

# **1.INTRODUCTION**

## **1.1.Overview:**

Our model predicts the amount of CO<sub>2</sub> that is emitted from the car basing on some parameters. We considered the parameter named FUELCONSUMPTION\_COMB\_MPG which gives the measure of fuel consumption by different cars. We used the best suitable Machine Learning algorithm in order to build the model that predicts the CO<sub>2</sub> emissions from car and created a web application using flask.

## **1.2.Purpose:**

To predict the emission of CO<sub>2</sub> from car by taking inputs from the user. This prediction helps the user to know how much amount of CO<sub>2</sub> is emitted from his car in terms of g/km. And to compare the predicted value with the threshold value.

# **2.LITERATURE SURVEY**

## **2.1.Existing Problem:**

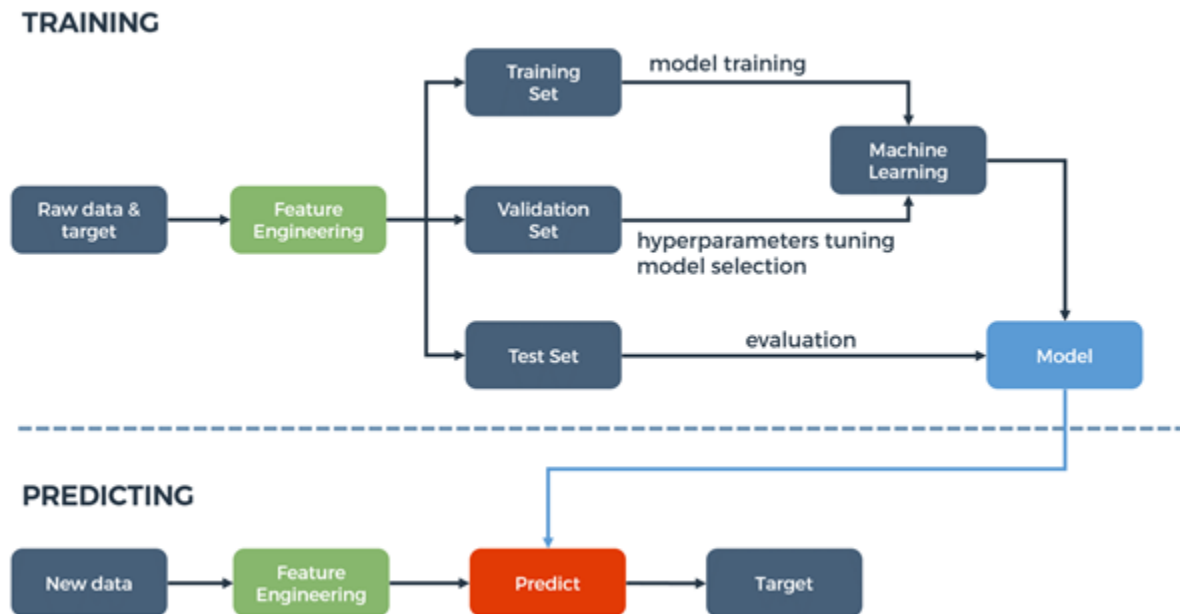
The amount of CO<sub>2</sub> emission from the transport sector (including cars) accounts for about 20% of total CO<sub>2</sub> emissions. Accordingly, from the viewpoint of preventing global warming, reducing that proportion is a key issue. In regard to CO<sub>2</sub> emissions from cars, fuel economy standards are getting tougher all over the world, so improving fuel economy of cars is strongly desired. From now onwards, it is considered that fuel economy of engines will be further improved by boosting engine efficiency and by hybridization (electrification) of cars. What's more, improving fuel economy by improving "driving operation" (i.e. the operation in which a car is driven) and by smoothing traffic flows will come into the picture in the near future

## **2.2.Proposed Solution:**

Here, in this project we used random forest regression. By using this algorithm and depending upon the input data, the model is going to predict the CO<sub>2</sub> emission of that particular car, so as to know if the Emission of CO<sub>2</sub> of that particular car is more than the threshold value or not.

