PARKINSON'S DISEASE DETECTION USING ENSEMBLE METHOD

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ABSTRACT

Parkinson's disease is a condition in which dopamine-producing cells in the brain die. Parkinson's disease symptoms appear as the amount of dopamine in the brain diminishes. Parkinson's disease is a slow-progressing condition with symptoms such as tremors in the hands, arms, legs, chin, and face that get worse with time. People may have trouble walking and speaking as the condition advances. Although there is no cure for Parkinson's disease, the symptoms of the disease can be alleviated with the use of some medications. There are a number of common symptoms that may or may not suggest that the patient has Parkinson's disease. In this study, a new rating system was developed to aid in determining the severity of Parkinson's disease. However, a person with identical symptoms does not necessarily have Parkinson's disease. Because Parkinson's disease is an unsolved problem, the study focuses on relevant aspects, medicines, and common approaches used to identify or assess the disease. Patients with Parkinson's disease often experience voice difficulties in the early stages of the condition. As a result, recent investigations for the identification of Parkinson's disease have focused on diagnosis systems based on voice disturbances.

Keywords: *PD (Parkinson Disease), dopamine, Ensemble Learning,Boosting*

INTRODUCTION

Parkinson's disease (PD) can be difficult to diagnose, especially in its early stages, because the symptoms of other neurologic conditions might be confusing. Motor signs such as bradykinesia (slowed movement and loss of spontaneous movement), muscle rigidity, a resting tremor, and postural instability are used to make the current diagnosis (balance issues).After Alzheimer's disease, Parkinson's disease (PD) is the second most common neurological disease .In general, there are two types of PD symptoms: motor and non-motor symptoms. Tremor, bradykinesia, stiffness (rigidity), and impaired balance are the main motor symptoms of Parkinson's disease (postural instability). Mood problems, cognitive dysfunction, pain, sensory dysfunction, and dysautonomia are the most common non-motor symptoms .Patients with Parkinson's disease frequently experience motor speech problems. More than half of the patients have speech problems, such as very quiet and rushed speaking .Speech signal analysis is a popular non-invasive way for diagnosing Parkinson's disease. Clinicians and neuroscientists are interested in noninvasive PD detection and prediction technology. Furthermore, detecting speech changes in Parkinson's patients would allow for early detection and intervention before the onset of disabling physical symptoms, which would have a significant impact on both patient quality of life and the healthcare system.

LITERATURE SURVEY

[1]"Stratification of Parkinson Disease using python scikit-learn ML library"

Author **-** Ashish kolte, Bodireddy mahitha ,Dr. N V Ganapathi Raju

Description**-**Parkinson's disease is a central nervous system condition that affects the body's motor processes. It's a long-term illness with symptoms that worsen over time. It usually affects the elderly, whose symptoms steadily worsen until they reach a peak. Hearing, walking, speech, and other basic bodily functions can all be affected by the condition. Generic machine learning methods that provide varied degrees of accuracy can be used to analyse this disease.

[**2**] "Features Selection For Building An Early Diagnosis Machine Learning Model For Parkinson's Disease"

Author- Abu Bakr ,Mohamed M. ,Mahmoud Al-Hefnawy,

Description**-** The data for this study was created by Athanasius Tsanas and Max Little of the University of Oxford in partnership with ten medical institutes in the United States and Intel Corporation. The goal of these medical assessments is to locate the Unified Parkinson's disease rating scale (UPDRS), which is the most often used scale in Parkinson's disease clinical research..

[**3**] **"**A Hybrid Approach to Parkinson Disease Classification using speech signal: The combination of SMOTE and Random Forests"

Author**-** Kemal Polat

Description**-** In this paper, a novel method for detecting Parkinson's disease using characteristics extracted from speech signals is proposed. In terms of disease development and treatment, early detection and diagnosis of Parkinson's disease are critical. The dataset for Parkinson's disease used in this work came from the UCI machine learning repository.

[**4**] "A Nonlinear Decision Tree based Classification Approach to Predict the Parkinson's disease using Different Feature Sets of Voice Data"

Author**-** Satyabrata Aich ,Kim younga , Kueh Lee Hui , Ahmed Abdulhakim Al-Absi and Mangal Sain .

Description**-** To uncover predictors of Parkinson's disease, researchers are continuing to study in domains such as gait analysis and voice analysis. Because of its precision on complicated data, several researchers in the field have recently adopted a machine learning-based method. In several cases of Parkinson's disease, a machine learning-based approach has been utilized to analyse gait and voice data. However, no one has yet examined performance metrics based on audio data using different feature sets and a non-linear based classification approach.

[**5**] "A Neural-based Approach to Aid Early Parkinson's Disease Diagnosis"

Author**-** Armin Salimi-Badr, Mohammad Hashemi

Description**-**A neural technique based on employing Long-Short Term Memory (LSTM) neural networks is proposed in this paper to diagnose individuals with Parkinson's disease. The temporal patterns of the gait cycle are different for healthy people and sick, according to this study. As a result, the suggested method extracts temporal patterns to distinguish patients from healthy people using a recurrent structure like LSTM, which can assess the dynamic character of the gait cycle.

