

# Detecting Parkinson's Disease using Machine Learning

## Literature Survey

Divya Singh R, Kaviya Vikashini M, Jaya Lakshmi J, Kaviarasu M, Bala Chandran T

TITLE	YEAR	AUTHOR	METHODS	LIMITATIONS
<b>A Parkinson's Disease Classification Using Stacking Ensemble Machine Learning Methodology</b>	2022	Dhyey D. Joshi, Hirva H. Joshi, Brijeshkumar Y. Panchal, Parth Goel, and Amit Ganatra.	A stack of Random-Forest -Classifier, Support-Vector-Machine & K-nearest-neighbor with Extra-Tree-Classifier as well as Extreme Gradient Boost and model is implemented by Mean Squared Error, Mean Absolute Error Loss as a loss function.	The main limitation of random forest is that a large number of trees can make the algorithm too slow and ineffective for real-time predictions.

<b>Parkinson Disease Detection Using Various Machine Learning Algorithms</b>	2022	Kanakaprabha . S., Arulprakash. P., Srikanth R.	A comparative analysis is done with various Machine Learning classifiers algorithms like XGBoost, Random Forest, KNN and SVM. Random Forest provides better performance with an accuracy 90%.	The paper fails to address the intricacies of detection related to detecting the disease.
<b>Novel Speech Signal Processing Algorithms for High-Accuracy Classification of Parkinson's Disease</b>	2012	Athanasios Tsanas, Max A Little, Patrick E. McSharry, Jennifer Spielman, Lorraine O. Raming	Speech signal processing algorithms and Then, we select four parsimonious subsets of these dysphonia measures using four feature selection algorithms, and map these feature subsets to a binary classification response using two statistical classifiers: random forests	Imprecision and false interpretations. Speech recognition software isn't always able to interpret spoken words correctly.

			and support vector machines	
<b>Detection of Parkinson's Disease through Smell Signatures</b>	2020	Shrinidhi Kulkarni, Neenu George Kalayil, Jinu James, Sneha Parsewar, and Revati Shriram.	The paper describes a non-intrusive and definite method for detecting Parkinson's disease through an individual's smell signatures. VOC sensors which determine the components in sweat were used to achieve the results.	The usage of sensors for detection can make the process cumbersome as it defeats the concept of using just an online website to predict the Parkinson's Condition.
<b>Early Diagnosis of Parkinson's Disease with Speech Pronunciation Features Based on XGBoost Model</b>	2022	Xiumei Wang, Xinghong Chen, Qinga Wang, and Guannan Chen.	A Parkinson's disease diagnosis method based on machine learning. XGBoost algorithm is applied to detect and classify the speech signals of Parkinson's disease patients.	The speech recording is dependant on the hardware used and also on the environment and cannot be performed in a remote location which is not desirable in the case of using a website.

<b>Improved KNN algorithm with information entropy for the diagnosis of Parkinson's disease.</b>	2022	Zhaozhao Fang.	This paper mainly introduces machine learning methods, specifically, KNN algorithm, Random Forest algorithm, and Naive Bayesian algorithm are utilized to conduct group decisions for PD, where, an improved KNN algorithm with information entropy is proposed.	The ensemble of various algorithms to obtain the prediction can be slow for larger datasets. Poor performance can be expected in case of overlapped classes.
<b>Smartphone-based gait assessment to infer Parkinson's disease severity using crowdsourced data</b>	2017	Kaveh Pahlavan Emmanuel agu, Hamza Abujrida	Time and frequency domain features such as entropy rate and peak frequency, and postural sway features were extracted from accelerometer data and random forest algorithm is	Random forest algorithm has a drawback as large number of trees can make the algorithm too slow and ineffective for real-time predictions.

			used with 85% of accuracy.	
<b>Parkinson's Disease Management via Wearable Sensors</b>	2022	Huma Mughal; Abdul Rehman Javed; Muhammad Rizwan; Ahmad S. Almadhor; Natalia Kryvinska	in-depth analysis of the PD symptoms, Motor and Non-Motor Symptoms (NMS), the current diagnosis and management techniques used and their efficacy.	Wearable technology, also known as "wearables," is a category of electronic devices that can be worn as accessories, embedded in clothing, implanted in the user's body, or even tattooed on the skin.
<b>Classification of Parkinson's Disease Using NNge Classification Algorithm</b>	2018	Ebtesam J. Alqahtani; Fatimah H. Alshamrani; Hajra F. Syed; Sunday O. Olatunji	NNge classification is known to be an efficient algorithm for analyzing voice signals but has not been explored in details in this area, SMOTE algorithm was used to balance the data	Algorithms are time-consuming. Big tasks are difficult to put in algorithms. Difficult to show branching and looping in algorithms. Understanding complex logic through algorithms can be very difficult

