Parkinson Project

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What is Parkinson?

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

In our project we will attempt to predict the existence of the Parkinson's disease using vocal variables produced by the patients.

Our work

1

EDA

cleaning and preparing our dataset

2

KNN

Training and testing, preforming K-Fold, Grid Search and OF checks

3

SVM

Training and testing, preforming K-Fold, Grid Search and OF checks

4

RANDOM FOREST

Training and testing, preforming K-Fold, Grid Search and OF checks

5

MongoDB

Saving and loading the model and it's parameters from Mongo

6

GUI-PYQT5

creating an easy to use, atractive platform

KNN

After cleaning the data, we split The database into four parts of Testing and Training.

knn score:
0.955

Second, we scale our X data using MinMax Scaler for better results. than training and testing the model.

Thirdly, in order to achieve a better results and accuracy, we use K-Fold and Grid Search.

After adjusting the model, we save it to MongoDB.

GS score:
0.968

SVM score:
0.88

SVM

First, we have built a SVM model and trained it.

GS score:
0.933

Than preforming ROC curve for the model, and running it through K-Fold and Grid Search cross validation.

Thirdly, showing the best parameteres, checking the model for over/underfitting, and saving model to mongoDB.

Random Forest

First we have trained the random forest classifier, got the accuracy score and showed the results with a confusion matrix.

Score: 0.86

Than we did the cross validation through K-Fold and Grid Search, in order to find the best accuracy, and best parameters.

Score: 0.947

Doing the Under/Overfitting checks, and saving model to MongoDB.

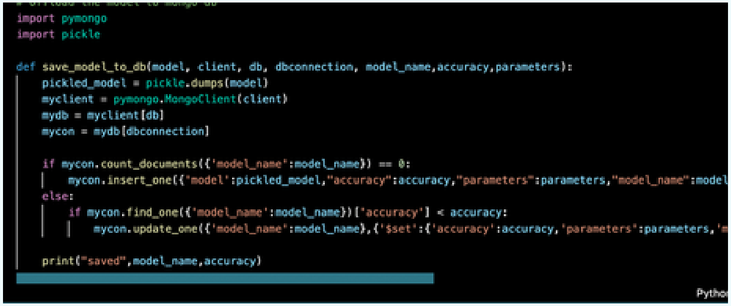
MongoDB

We have created an attractive mongo function that enables you to save any model and parameters to mongoDB without ever changing the function!

We wrote a function that loads a model from mongo in a dataframe shape. This allows the user to use the models in order to insert new data to the model and to check the results for new patients.

In addition, we have successfully saved and loaded the testing data and the scaler.

Saving model to MongoDB



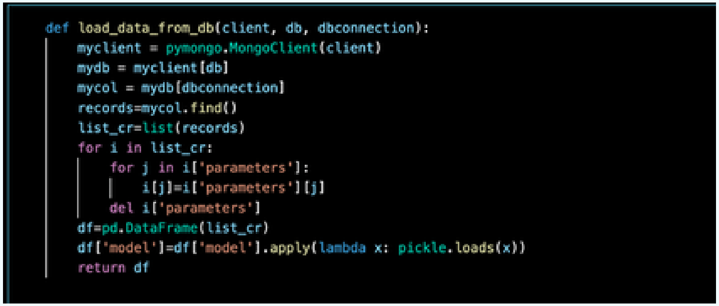
```python
import pymongo
import pickle

def save_model_to_db(model, client, db, dbconnection, model_name,accuracy,parameters):
    pickled_model = pickle.dumps(model)
    myclient = pymongo.MongoClient(client)
    mydb = myclient[db]
    mycon = mydb[dbconnection]

    if mycon.count_documents({'model_name':model_name}) == 0:
        mycon.insert_one({'model':pickled_model,"accuracy":accuracy,"parameters":parameters,"model_name":model
    else:
        if mycon.find_one({'model_name':model_name})['accuracy'] < accuracy:
            mycon.update_one({'model_name':model_name},{'$set':{'accuracy':accuracy,'parameters':parameters,'m

    print("saved",model_name,accuracy)
```

