremor, rigidity, dyskinesia, akinesia, and dystonia are both objective and automatic.[1] To find out the Parkinson's disease motor symptoms using multiple instance learning in the uncontrollable environment. The detection of Parkinson's disease symptoms from the labeled data identifies as a semi-supervised multiple instance learning problem. To address the symptoms and subject specific nature of the problem the characteristics were carefully chosen. [2] Depends upon the handwriting the Parkinson's disease classification is done. However, it should be noted that the first results in this area were significantly lower, identifying PD with around 90 % accuracy. The 90 % classification accuracy presented by little is very similar to results presented in this study. The application of this approach based on handwriting avoids the additional processing steps connected with speech processing, such as speech segmentation, noise removal, and requirements for a quality recording environment without external noises and disturbance.[6]

Limitations of existing Systems:
 (a) The audio samples used in machine learning models were very short-only for 10 sec.
 (b) The machine learning models are not more trained with PD affected persons datasets.

The existing working model of predicting PD in gait using a sensor has drawbacks like old age peoples will always have leg tremor, so there is possibility of positive result.

3. EXISTING SYSTEM

Prediction of Parkinson disease in gait by deep learning approach describes how non-invasive wearable sensors can be used in combination with deep learning to classify artificially induced gait alterations without the need for the doctors or the analyst to be present physically.

In this method the main goal is to diagnose the gait symptom without considering whether the patient is affected by any other neuromuscular movement disorder. This technique in turn leads to improve the treatment and offer a better insight into movement disorder. Methods: Inshore pressure of each participants will be measured of 12 able-bodied, each subject to 8 artificially induced gait alterations, achieved by modifying the underside of the shoe. Using the deep learning architecture, long-term, and short-term memory network the data is recorded and analysed. Through various data channels data was recorded at 100Hz. In addition, the logic for the decision-making process of these networks was inquired.

4. PROPOSED SYSTEM

Machine learning supervised classification algorithms will be used to give the given dataset and extract patterns, which would help in predicting the likely affected or not, thereby helping the medical organisation to predict people who is normal and who is affected by Parkinson's disease. Multiple datasets from Kaggle website would be combined to form a generalized dataset, and then different machine learning algorithms would be applied to extract patterns and to obtain results with maximum accuracy.
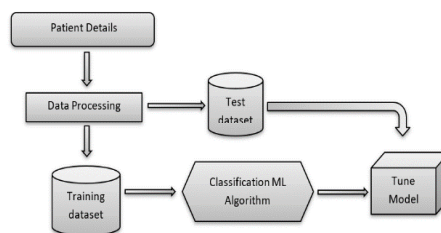

Fig. 1: Architecture of the proposed model

5. ARCHITECTURAL DESIGN

Design is the representation of something that is to be built. Software design is a process design is the perfect way to accurately translate requirements in to a finished software product. The below design gives an idea about the working process and the necessary methods of the project.
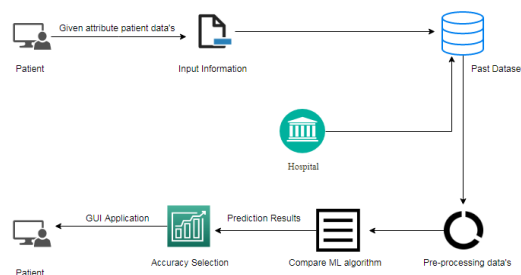

Fig. 2: Flow diagram

6. CONCLUSION

The process starts with data pre-processing techniques like data cleaning and data validation to eliminate noise and identify missing value after that data visualization is used to visualize the data and finally model building and evaluation is done. The best accuracy on public test set is higher accuracy score will be finding out. The above brings some understandings about the symptoms and methods to diagnose the Parkinson disease. Early diagnosis of Parkinson's is most important for the patient to reduce its impact. It presented a prediction model with the aid of artificial intelligence to improve over human accuracy and provide with the scope of early detection. It can be inferred from this model that, area analysis and use of machine learning technique is useful in developing prediction models that can help a doctor reduce the long-time process of prediction and eliminate any human error.

7. REFERENCES

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