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Parkinsons Disease Prediction

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Abstract: ***Parkinson's disease is a neurodegenerative disease which worsens over time. People have trouble vocally, writing, strolling, or completing other simple tasks when dopaminegenerating neurons in parts of the brain become impaired or expire. These symptoms worsen over time, increasing the severity of the condition in patients. We have suggested a methodology in this article for the prediction of Parkinson's disease severity using deep neural networks on UCI's Parkinson's Telemonitoring Vocal Data Set of patients. We have created a neural network to predict the severity of the disease and a machine learning model to detect the disorder. Classification of Parkinson's Disease is done by Neural network, Random Forest Classifier.***

I. INTRODUCTION

Parkinson's disease (a neurodegenerative disorder) that causes the patients' motor abilities to degrade over time due to the damage caused to the dopamine-generating brain cells. Shaking, trouble moving, behavioral disorders, dementia,
and depression are some of the results of this disorder. The primary motor conditions are referred to as "Parkinsonism," or a "Patient with Parkinson's Disease." One of the most common symptom that can be recognized by studying the patients' voice data is changes in their voice. The patient's speech stutters and becomes increasingly impacted as the disease progresses. Deep learning has risen in importance as a method for analysing unstructured data such as speech and
audio signals. Multiple layers of neurons are often used I deep neural networks, these layers are stacked as a single unit for classification and feature selection models. Deep learning is being used in this paper to classify the patient's voice
data into "extreme" and "not severe" categories. The two UPDRS (Unified Parkinson's Disease Rating Scale) scores - total UPDRS and motor UPDRS - were used as assessment criteria in this study. The motor UPDRS assesses the patient's motor capacity in the scale of 0-108, while the total UPDRS assesses the patient's overall ability and its score range from 0-176.

II. LITEARTURE SURVEY

1) A comparison of multiple classification methods for diagnosis of Parkinson disease

AUTHORS: ResulDas

In this paper, different types of classification methods are compared for effective diagnosis of Parkinson's diseases. The reliable diagnosis of Parkinson's disease is notoriously difficult to achieve with misdiagnosis reported to be as high as 25% of cases. The approaches described in this paper purpose to efficiently distinguish healthy individuals. Four independent classification schemas were applied and a comparative study was carried out. These are Neural Networks, DMneural, Regression and Decision Tree respectively. Various evaluation methods were employed for calculating the performance score of the classifiers. According to the application scores, neural networks classifier yields the best results. The overall classification score for neural network is 92.9%. Moreover, we compared our results with the result that was obtained by kernel support vector machines [Singh, N., Pillay, V., & Choonara, Y. E. (2007). Advances in the treatment of Parkinson's disease. Progress in Neurobiology, 81, 29–44]. To the best of our knowledge, our correct classification score is the highest so far.

2) Predicting Severity Of Parkinson's Disease Using Deep Learning

AUTHORS: Srishti Grover, Saloni Bhartia, Akshama, Abhilasha

Parkinson's disease is a progressive and chronic neurodegenerative disorder. As the dopamine-generating neurons in parts of the brain become damaged or die, people begin to experience difficulty in speaking, writing, walking, or completing other simple tasks. These symptoms grow worse over time, thus resulting in the increase of its severity in patients. In this paper, we have proposed a methodology for the prediction of Parkinson's disease severity using deep neural networks on UCI's Parkinson's Telemonitoring Voice Data Set of patients. We have used 'TensorFlow' deep learning library of python to implement our neural network for predicting the severity. The accuracy values obtained by our method are better as compared to the accuracy obtained in previous research work.

3) UPDRS tracking using linear regression and neural network for Parkinson's disease prediction

AUTHORS : Elmehdi BENMALEK , Jamal ELMHAMDI , Abdelilah JILBAB

The Unified Parkinson's Disease Rating Scale (UPDRS) is often used to track Parkinson's disease (PD) but it requires costly and logistically inconvenient for patient and clinical staff. In this work we present clinically useful accuracy replication of UPDRS, so we can classify the disease's severity of the patients with, and predict the evolution of PD based on those results. We map the features extracted from the speech to UPDRS using Least-squares regression technique and neural network. We applied our techniques on large database of PD speech (~6,000 recordings from 42PD patients). And we compare our results with state of the art.

