Model Deployment

Deployment of an ML-model simply means the integration of the model into an existing production environment which can take in an input and return an output that can be used in making practical business decisions.

To deploy a model there are various web-framework available which depends on in which language the model has been developed.

Deployment of Python code:

Deployment of python ML-model can be done by using few modules.

1. **Pickle**.
   Pickle is a python library which is used to serialize and de serialize objects in Python. Any object in Python can be pickled so that it can be saved on disk.

2. **Flask**.
   Flask is a micro web application framework written in Python. It is designed to make getting started quick and easy, with the ability to scale up to complex applications.

Instruction for deployment:

- **Environment Setup**

  We need to install the necessary packages for the deployment. These packages are

  - Flask
  - Pickle
  - Pandas
  - Numpy
  - Scipy
  - Sklearn
  - Seaborn
  - Matplotlib
  - Lightgbm
  - Geopy

  To install the packages we can use pip command.

  pip install flask, pip install pickle,…..

- **Directory Control**

  Put model.py, train_cab.csv, app.py, static folder, templates folder in same directory.

- **Model Development**

  Develop
  Cab_Fare_Prediction_model.model,
  scaler.model,
  By running the **model.py.**

  - **To run** Open the DOS command shell & direct to the directory containing **model.py**
  - Run the **model.py** by using command
    >> python **model.py**

