PARKINSONS DISEASE DETECTION

ABOUT

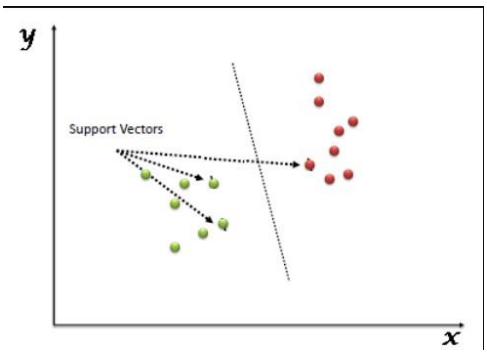
The Parkinson's disease is progressive neuro degenerative disorder that affects a lot only people significantly affecting their quality of life. It mostly affects the motor functions of human. The main motor symptoms are called "parkinsonism" or "parkinsonian syndrome". The symptoms of Parkinson's disease will occur slowly, the symptoms include shaking, rigidity, slowness of movement and difficulty with walking, Thinking and behaviour change, Depression and anxiety are also common. There is a model for detecting Parkinson's using voice. The deflections in the voice will confirm the symptoms of Parkinson's disease.

DATASET

The dataset was taken from Kaggle. One of the attributes is whether the person has Parkinson’s disease or not in the form of binary: 0 or 1.

SUPPORT VECTOR MACHINE

“Support Vector Machine” (SVM) is a supervised machine learning algorithm that can be used for both classification or regression challenges. However, it is mostly used in classification problems. In the SVM algorithm, we plot each data item as a point in n-dimensional space (where n is a number of features you have) with the value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper-plane that differentiates the two classes very well.



IMPLEMENTATION

1. **Importing dependencies:** Libraries included – Pandas, NumPy, Sckit-Learn
2. **Data collection and analysis:** Data is read using pandas. We can use functions like "describe" and "isnull.sum" to find out about the dataset and check for null values. We use "value. counts" to find out how many people had Parkinson's disease and what were the symptoms that led to that conclusion.

```
In [7]: # get statistical information
parkinsons_data.describe()
```

	MDVP:Fo(Hz)	MDVP:Fhi(Hz)	MDVP:Flo(Hz)	MDVP:Jitter(%)	MDVP:Jitter(Abs)	MDVP:RAP	MDVP:PPQ	Jitter:DDP	MDV
count	195.000000	195.000000	195.000000	195.000000	195.000000	195.000000	195.000000	195.000000	195.0
mean	154.228641	197.104918	116.324631	0.006220	0.000044	0.003306	0.003446	0.009920	0.029
std	41.390065	91.491548	43.521413	0.004848	0.000035	0.002968	0.002759	0.008903	0.018
min	88.333000	102.145000	65.476000	0.001680	0.000007	0.000680	0.000920	0.002040	0.009
25%	117.572000	134.862500	84.291000	0.003460	0.000020	0.001660	0.001860	0.004985	0.016
50%	148.790000	175.829000	104.315000	0.004940	0.000030	0.002500	0.002690	0.007490	0.022
75%	182.769000	224.205500	140.018500	0.007365	0.000060	0.003835	0.003955	0.011505	0.037
max	260.105000	592.030000	239.170000	0.033160	0.000260	0.021440	0.019580	0.064330	0.119

8 rows x 23 columns

```
In [8]: # distribution of target variable --> column 'status'
parkinsons_data['status'].value_counts()

1    147
0     48
Name: status, dtype: int64
```

1 –> Parkinson's positive

0 –> Healthy

```
In [6]: # check for missing values
parkinsons_data.isnull().sum()

name              0
MDVP:Fo(Hz)       0
MDVP:Fhi(Hz)      0
MDVP:Flo(Hz)      0
MDVP:Jitter(%)    0
MDVP:Jitter(Abs)  0
MDVP:RAP          0
MDVP:PPQ          0
Jitter:DDP        0
MDVP:Shimmer      0
MDVP:Shimmer(dB)  0
Shimmer:APQ3      0
Shimmer:APQ5      0
MDVP:APQ          0
Shimmer:DDA       0
NHR               0
HNR               0
status            0
RPDE              0
DFA               0
spread1           0
spread2           0
D2                0
PPE               0
dtype: int64
```

```
In [5]: # get more information about the dataset
parkinsons_data.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 24 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   name              195 non-null    object
 1   MDVP:Fo(Hz)       195 non-null    float64
 2   MDVP:Fhi(Hz)      195 non-null    float64
 3   MDVP:Flo(Hz)      195 non-null    float64
 4   MDVP:Jitter(%)    195 non-null    float64
 5   MDVP:Jitter(Abs)  195 non-null    float64
 6   MDVP:RAP          195 non-null    float64
 7   MDVP:PPQ          195 non-null    float64
 8   Jitter:DDP        195 non-null    float64
 9   MDVP:Shimmer      195 non-null    float64
 10  MDVP:Shimmer(dB)  195 non-null    float64
 11  Shimmer:APQ3      195 non-null    float64
 12  Shimmer:APQ5      195 non-null    float64
 13  MDVP:APQ          195 non-null    float64
 14  Shimmer:DDA       195 non-null    float64
 15  NHR               195 non-null    float64
 16  HNR               195 non-null    float64
 17  status            195 non-null    int64
 18  RPDE              195 non-null    float64
 19  DFA               195 non-null    float64
 20  spread1           195 non-null    float64
 21  spread2           195 non-null    float64
 22  D2                195 non-null    float64
 23  PPE               195 non-null    float64
dtypes: float64(22), int64(1), object(1)
memory usage: 36.7+ KB
```

3. **Data Pre-processing:** We drop the columns "name" and "status" before splitting it to training set and testing size as the testing size was 20%.

```
(195, 22) (156, 22) (39, 22)
```

4. **Model Evaluation:** We use SVM for the prediction.

```
Accuracy score of testing data:  0.8717948717948718
Accuracy score of training data:  0.8846153846153846
```

```
SVC(kernel='linear')
```

```
[1]
The person has Parkinson's disease

C:\Users\vaish\OneDrive\Desktop\Anaconda\lib\site-packages\sklearn\base.py:450: UserWarning: X does not have valid feature names, but Stan
dardScaler was fitted with feature names
  warnings.warn(
```

CONCLUSION

We observe that SVM gives 87% accuracy. As we can observe the Parkinson's detection system, when we input the values for the symptoms, we can predict whether the person has the disease or not using the old data.