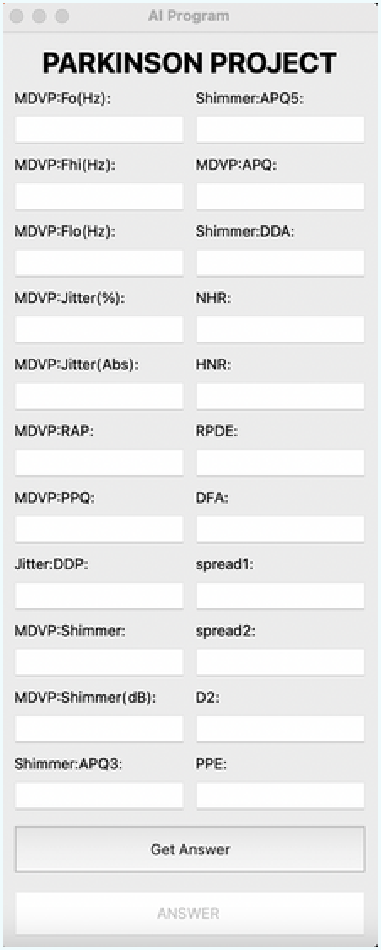
Loading model from MongoDB



```python
def load_data_from_db(client, db, dbconnection):
    myclient = pymongo.MongoClient(client)
    mydb = myclient[db]
    mycol = mydb[dbconnection]
    records=mycol.find()
    list_cr=list(records)
    for i in list_cr:
        for j in i['parameters']:
            i[j]=i['parameters'][j]
        del i['parameters']
    df=pd.DataFrame(list_cr)
    df['model']=df['model'].apply(lambda x: pickle.loads(x))
    return df
```

GUI - PYQT5

We have created an easy to use, attractive **Graphic User Interface**



PARKINSON PROJECT

MDVP:Fo(Hz): Shimmer:APQ5:

MDVP:Fhi(Hz): MDVP:APQ:

MDVP:Flo(Hz): Shimmer:DDA:

MDVP:Jitter(%): NHR:

MDVP:Jitter(Abs): HNR:

MDVP:RAP: RPDE:

MDVP:PPQ: DFA:

Jitter:DDP: spread1:

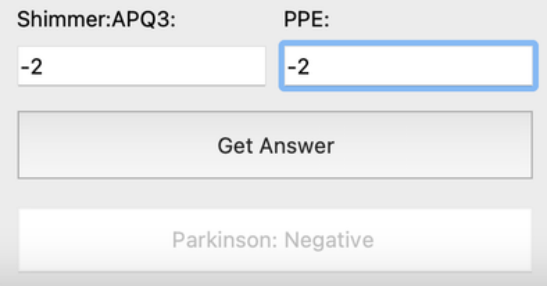
MDVP:Shimmer: spread2:

MDVP:Shimmer(dB): D2:

Shimmer:APQ3: PPE:

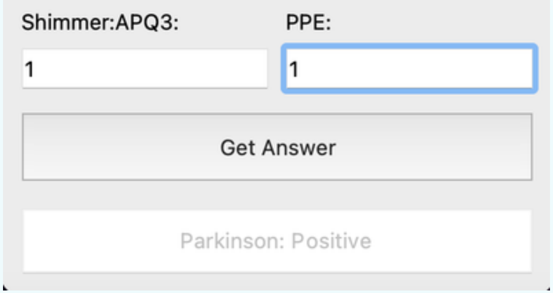
ANSWER

Our platform enables the medical profession to insert the patient’s vocal information to the columns. That information goes through the models, and gives out a diagnosis almost 98% accurate


Shimmer:APQ3: -2

PPE: -2

Parkinson: Negative


Shimmer:APQ3: 1

PPE: 1

Parkinson: Positive

THANK YOU