### 3.THEORETICAL ANALYSIS

#### 3.1.Block Diagram:



#### 3.2.Hardware/Software Designing:

1. Strategy: matching the problem with the solution.
2. Dataset preparation and preprocessing:
  - Data collection.
  - Data visualization.
  - Labeling.
  - Data selection.
  - Data preprocessing.
  - Data transformation.
3. Splitting the dataset into training set and testing set.
4. Modeling:
  - Model training.
  - Model evaluation and testing.
  - Improving predictions with ensemble methods.
5. Model deployment.

## 4.EXPERIMENTAL INVESTIGATIONS

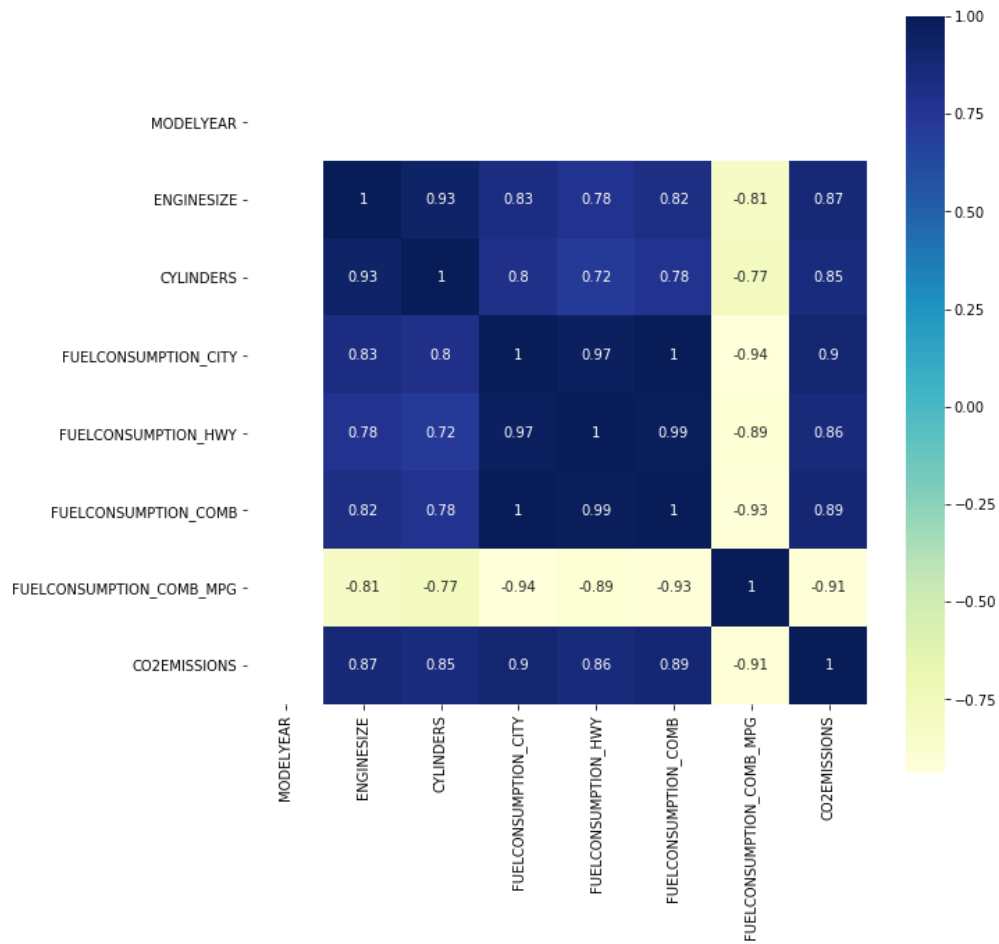
a) Checking of Null values:

MODELYEAR	False
MAKE	False
MODEL	False
VEHICLECLASS	False
ENGINE SIZE	False
CYLINDERS	False
TRANSMISSION	False
FUELTYPE	False
FUELCONSUMPTION_CITY	False
FUELCONSUMPTION_HWY	False
FUELCONSUMPTION_COMB	False
FUELCONSUMPTION_COMB_MPG	False
CO2EMISSIONS	False
dtype: bool	