4) Predicting Severity Of Parkinson's Disease Using Deep Learning

AUTHORS : SrishtiGroverSaloniBhartiaAkshama

Parkinson's disease is a progressive and chronic neurodegenerative disorder. As the dopamine-generating neurons in parts of the brain become damaged or die, people begin to experience difficulty in speaking, writing, walking, or completing other simple tasks. These symptoms grow worse over time, thus resulting in the increase of its severity in patients. In this paper, we have proposed a methodology for the prediction of Parkinson's disease severity using deep neural networks on UCI's Parkinson's Telemonitoring Voice Data Set of patients. We have used 'TensorFlow' deep learning library of python to implement our neural network for predicting the severity. The accuracy values obtained by our method are better as compared to the accuracy obtained in previous research work.

5) High-accuracy detection of early Parkinson's Disease using multiple characteristics of finger movement while typing

AUTHORS : Warwick R. Adams

Parkinson's Disease (PD) is a progressive neurodegenerative movement disease affecting over 6 million people worldwide. Loss of dopamine-producing neurons results in a range of both motor and non-motor symptoms, however there is currently no definitive test for PD by non-specialist clinicians, especially in the early disease stages where the symptoms may be subtle and poorly characterised. This results in a high misdiagnosis rate (up to 25% by non-specialists) and people can have the disease for many years before diagnosis. There is a need for a more accurate, objective means of early detection, ideally one which can be used by individuals in their home setting. In this investigation, keystroke timing information from 103 subjects (comprising 32 with mild PD severity and the remainder non-PD controls) was captured as they typed on a computer keyboard over an extended period and showed that PD affects various characteristics of hand and finger movement and that these can be detected. A novel methodology was used to classify the subjects' disease status, by utilising a combination of many keystroke features which were analysed by an ensemble of machine learning classification models. When applied to two separate participant groups, this approach was able to successfully discriminate between early-PD subjects and controls with 96% sensitivity, 97% specificity and an AUC of 0.98. The technique does not require any specialised equipment or medical supervision, and does not rely on the experience and skill of the

practitioner. Regarding more general application, it currently does not incorporate a second cardinal disease symptom, so may not differentiate PD from similar movement-related disorders.

III. PROPOSED METHOD

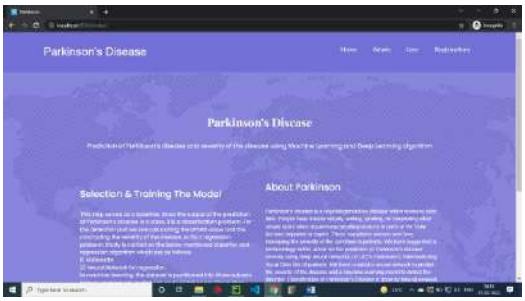
the proposed work, there are four different classification algorithms were selected along with the two feature compressing methods as CFS with best-first search and Gain ratio with ranker mechanism. As described in the literature survey each algorithm is designed with an obtainable process in an optimized form, such a selected process may not be utilized to build a more competent method. The proposed method investigate and analyze four chosen method such as Hidden Markov Model (HMM), Artificial Neural Network (ANN), Support Vector Machine (SVM) and Decision Tree (J48) along with two other feature compressing methods. [2, 17] After analyzing these feature compressing methods, combine them with the linear models. And if any data is mismatched then reexamine with the other employed technique to improve the QoS.

ADVANTAGES OF PROPOSED SYSTEM:

- The comparative values show that the proposed method obtains higher accuracy when compared with other existing methods.
- The efficiency and suitability of the proposed approach are compared with other suggested methods.