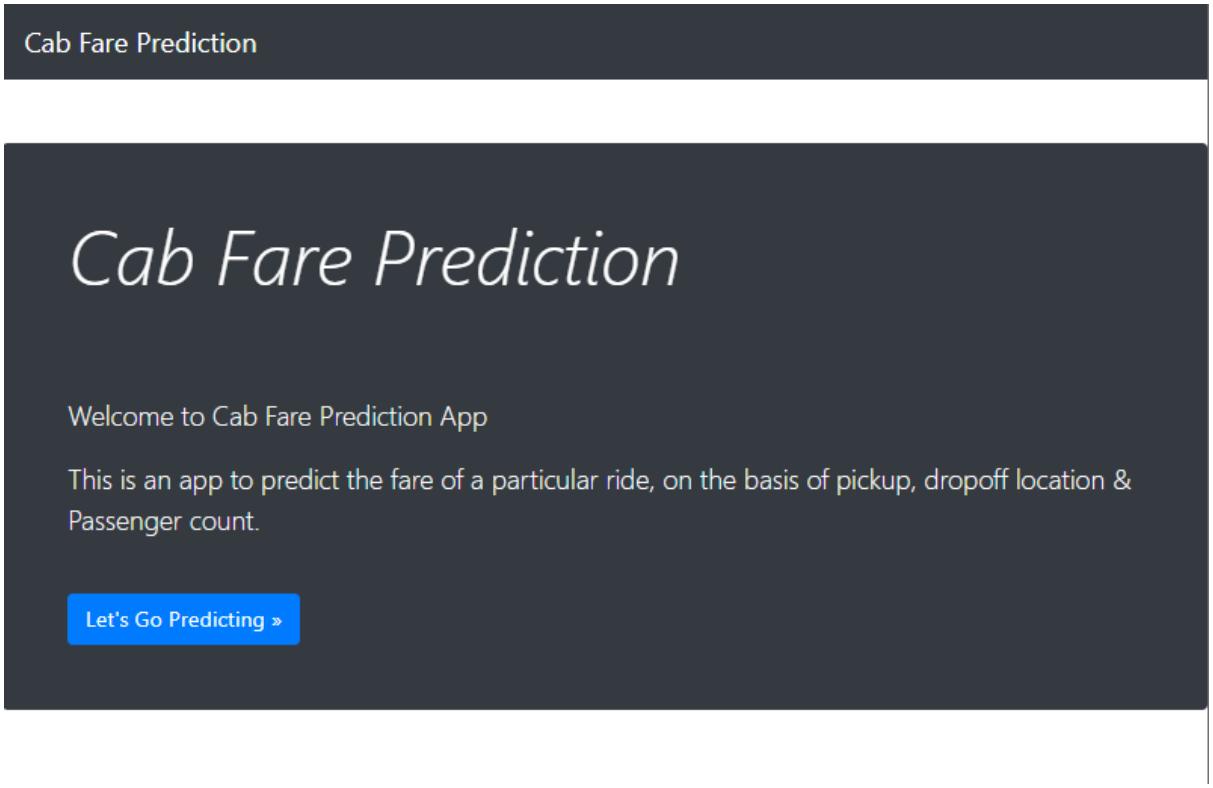
- **Deployment using Flask**

  - Open the DOS command shell & direct to the directory containing app.py.

  - Run the app.py by using command
    >> python **app.py**

    This will deploy the model on the local server : "http://127.0.0.1:5000/" or "http://localhost:5000/".

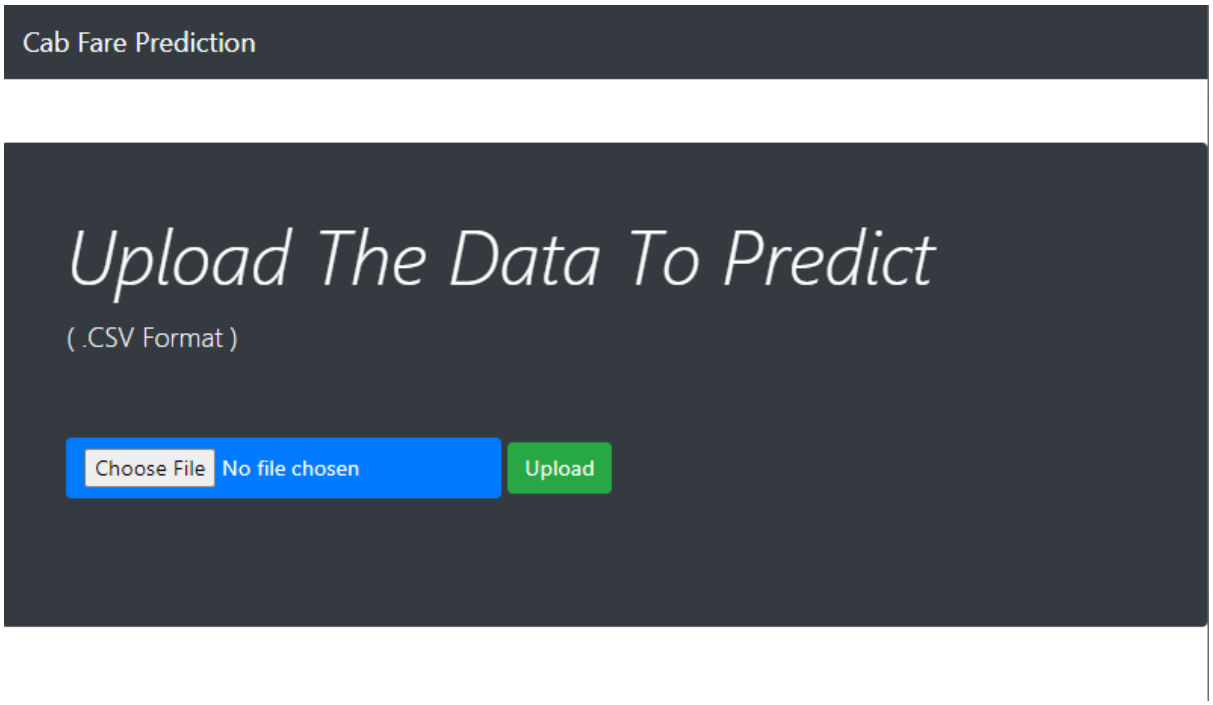
  - Open "http://127.0.0.1:5000/" or "http://localhost:5000/" in the browser. This will open the homepage.