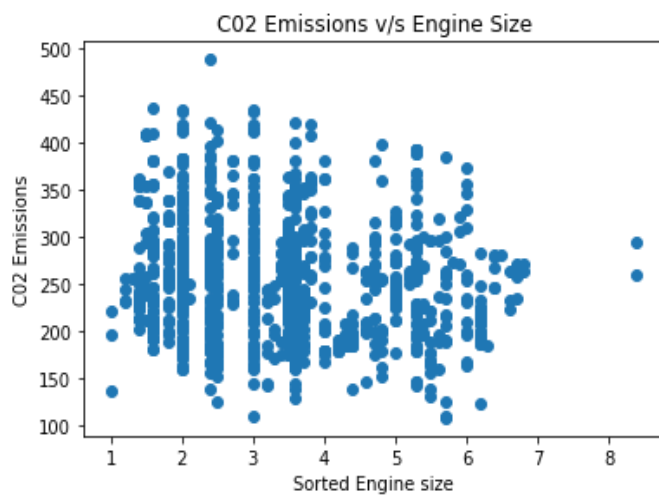
b) Datatypes of each attributes:

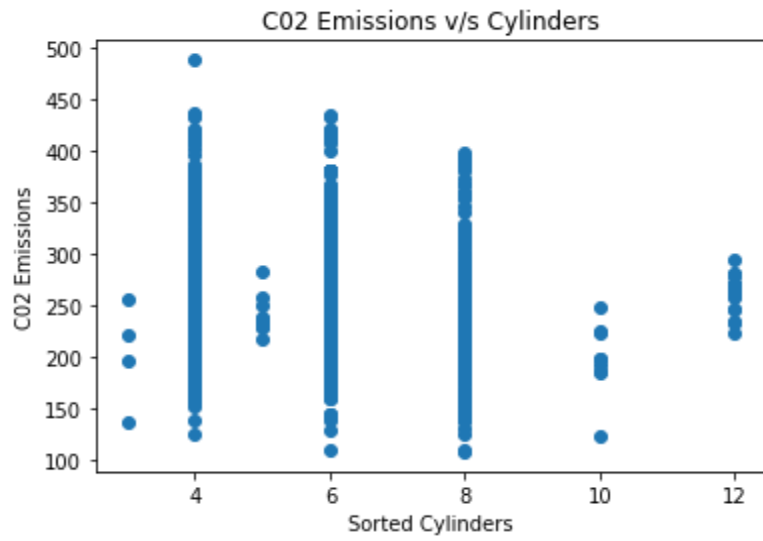
MODELYEAR	int64
MAKE	object
MODEL	object
VEHICLECLASS	object
ENGINE SIZE	float64
CYLINDERS	int64
TRANSMISSION	object
FUELTYPE	object
FUELCONSUMPTION_CITY	float64
FUELCONSUMPTION_HWY	float64
FUELCONSUMPTION_COMB	float64
FUELCONSUMPTION_COMB_MPG	int64
CO2EMISSIONS	int64
dtype: object	