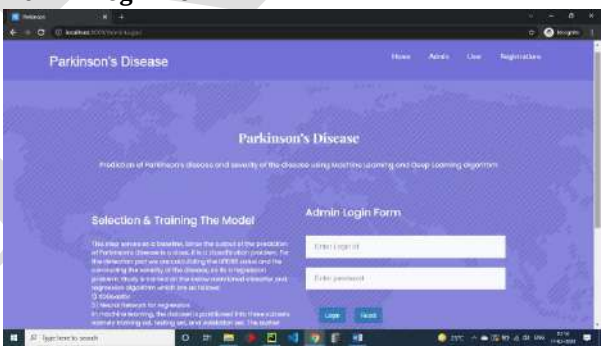
Algorithm: Machine learning, Classification Technique, Naïve Bayes, neural networks, supervised machine learning.

IV. RESULTS



User Register Form

Admin Login Form



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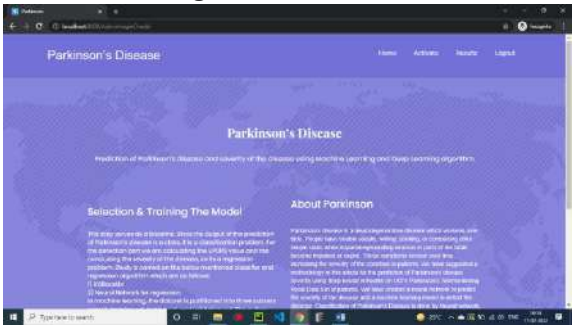

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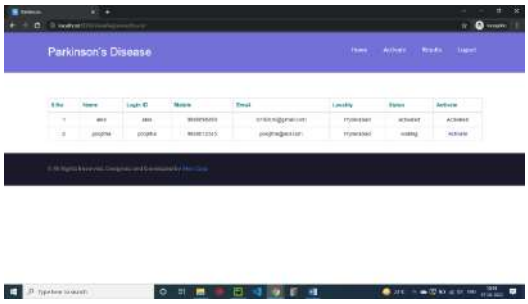
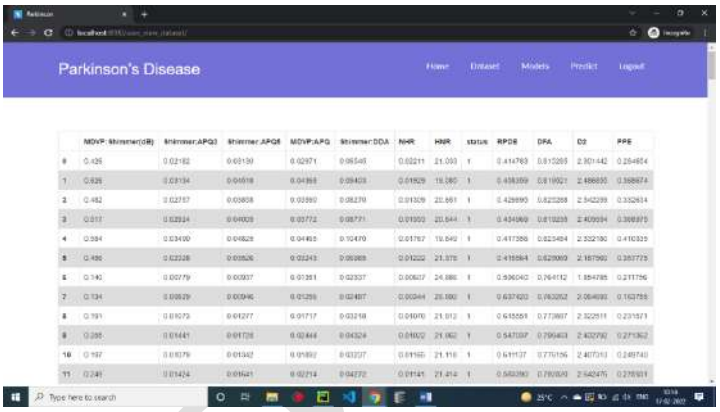
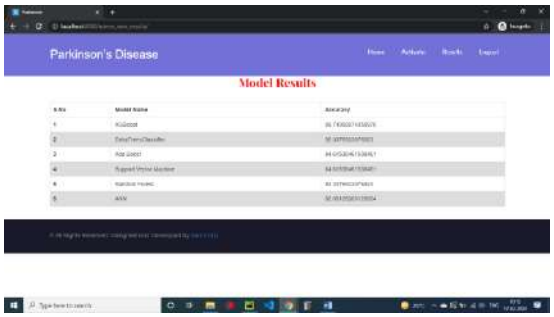
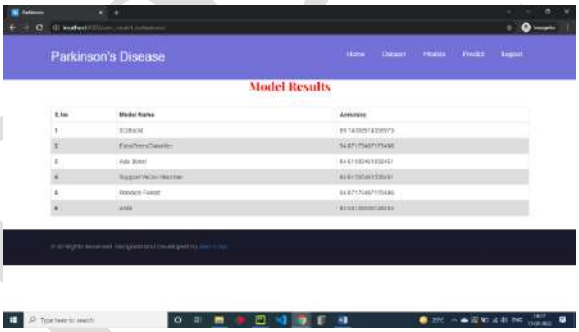




