LITERATURE SURVEY

Title of the Paper 1: The Parkinson's Disease Detection Using Machine Learning Techniques.

Year of Publication: Dec 2021

Author: C K Gomathy

Topic: Detecting Parkinson's Disease Using Machine Learning

Theme:

More than 10 million people are living with Parkinson's Disease worldwide, according to the Parkinson's Foundation. While Parkinson's cannot be cured, early detection along with proper medication can significantly improve symptoms and quality of life.The scope of this project is to show the high accuracy of detecting Parkinson's disease in early stage.

Overall Interface:

This Parkinson's Disease can be identified by voice and drawings. In this article, they used voice to detect the disease. Parkinson's disease is a neurodegenerative disorder. The symptoms of Parkinson's disease will occur slowly, the symptoms include shaking, rigidity, slowness of movement, difficulty with walking, Thinking, and behavior change, Depression and anxiety are also common.

A massive amount of data must be collected and that must be trained using machine learning algorithms. Those data are directly collected from clinics. 60% of the collected data will be used for training. And remaining 40% will be used for testing. They used 24 columns in the data set each column will indicate the symptom values of a patient except the status column. The status column indicates whether the person is affected or not by 0's and 1's.

The methodologies:

1)Data Collection.
2)Training and testing of Data.
3)Apply XGBoost algorithm.

Testing can be done by:

- Unit Testing
- Integration Testing
- Functional Testing

Title of the paper 2:

Prediction of Parkinson’s Disease using Machine Learning Techniques on Speech dataset

Year Of Publication:

2018

Authors:

Basil K Varghese, Geraldine Bessie Amali D*, Uma Devi K S

Theme:

More than 10 million people are living with Parkinson’s Disease worldwide, according to the Parkinson’s Foundation. While Parkinson’s cannot be cured, early detection along with proper medication can significantly improve symptoms and quality of life.The scope of this project is to show the high accuracy of detecting Parkinson’s disease in early stage.

Inference:

Parkinson's Disease is a neuro-degenerative disorder mostly occurring in people above the age of 60. Occurs due to the decrease in the dopamine level in the brain which results in the degeneration of dopaminergic neurons. In these cases, 90% are vocal impairment which consists of deterioration of normal production of vocal sounds, called Dysphonia.

PD can be detected using vocal tests as PD patients show unique and characteristic vocal features for the detection of PD. Voice records for detection are taken and audio clips are analyzed and categorized based on the PD rating scale(UPDRS) - used for measuring Parkinson's disease.

Dataset is taken from the UCI ML repository and then analyzed and split into training and test dataset. ML and neural network algorithms fit into the training dataset thus this helps in predicting the value from test data and provides accurate results. Obtaining a total score and motor result from 16 vocal attributes will give an idea of information about the progression of PD.

Some attributes are subject number, age, gender, test time, UPDRS, and motor UPDRS. Etc. The conclusion is to accurately predict the motor and total UPDRS scores from 16 voice measures using machine learning and compare the result. Thus results are obtained by SVM, Decision Trees, Linear Regression, etc.

Title of the Paper 3:

Machine Learning for the Diagnosis of the Parkinson's Disease

Year of Publication :

06 May 2021

Authors :

Jie Mei , Christian Desrosiers and Johannes Frasnelli

Theme :

More than 10 million people are living with Parkinson's Disease worldwide, according to the Parkinson's Foundation. While Parkinson's cannot be cured, early detection along with proper medication can significantly improve symptoms and quality of life.The scope of this project is to show the high accuracy of detecting Parkinson's disease in early stage.

Overall Interface :

Applied machine learning is used for the diagnosis and differential diagnosis of PD(Parkinson's Disease). Providing access to information including machine learning methods that have been used in the diagnosis of PD and associated outcomes. Types of clinical, behavioral, and biometric data that could be used for rendering more accurate diagnoses. Potential biomarkers for assisting clinical decision-making, and other highly relevant information, including databases that could be used to enlarge and enrich smaller datasets.

The realization of machine learning-assisted diagnosis of PD yields high potential for a more systematic clinical decision-making system, while adaptation of novel biomarkers may give rise to easier access to PD diagnosis at an earlier stage. Machine learning approaches, therefore, have the potential to provide clinicians with additional tools to screen, detect or diagnose PD.

Title of the Paper 4:

Parkinson's Disease Diagnosis Using Machine Learning and Voice

Year of Publication:

November 2018

Author:

Timothy Wroge, Yasin Serdar Özkanca ,Cenk Demiroglu.

Topic:

Detecting Parkinson's Disease Using Machine Learning

Theme:

More than 10 million people are living with Parkinson's Disease worldwide, according to the Parkinson's Foundation. While Parkinson's cannot be cured, early detection along with proper medication can significantly improve symptoms and quality of life.The scope of this project is to show the high accuracy of detecting Parkinson's disease in early stage.

Overall Interface:

We provide evidence to validate this concept here using a voice dataset collected from people with and without PD. This paper explores the effectiveness of using supervised classification algorithms, such as deep neural networks, to accurately diagnose individuals with the disease. The data used for this analysis were collected through mPower, a clinical observational study conducted by Sage Bionetworks to collect digital biomarkers and health data on participants both with and without PD. Prior to being fed into the feature extraction algorithms, the raw audio was cleaned with VoiceBox's Voice Activation Detection (VAD) algorithm, actively, to extract and remove the background noise from the audio.

This prepossessing step was required in order to pass only raw voice into the audio feature extraction algorithms. Methods drawn from the AudioVisual Emotion recognition Challenge (AVEC) from 2013 were used for preliminary audio analysis and the method of Minimum Redundancy Maximum Relevance (mRMR) A diverse range of machine learning classifiers were examined to find the highest categorical accuracy for PD diagnosis. The decision tree and

support vector machine classifiers were developed with the help of the Scikit-Learn machine learning library as well as the TensorFlow and Keras Deep Learning Libraries Models were optimized through stratified cross validation with accuracy,F-1, recall and precision as metrics.

A series of decision tree classifiers were used to classify the dataset including standard decision trees, random forest, gradient boosted decision trees and extra tree classifiers. Disease diagnosis and prediction is possible through automated machine learning architectures using only non-invasive voice biomarkers as features. This analysis provides a comparison of the effectiveness of various machine learning classifiers in disease diagnosis with noisy and high dimensional data. After thorough feature selection, clinical level accuracy is possible.

These results are promising because they may introduce novel means to assess patient health and neurological diseases using voice data. Due to the high accuracy performed by the models with these short audio clips there is reason to believe denser feature sets with spoken word, video, or other modalities would aid in disease prediction and clinical validation of diagnosis in the future.