### c) Correlation HeatMap:

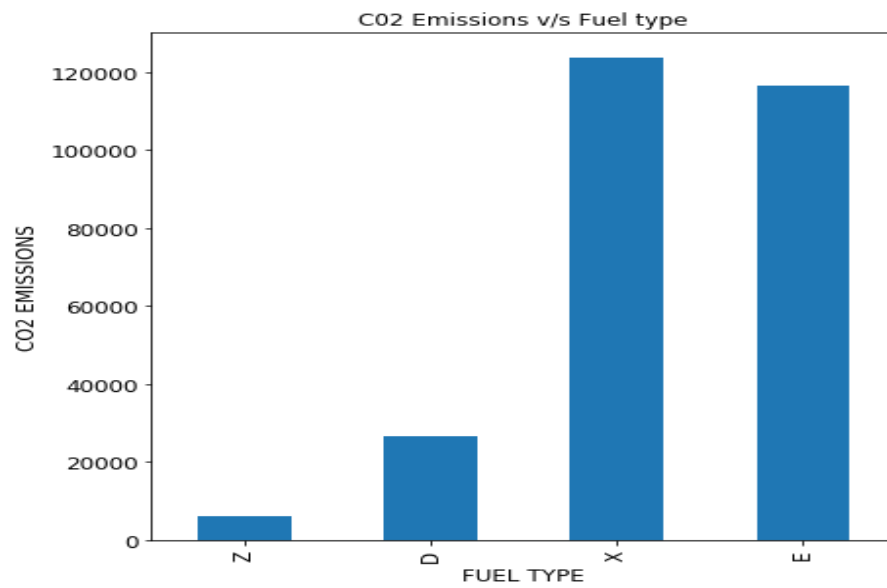


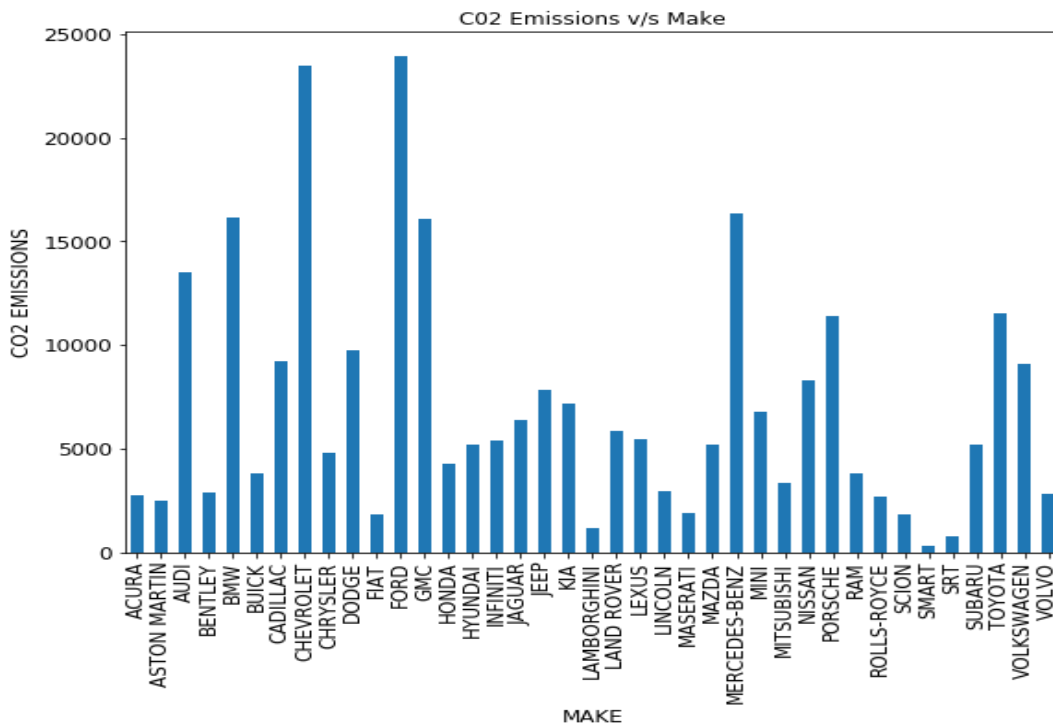
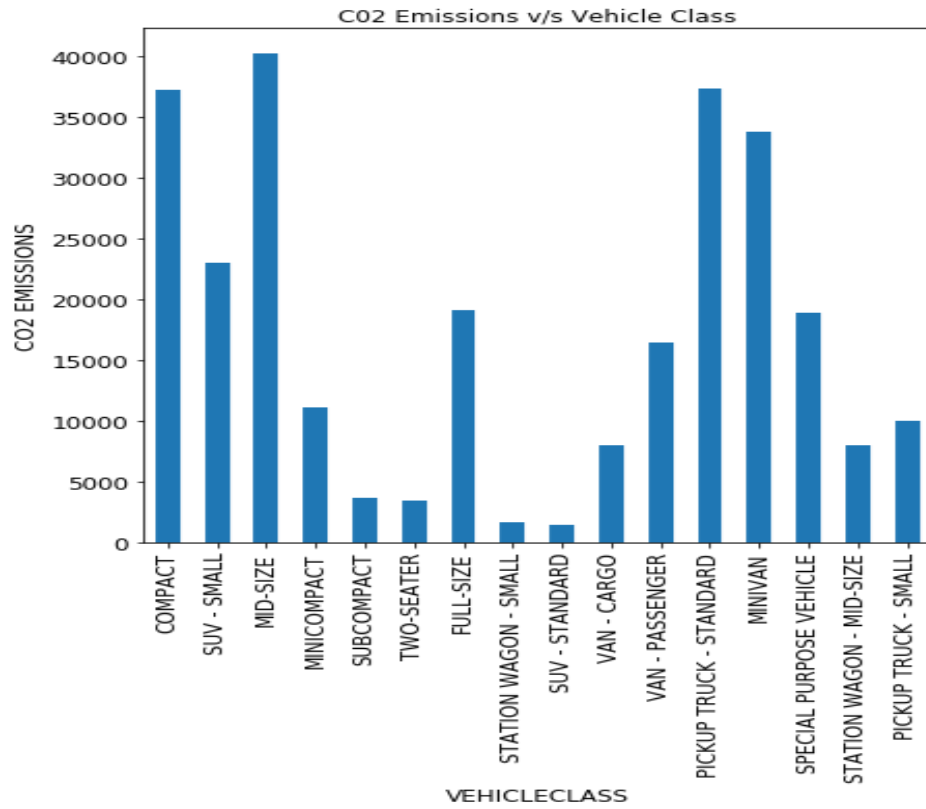
### d) Scatter plots:





