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RESEARCH ARTICLE OPEN ACCESS

Supervised Machine Learning Algorithms for Vehicles Reliability Performance

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ABSTRACT

It is an important to analysis the factors using number of well-known approaches of machine learning algorithms like linear regression, decision tree and random forest to improve the vehicle performance efficiency. And here we consider a performance in mileage.

Keywords: Machine learning, Random forest, Performance, KNN, SVM

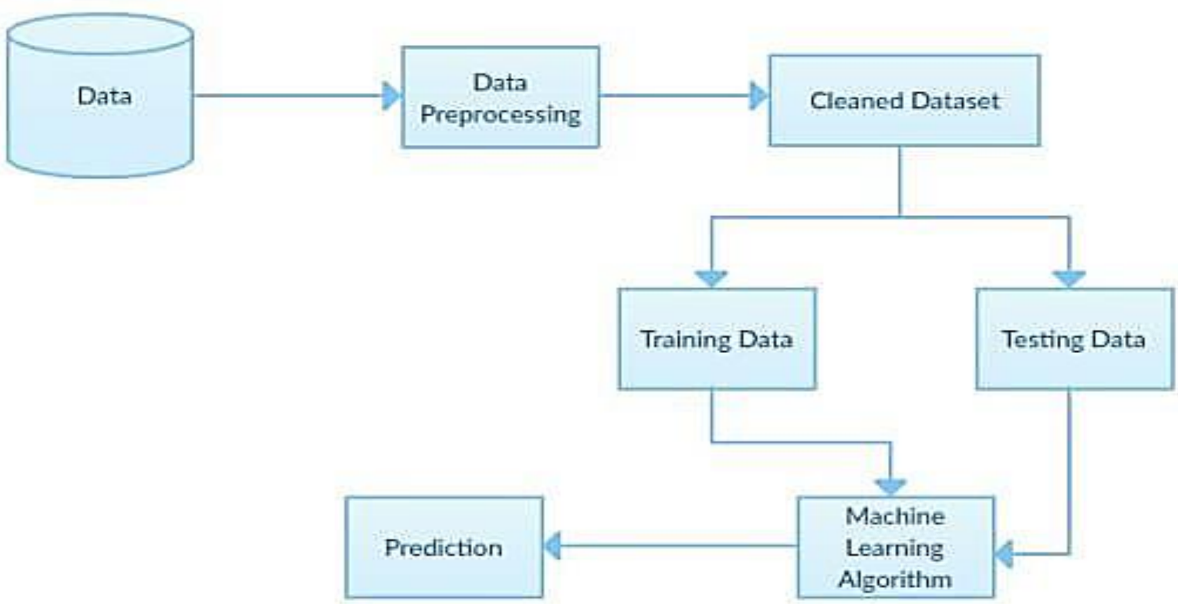
I. INTRODUCTION

Predicting the performance level of cars is an important and interesting problem. The main goal of the current study is to predict the performance of the car to improve certain behaviour of the vehicle. This can significantly help to improve the systems fuel consumption and increase the efficiency. The performance analysis of the car based on the engine type, no of engine cylinders, fuel type and horsepower etc. These are the factors on which the health of the car can be predicted. It is an on-going process of obtaining, researching, analysing and recording the health based on the above three factors. The performance objectives like mileage, dependability, flexibility and cost can be grouped together to play a vital role in prediction engine and engine management system. This approach is the very important step towards understanding the vehicles performance.

II. DATA SET

The Kaggle website hosts the dataset that is used for predicting the performance. This study's classification objective is to determine the performance of the car. Jupyter Notebook, a more adaptable and potent data science application software, is used to conduct the data analysis in Python programming. There are various phases in determining the performance of car, and those stages are mentioned in the form of methodology in the diagram below, which summarizes the methodology of the complete procedure.

2.1. METHODOLOGY



2.2. EXISTING METHOD

In the existing system use only decision tree model algorithm to develop this model and it produce low accuracy and it is the time taken to predict the result is more.

2.3. PROPOSED METHOD

The proposed system consists of main components. Firstly Random Forest Model is used to obtain feature importance to train the model with top features. After the model is trained, the URL features are extracted to obtain the features of different layers in the network.

We imported all the required libraries and packages, including keras, tensor flow, matplotlib, numpy, etc., in the first stage. We must load the dataset and process the dataset after importing the libraries. Here the user uploads the dataset and then the system read that and train the data and then test the data and then at last it will predict the result using applied model and displays on the screen.

