



# **Machine Learning Project**

## **Parkinson's Disease**

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# INTRODUCTION TO PARKINSON'S DISEASE

Parkinson's disease is a brain disorder that causes unintended or uncontrollable movements, such as shaking, stiffness, and difficulty with balance and coordination.

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.

Older woman with Parkinson's disease and her caregiverWhile virtually anyone could be at risk for developing Parkinson's, some research studies suggest this disease affects more men than women. It's unclear why, but studies are underway to understand factors that may increase a person's risk. One clear risk is age: Although most people with Parkinson's first develop the disease after age 60, about 5% to 10% experience onset before the age of 50. Early-onset forms of Parkinson's are often, but not always, inherited, and some forms have been linked to specific alterations in genes.

## PARKINSON'S SYMPTOMS MAY INCLUDE :

### **Parkinson's has four main symptoms:**

- Tremor in hands, arms, legs, jaw, or head
- Muscle stiffness, where muscle remains contracted for a long time
- Slowness of movement
- Impaired balance and coordination, sometimes leading to falls

### **Other symptoms may include :**

- Depression and other emotional changes
- Difficulty swallowing, chewing, and speaking
- Urinary problems or constipation
- Skin problems

# SYMPTOMS :



Slowness of movement



Tremor



Speech Changes



Flatulence



Loss of smell



Impaired balance

# PROJECT OBJECTIVE

The primary objective of this project is to develop predictive models for Parkinson's disease using a range of machine learning algorithms. By harnessing the power of these algorithms, we aim to accurately classify individuals as either healthy or having Parkinson's disease based on relevant medical and demographic features.

# MODULE DESCRIPTION - MODEL TRAINING

Supervised Classification algorithms were used to train the model on the cleaned dataset after feature extraction and dimensionality reduction.

● **The algorithms used include :**

1. Support Vector Machine
2. Random Forest
3. Decision Tree Classifier
4. K-Fold cross Validation

# Parkinson Disease Prediction using Machine Learning in Python :

## Importing Libraries and Dataset

Python libraries make it very easy for us to handle the data and perform typical and complex tasks with a single line of code.

**Pandas** – This library helps to load the data frame in a 2D array format and has multiple functions to perform analysis tasks in one go.

**Numpy** – Numpy arrays are very fast and can perform large computations in a very short time.

**Matplotlib/Seaborn** – This library is used to draw visualizations.

**Sklearn** – This module contains multiple libraries having pre-implemented functions to perform tasks from data preprocessing to model development and evaluation.



> **Data is collected from Kaggle for detection of disease which is then analysed. The data would be analysed on various parameters of our speech.**

>**The features are as below:**

- i. name - ASCII subject name and recording number
- ii. Average vocal fundamental frequency
- iii. Maximum vocal fundamental frequency
- iv. Minimum vocal fundamental frequency
- v. Several measures of variation in fundamental frequency
  
- vi. Several measures of variation in amplitude
- vii. Two measures of the ratio of noise to tonal components in the voice status -  
**The health status of the subject (one) - Parkinson's, (zero) - healthy**
- viii. Two nonlinear dynamical complexity measures
- ix. Signal fractal scaling exponent
- x. Three nonlinear measures of fundamental frequency variation

# PROCEDURE/ALGORITHM:

Start

>CREATING A MACHINE LEARNINGMODEL{

IMPORTING DEPENDENCIES;

DATA COLLECTION AND ANALYSIS {

loading the data from csv file to a Pandas DataFrame;

Data Normalization(removing inconsistentvalues);

}

DATA PREPROCESSING{

Separating the features & Target,

Splitting the data to training data & Test data;

}

Data Standardization; Model Training: Model

Evaluation{

calculating accuracy of training dataset;

calculating accuracy of test dataset;

}

BUILDING A PREDICTIVE SYSTEM(

user\_input\_data(parameters/attributes);

user\_input\_data to numpy.array; standardization of data:

std\_data = scaler.transform(input\_data); #predicting

prediction = predict(std\_data) print(prediction);

if prediction is '0' then do

print("The Person does not have Parkinsons Disease");

else do

print("The Person has Parkinsons Disease");

}

End

*Thank You*