e) Bar Charts:



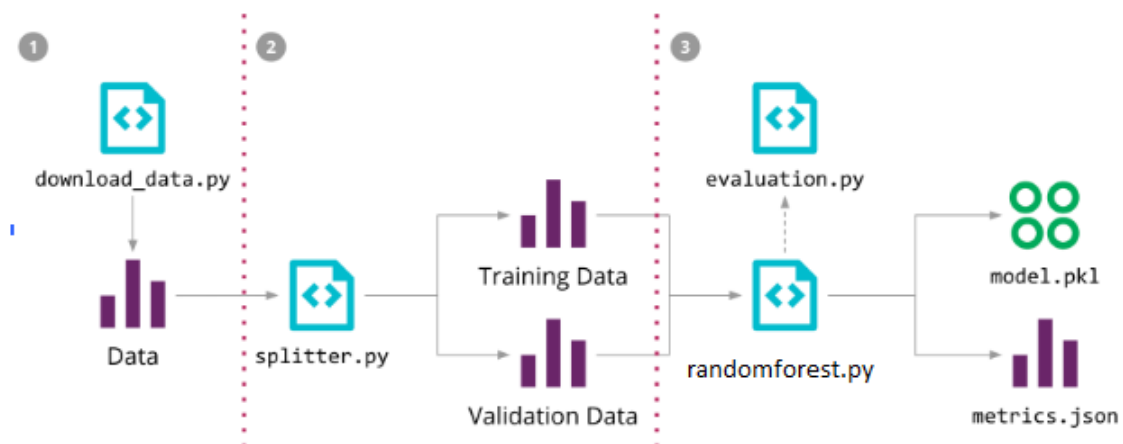


During this investigation, we came to know all the required parameters to predict the result of our model.

The required parameters are:

- 1)MAKE
- 2)VEHICLECLASS
- 3)CYLINDERS
- 4)TRANSMISSION
- 5)FUELTYPE
- 6)FUELCONSUMPTION\_COMB\_MPG

## 5. FLOW CHART:



## 6. RESULT:

Based on all the inputs entered by the user in the UI, the model predicts the CO2 emissions from that particular car and displays whether it is greater or lesser than the threshold value.

## 7. ADVANTAGES AND DISADVANTAGES

Advantages:

- Easy to use UI.
- Accurate Result of CO2 emission from the car.

Disadvantage:

- User should know each and every parameter along with it's units.

## 8. APPLICATIONS

- It can be used to predict the CO2 emissions from a particular car.
- It can be used to check whether the predicted value is greater than or less than threshold value.

## 9. CONCLUSION

Our application predicts the CO2 emissions from the cars and compares with the threshold value. If the predicted value is greater than threshold value, then the user should take remedies regarding his vehicle so as to reduce the CO2 emissions from his car.

## 10. FUTURE SCOPE

In order to reduce many climatic problems like Green House Effect and Global Warming, one should have a car that emits CO2 gases within the threshold value. Our application help the users to predict the CO2 emissions from their cars.

## 11. BIBLIOGRAPHY APPENDIX

Model Building:

- [Dataset](#)
- [Jupyter Notebook](#)

Application Building:

- HTML and CSS files
- Flask
- Pickle