Admin view Results

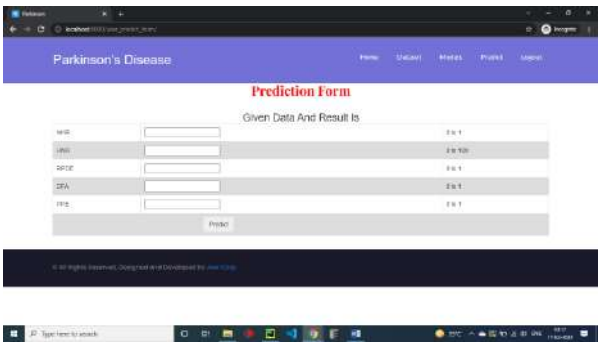


User view Models Results



User login form

Prediction form



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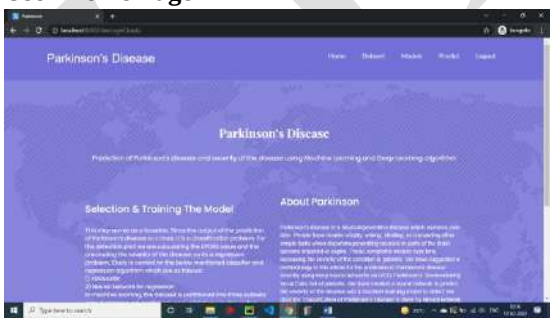
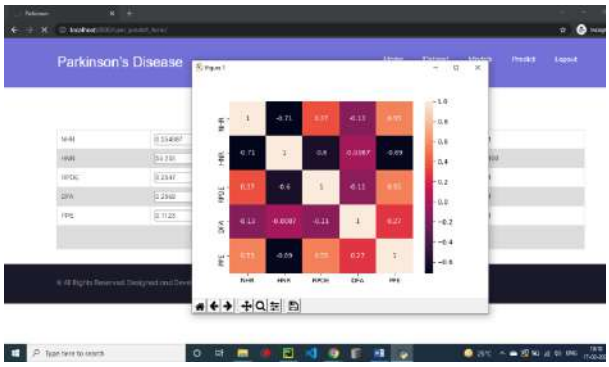
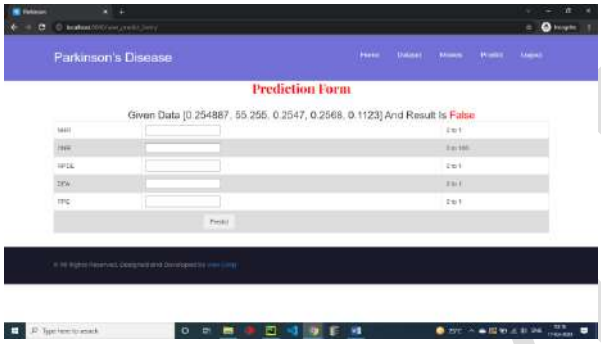


Correlation Graph

User view Dataset



Prediction Results



V. CONCLUSION

Detection of Parkinson's Disease

1) The research area for Parkinson's Disease is significant, early stage detection of it can improve patient's health

2) This solution was capable of differentiating among early stage Parkinson disease subjects and controls with a tolerance of 92 to 100 %, a specificity of 95 to 100
% and an AUC(Area Under Curve) in the range of 0.97 and 1.00.

3) It was found that Parkinson's disease was detected positive in people above the age of 55 years.

4) According to the study, females are more likely to have Parkinson's than males

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Parkinson disease". *Expert Systems With Applications*, 37:1568–1572,
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