Project-3

Detection of the Parkinson’s Disease

Parkinson's disease is a neurodegenerative disorder that affects movement. There are different ways to detect Parkinson's disease, including medical exams and specialized tests. In this response, I will provide a Python code that uses machine learning to predict the presence of Parkinson's disease based on voice samples. This method is based on the paper "A comparative study on classification of Parkinson's disease using voice samples" by Sharma et al.

Before we start, make sure you have the necessary Python libraries installed. You can install them using pip:

pip install numpy scipy sklearn librosa soundfile pyaudio

Code:-

```
import numpy as np
import scipy.stats as stats
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.neural_network import MLPClassifier
import librosa
import soundfile as sf
import pyaudio

# Load the dataset
data, labels = [], []
```

```
for i in range(1, 32):
    filename = f"parkinsons_updrs_data/subject{i:02d}.wav"
    x, sr = librosa.load(filename)
    mfccs = librosa.feature.mfcc(x, sr=sr, n_mfcc=13)
    data.append(np.mean(mfccs.T, axis=0))

labels.append(np.loadtxt(f"parkinsons_updrs_data/subject{i:02d}.txt"))

# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(data, labels, test_size=0.2, random_state=42)

# Standardize the data
```

```
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

# Train a neural network classifier
clf = MLPClassifier(hidden_layer_sizes=(50, 50), max_iter=1000)
clf.fit(X_train, y_train)

# Evaluate the classifier
acc = clf.score(X_test, y_test)
print(f"Accuracy: {acc}")
```

Explaination:-

This code loads voice samples from the Parkinson's Disease Classification dataset, which consists of 31 subjects, and extracts MFCC features. The features are then used to train a neural network classifier, which predicts the presence of Parkinson's disease based on the severity of the disease. The accuracy of the classifier is printed at the end.

Note that this code assumes that the dataset is stored in a folder called "parkinsons_updrs_data" in the same directory as the Python script. The dataset can be downloaded from the UCI Machine Learning Repository.