The datasets are imported, the null valued columns are dropped and the columns are labelled. The dataset consists of different features that are to be taken into consideration while determining a website URL as legitimate or phishing. Follow the commands as shown:

```
datas=pd.read_csv(r"C:\Users\HP\Downloads\car performance-dataset.csv")
```

	mpg	cylinders	displacement	horsepower	weight	acceleration	model year	origin	car name
0	18.0	8	307.0	130	3504	12.0	70	1	chevrolet chevelle malibu
1	15.0	8	350.0	165	3693	11.5	70	1	buick skylark 320
2	18.0	8	318.0	150	3436	11.0	70	1	plymouth satellite
3	16.0	8	304.0	150	3433	12.0	70	1	amc rebel sst
4	17.0	8	302.0	140	3449	10.5	70	1	ford torino

PRE-PROCESS THE DATASET TO GET THE PROPER TRAINING SET:

In this activity we will find whether there are any null values present in 'data_website'.

```
datas.isnull().any()
```

```
mpg             False
cylinders       False
displacement    False
horsepower      False
weight          False
acceleration    False
model year      False
origin          False
car name        False
dtype: bool
```

IDENTIFYING INDEPENDENT & DEPENDENT VARIABLES:

In this activity, the dependent and independent variables are to be identified.

The last column (Result) in the dataset is the dependent variable which is dependent on the 30 different factors. The independent columns are considered as x and the dependent column as y.

```
x=datas.iloc[:,1:8].values
y=datas.iloc[:,0].values
```

SPLITTING THE DATA:

After identifying the dependent and independent variables, the dataset now has to be split into two sets, one set is used for training the model and the second set is used for testing how good the model is built. The split ratio we consider is 80% for training and 20% for testing.

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=0)
```

START BUILDING MACHINE LEARNING MODEL:

There are several Machine learning algorithms to be used depending on the data you are going to process such as images, sound, text, and numerical values. The algorithms can be chosen according to the objective. As the dataset which we are using is a Classification dataset so you can use the following algorithms

- Logistic Regression
- Random Forest Regression / Classification
- Decision Tree Regression / Classification
- K-Nearest Neighbours
- Support Vector Machine

You will need to train the datasets to run smoothly and see an incremental improvement in the prediction rate.

CHOOSE THE APPROPRIATE MODEL

Working with Standard scaler model

Step 1: Here, we will be initially considering the Standard scaler model and fit the data.

```
from sklearn.preprocessing import StandardScaler
sd=StandardScaler()
x_train=sd.fit_transform(x_train)
x_test=sd.fit_transform(x_test)
```

Step 2:

```
from sklearn.ensemble import RandomForestRegressor
d=RandomForestRegressor(n_estimators=30,random_state=0)
d.fit(x_train,y_train)
```

```
RandomForestRegressor(n_estimators=30, random_state=0)
```

CHECK THE METRICS OF THE MODEL:

Here we will be evaluating the model built. We use the test set for evaluation. The test set is given to the model for prediction and prediction values are stored in another variable called y_pred.

The actual and predicted values are compared to know the accuracy of the model using the accuracy_score function from sklearn.metrics package.

Follow the below steps to find the accuracy of the model.

```
y_pred=d.predict(x_test)
y_pred
```

```
array([14.38333333, 24.25666667, 14.21666667, 20.56666667, 18.47333333,
       30.21666667, 34.63333333, 21.15      , 16.30333333, 25.76      ,
       36.60333333, 36.27      , 19.53666667, 27.32333333, 16.54333333,
       32.99333333, 28.32333333, 27.49666667, 17.03      , 35.82      ,
       16.47333333, 23.54      , 23.16666667, 20.7       , 33.69666667,
       26.45      , 33.79666667, 30.37333333, 31.93666667, 16.57333333,
       20.26666667, 32.99      , 19.79666667, 34.08333333, 20.85666667,
       25.02      , 19.65333333, 17.14      , 34.78333333, 12.76666667,
       13.73333333, 15.2       , 28.32      , 32.76666667, 28.74333333,
       22.68666667, 20.54333333, 16.50666667, 23.38      , 29.88333333,
       34.31666667, 26.5       , 17.63      , 27.78333333, 15.96666667,
       12.96666667, 18.86666667, 26.91666667, 31.95666667, 15.68      ,
       20.81      , 25.97      , 19.84666667, 21.6       , 13.46666667,
       15.33333333, 14.2       , 18.90333333, 24.72666667, 14.21666667,
       34.87666667, 13.25      , 22.96666667, 18.77666667, 23.83333333,
       32.16666667, 28.17666667, 31.23666667, 31.94      , 14.35      ])
```

