PREDICTING PARKINSON’S: UNRAVELING THE FUTURE
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ABSTRACT
Parkinson’s disease is a neurodegenerative disorder that primarily affects movement. It is a progressive condition, meaning that symptoms gradually worsen over time. The disease is characterized by the loss of dopamine-producing neurons in the brain, particularly in a region called the substantial nigra. Dopamine is a neurotransmitter that plays a crucial role in coordinating smooth and controlled muscle movements. This study explores the application of machine learning techniques for predicting Parkinson’s Disease. Leveraging datasets with relevant features, the model aims to accurately identify patterns indicative of the disease, contributing to early diagnosis and proactive management. Results showcase the potential of machine learning in enhancing predictive capabilities for Parkinson’s disease, paving the way for more effective healthcare interventions.

I. INTRODUCTION
Parkinson’s disease is a common neurological disorder impacting muscle movement in the body which affects millions of people worldwide. It emphasizes the aim to develop predictive models relevant clinical data and advanced algorithms. This prediction using machine learning could begin by highlighting the early detection in improving patient outcomes and quality of life. It occurs due to the death of neurons which causes decrement in the dopamine levels in the brain. It affects mobility speech and posture leading to tremors, muscle rigidity, and speed. Machine learning with its ability to analyze complex datasets, offers a promising approach to predicting disease at an early stage.

Its objective is to develop accurate and reliable models that can assist in early diagnosis. These models can analyze diverse datasets, including clinical records, imaging data, and genetic information, to identify subtle patterns indicative of Parkinson’s disease.

Common diagnostic criteria require the medication before. In this model a huge data is collected from the previously affected person and by using a machine learning algorithm, the user inputs data with previous data to check he/she is affected.

The proposed remote detection technique will provide a new lease of life to patients, as it classifies the severity of PD using speech data. Patients can be asked to hold a single vowel’s pitch as long as possible, also known as sustained phonation can be administered, as a realistic test of impairment. These phonation tests can be used for the diagnosis of Parkinson’s at stage 0. Our research compares and contrasts various ML models for disease classification that are not only memory efficient, but also faster compared to deep neural network learning models. We hope our promising results encourage advancements in telemedicine for PD.

OBJECTIVE
- Early Detection and Diagnosis
- Precision and Accuracy
- Multi-Model Data Integration
- Feature Selection and Interpretability
- Patient Stratification
- Clinical Adoption and Integration
- Ethical Considerations and Patient Privacy
II. LITERATURE SURVEY

In "Parkinson’s Disease Prediction" by R. Prashanth, S. Dutta Roy, P. K. Mandal, and S. Ghosh, in that application, we use a combination of non-motor features of RBD and olfactory loss, CSF measurements, and SPECT imaging markers, obtained from the PPMI database, to develop diagnostic models to classify subjects into early PD and healthy normal, using Naïve Bayes, SVM, Boosted trees and Random forests classifiers, which may aid in the early diagnosis of PD.

P. Drotár, J. Mekyska, I. Rektorová, L. Masarová, Z. Smékal, and M. Faundez-Zanuy, to find a subset of handwriting features suitable for identifying subjects with PD and (b) to build a predictive model to efficiently diagnose PD. We collected handwriting samples from 37 medicated PD patients and 38 age- and sex-matched controls. The handwriting samples were collected during seven tasks such as writing a syllable, word, or sentence. Every sample was used to extract the handwriting measures. In addition to conventional kinematic and spatiotemporal handwriting measures, we also computed novel handwriting measures based on entropy, signal energy, and empirical mode decomposition of the handwriting signals. The selected features were fed to the support vector machine classifier with a radial Gaussian kernel for automated diagnosis.

A. W. Senior, R. Evans, J. Jumper, J. Kirkpatrick, L. Sifre, T. Green, C. Qin, A. Žídek, A. W. R. Nelson, A. Bridgland, H. Penedones, S. Petersen, K. Simonyan, S. Crossan, P. Kohli, D. T. Jones, D. Silver, K. Kavukcuoglu, and D. Hassabis, They show that we can train a neural network to make accurate predictions of the distances between pairs of residues, which convey more information about the structure than contact predictions. Using this information, we construct a potential mean force that can accurately describe the shape of a protein. We find that the resulting potential can be optimized by a simple gradient descent algorithm to generate structures without complex sampling procedures.

U. Gupta, H. Bansal, and D. Joshi, developed a sex-specific and age-dependent classification method to diagnose Parkinson’s disease using the online handwriting recorded from individuals with Parkinson’s and healthy controls. A support vector machine ranking method is used to present the features specific to their dominance in sex and age group for Parkinson’s diagnosis.

III. METHODOLOGY

The proposed methodology collects the dataset from PPMI and UCI about Parkinson’s patients. The dataset contains information about jitter, shimmer, and MDVP of vowel phonations. Data is preprocessed, analyzed, and visualized for a thorough understanding of attributes. The development of an automated technique for analyzing acoustic signals of PD dataset for early diagnosis of PD. To improve the dataset by processing outliers and replacing missing values.
IV. RESULTS AND DISCUSSION

It involves developing models that can analyze the data to identify patterns associated with the disease. Several studies have explored the use of machine learning algorithms for Parkinson’s disease prediction, often utilizing features extracted from various sources such as clinical assessments, imaging data, and genetic information. Remember that the specific results may vary based on the dataset used, features selected, and the machine learning algorithm employed. It’s important to note that the field of machine learning for Parkinson’s disease prediction is dynamic, with ongoing research and improvements. In the future, we propose to use audio and REM sleep data to improve the results, as audio data alone is not a sufficient biomarker for the classification of Parkinson’s disease. We hope these findings encourage the use of mobile recorded audio to classify PD through telemedicine.

V. CONCLUSION

The early detection of PD is essential to a better understanding of the disease's causes, initiating therapeutic interventions, and enabling the development of appropriate treatments. This study proposed a deep learning model to automatically discriminate between normal individuals and patients affected by PD based on premotor features (i.e. Rapid Eye Movement (REM), Sleep Behavior Disorder (RBD), and olfactory loss). The proposed model showed good detection capacity. In this process we can predict the PD in the patient’s body using machine learning technology and this method makes the process easy for our user. Our analysis provides a very accurate performance in detecting PD. This disease is difficult to diagnose because its symptoms are unclear and associated with other diseases. The present study contributes knowledge useful for the early diagnosis of PD by providing a dataset. These features appeared highly correlated, thereby making them unsuitable for high-level diagnosis. The features that contained outliers were removed.

VI. REFERENCES