EXISTING SYSTEM

Clinical judgments are frequently made based on doctors' intuition and experience rather than the database's knowledge-rich data. This approach causes unintended biases, errors, and exorbitant medical costs, all of which have an impact on the quality of care offered to patients.

- Wearable technologies are being used as part of the Internet of Things.
- Using a support vector machine, handwriting was used as a marker for the diagnosis of Parkinson's disease.
- Using 3D visualisation techniques to provide an easy tool for assessing Parkinson's disease patients' performance Visually guided tracking of PD patients' performance using data mining techniques.

PROPOSED SYSTEM

Parkinson's disease (PD) is a neurological disease that has progressed to an advanced stage. In the early stages of Parkinson's disease, roughly 90% of people with the disease have speech problems. As a result, speech features were used to classify this condition in this study. Jitter, shimmer, basic frequency parameters, harmonicity parameters, Recurrence Period Density Entropy (RPDE), Detrended Fluctuation Analysis (DFA), and Pitch Period Entropy are some of the most well-known speech aspects employed in PD research (PPE). Those characteristics were dubbed baseline characteristics in this study.
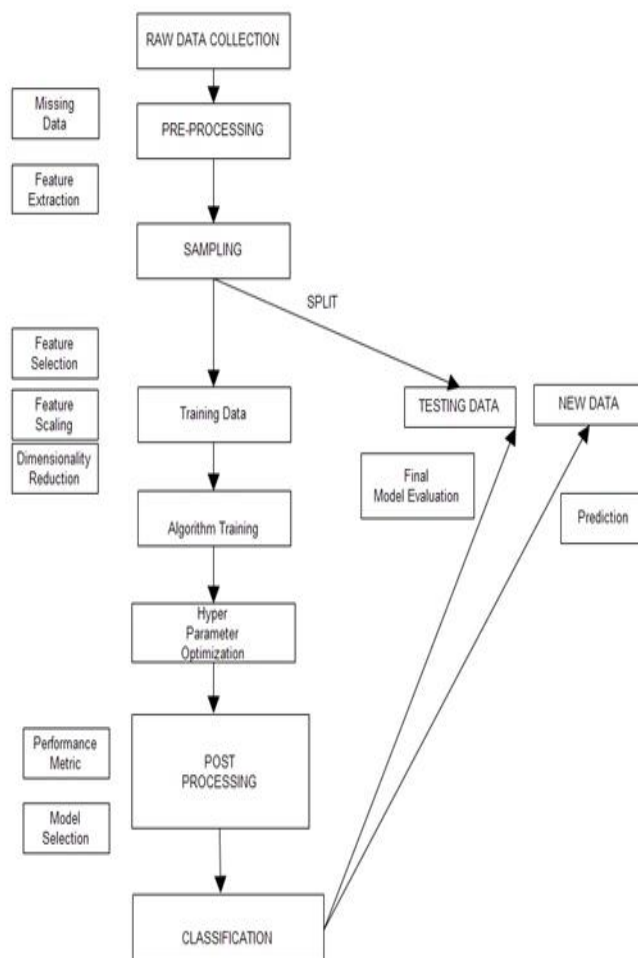
PROBLEM STATEMENT

Medical observations and assessment of clinical indicators, including the identification of a variety of motor symptoms, are often used to diagnose Parkinson's disease (PD). Traditional diagnostic procedures, on the other hand, may be vulnerable to subjectivity because they rely on the assessment of motions that are sometimes subtle to human sight and hence difficult to define, potentially leading to misdiagnosis. Meanwhile, early non-motor symptoms of Parkinson's disease can be minor and be caused by a variety of other illnesses. As a result, these symptoms are frequently missed, making early PD diagnosis difficult.

ADVANTAGES

It's critical to correctly diagnose Parkinson's disease so that sufferers can receive the right treatment and counselling. Furthermore, recognizing Parkinson's disease early is critical since therapies like levodopa/carbidopa are more successful when given early in the disease. Non-pharmacological treatments, such as increased exercise, are also easier to implement in the early stages of Parkinson's disease and may help halt disease development.

CONCLUSION:

Artificial intelligence and medical research have formed a partnership that aids in the treatment of ubiquitous disorders such as Parkinson's disease. For early detection of Parkinson's disease, symptoms such as Bradykinesia, Tremor at rest, Rigidity, and Voice Impairment can be noticed. There is no specific medical method or diagnosis for a person's parkinsonism, which also applies to bioinformatics. Strong techniques like Machine Learning, on the other hand, have sped up the process of detecting Parkinson's disease by making it more cost-effective and efficient. Machine learning can help doctors detect Parkinson's disease.

FUTURE SCOPE

The study used a single model for each purpose to detect and assess the severity of Parkinson's disease. The research can be expanded by utilizing additional models and comparing the results to establish the most optimized and efficient models for disease detection and determining the degree of disease in the patient.

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