```
import pickle
pickle.dump(d,open(r'C:\Users\HP\Downloads\regression.pkl','wb'))
```

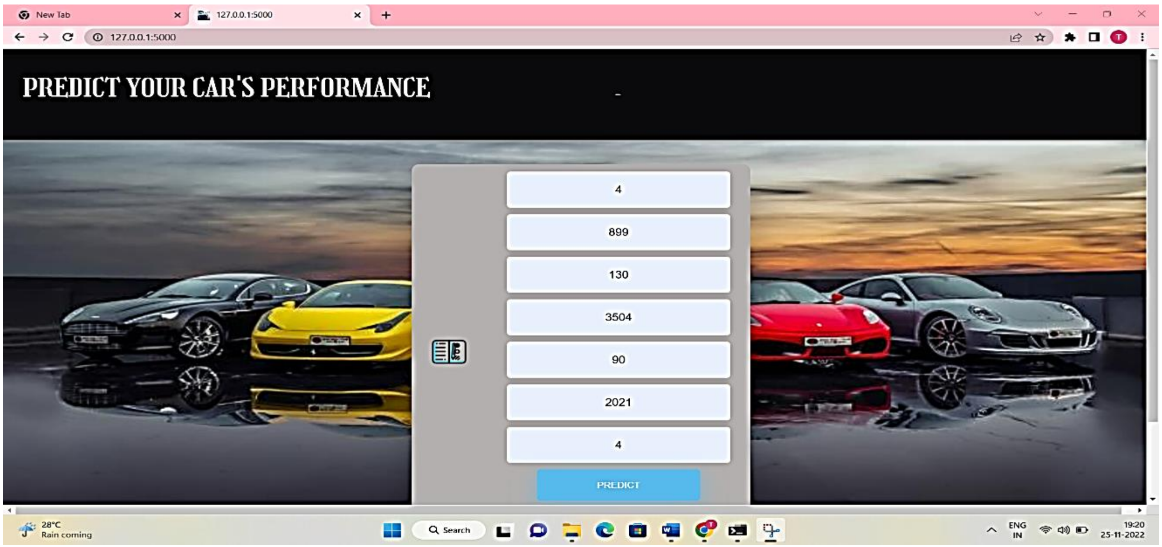
```
from sklearn.metrics import r2_score
accuracy=r2_score(y_test,y_pred)
accuracy
```

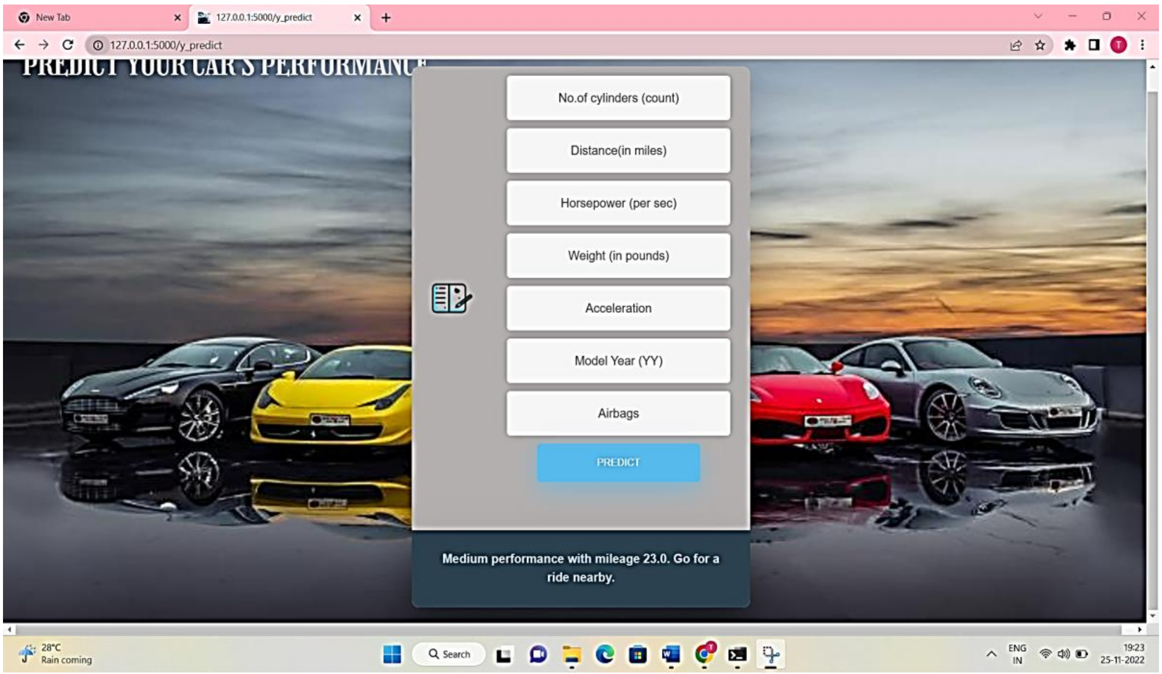
```
0.8914224071232417
```

III. RESULTS

The app.py page when run on the Spyder application will produce an url as output.

- URL should be copied and placed on an web browser.
- Then the phishing detection page gets opened.





IV. CONCLUSION

With the help of this model users can easily predict their performance quickly.The results will display whether the car have better performance or not by taking some test values like accurate value.Present world is running towards Machine Learning so,The future scope for this model is very high because by following some simple procedure only we are getting the disease prediction results.This model makes the user work easy by predicting the results quickly.

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