THE PARKINSON'S DISEASE DETECTION USING MACHINE LEARNING TECHNIQUES	2021	C K Gomathy	Parkinson's disease; machine learning (ML), XGBoost, Decision tree.	Symptoms usually begin gradually and worsen over time. As the disease progresses, people may have difficulty walking and talking. They may also have mental and behavioral changes, sleep problems, depression, memory difficulties, and fatigue.
<b>Telemonitoring Parkinson's disease using machine learning by combining tremor and voice analysis</b>	2020	Md. Sakibur Rahman Sajal, Md. Tanvir Ehsan, Ravi Vaidyanathan, Shouyan Wang, Tipu Aziz & Khondaker Abdullah Al Mamun	This proposed system receives rest tremor and vowel phonation data acquired by smartphones with built-in accelerometer and voice recorder sensors	Essential tremor (ET) is a neurological disorder that causes your hands, head, trunk, voice or legs to shake rhythmically. It is often confused with Parkinson's disease. Essential tremor is the most common trembling disorder.

<b>Parkinson's Disease Diagnosis Using Machine Learning and Voice</b>	2018	Timothy J. Wroge, Yasin Özkanca, Cenk Demiroglu, Dong Si, David C. Atkins, Reza Hosseini Ghomi	Due to the decrease in motor control that is the hallmark of the disease, voice can be used as a means to detect and diagnose PD.	
<b>Diagnosis of The Parkinson Disease Using Enhanced Fuzzy Min-Max Neural Network and OneR Attribute Evaluation Method</b>	2019	Osama nayel al sayaydeha, Mohammad Falah Mohammad.	An enhanced fuzzy minmax neural network with the OneR attribute evaluator (EFMM-OneR) is proposed as a hybrid model for diagnosing Parkinson's disease. The proposed model consists of two stages: In the first stage, feature selection is used to identify and remove irrelevant, redundant, or noisy features from the provided dataset. In the second stage, the enhanced	Fuzzy minmax logic has two major limitations: the handling of imprecise data and the inherent inference of human thinking. Both these problems are related to each other. If the data is imprecise in the system, then a human being cannot infer the knowledge or relation

			fuzzy min-max (EFMM) neural network is used for the classification process	
<b>Analysis and evaluation of handwriting in patients with Parkinson's disease using kinematic, geometrical, and non-linear features</b>	2019	C.D. Rios-Urrego, J.C. Vasquez-Correa, J.F. Vargas-Bonilla, E. noth, F. Lopera, J.R. Orozco-Arroyave.	Features based on kinematic, geometrical and non-linear dynamics analyses were evaluated to classify Parkinson's disease and healthy subjects. Classifiers based on K-nearest neighbours, support vector machines, and random forest were considered	K-nearest neighbours has a major drawback of becoming significantly slows as the size of that data in use grows. Kinematic has a drawback of limited orientation angles, non-linear force transmission and stiffness characteristics



<b>Detection of Parkinson's Disease Using Machine Learning and Deep Learning Algorithms</b>	2021	Shrihari K Kulkarni, K R Sumana	Decision Tree, Logistic Regression, and Naive Bayes and Deep Learning algorithm like Recurrent Neural Networks (RNN) by predicting with accuracy rate and performance comparison of all Machine Learning and Deep Learning algorithms.	Slow and Complex training procedures.
<b>The parkinson's disease detection using machine learning techniques</b>	2021	C K Gomathy	XGBoost and Navie Bayes algorithm	XGBoost does not perform so well on sparse and unstructured data.

<b>Telemonitoring Parkinson's disease using machine learning by combining tremor and voice analysis</b>	2020	Md. Sakibur Rahman Sajal, Md. Tanvir Ehsan, Ravi Vaidyanathan, Shouyan Wang, Tipu Aziz & Khondaker Abdullah Al Mamun	k-nearest neighbors (kNN) algorithm & (MRMR) feature selection	high sensitivity of standard relevance and redundancy measures to the presence of outliers in the data
<b>Parkinson's Disease Detection using Machine Learning</b>	2021	Radha N, Sachin Madhavan RM, Sameera holy S	Convolutional Neural Network (CNN), Artificial Neural Network (ANN) and Hidden Markov Model (HMM)	HMM is only dependent on every state and its corresponding observed object: The sequence labeling, in addition to having a relationship with individual words, also relates to such aspects as the observed sequence length, word context and others.
<b>Prediction of Parkinson's Disease using Machine Learning Techniques on Speech dataset</b>	2019	Basil K Varghese, Geraldine Bessie Amali D, Uma Devi K S	DMNeural, Neural Network, Regression and Decision Tree	