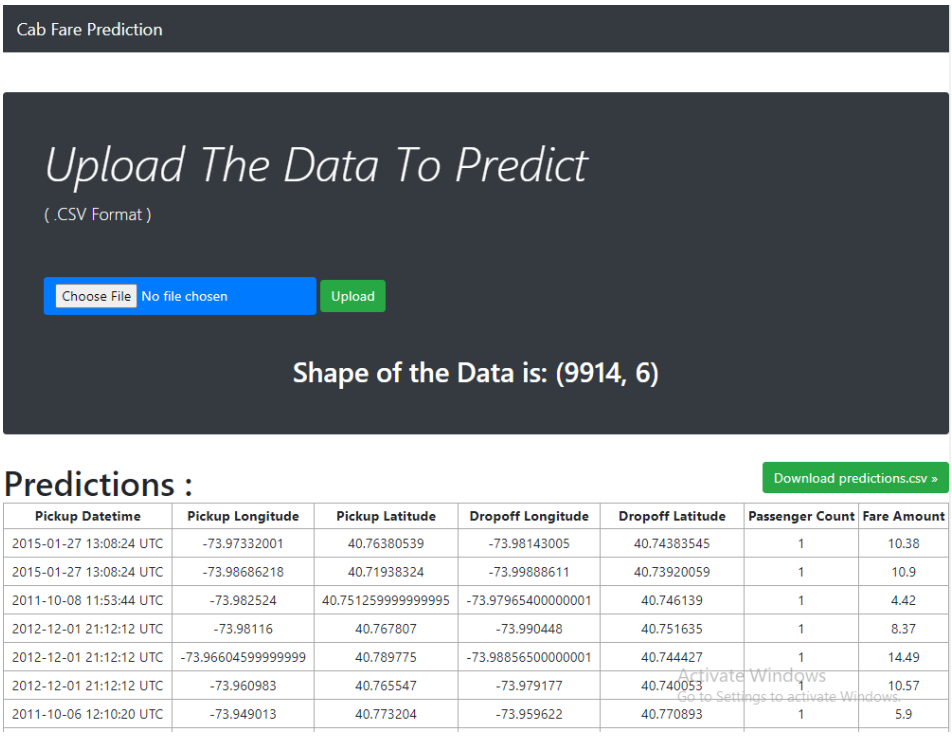
After that click on 

button.

- This will direct you the predict page "http://localhost:5000/predict"



- Click on **Choose file** & select the .csv file for predictions & click **Upload**.
- After upload the shape of the data & predictions will be displayed on the screen.



Pickup Datetime	Pickup Longitude	Pickup Latitude	Dropoff Longitude	Dropoff Latitude	Passenger Count	Fare Amount
2015-01-27 13:08:24 UTC	-73.97332001	40.76380539	-73.98143005	40.74383545	1	10.38
2015-01-27 13:08:24 UTC	-73.98686218	40.71938324	-73.99888611	40.73920059	1	10.9
2011-10-08 11:53:44 UTC	-73.982524	40.751259999999995	-73.97965400000001	40.746139	1	4.42
2012-12-01 21:12:12 UTC	-73.98116	40.767807	-73.990448	40.751635	1	8.37
2012-12-01 21:12:12 UTC	-73.96604599999999	40.789775	-73.98856500000001	40.744427	1	14.49
2012-12-01 21:12:12 UTC	-73.960983	40.765547	-73.979177	40.740053	1	10.57
2011-10-06 12:10:20 UTC	-73.949013	40.773204	-73.959622	40.770893	1	5.9

- Click on 

to download the predictions result in .csv format.

**********END**********

Deployment of R code:

Deployment of R ML-model can be done by using RShiny.

Shiny is an R package that makes it easy to build interactive web apps straight from R. You can host standalone apps on a webpage or embed them in R Markdown documents or build dashboards. You can also extend your Shiny apps with CSS themes, htmlwidgets, and JavaScript actions.

Instruction for deployment:

1. **Directory Control**

   Put Cab_Fare_Prediction.R, app.R, train_cab.csv files in the same directory.

2. **Model Development**

   Develop **final_model.rds**
   By running the **Cab_Fare_Prediction.R**

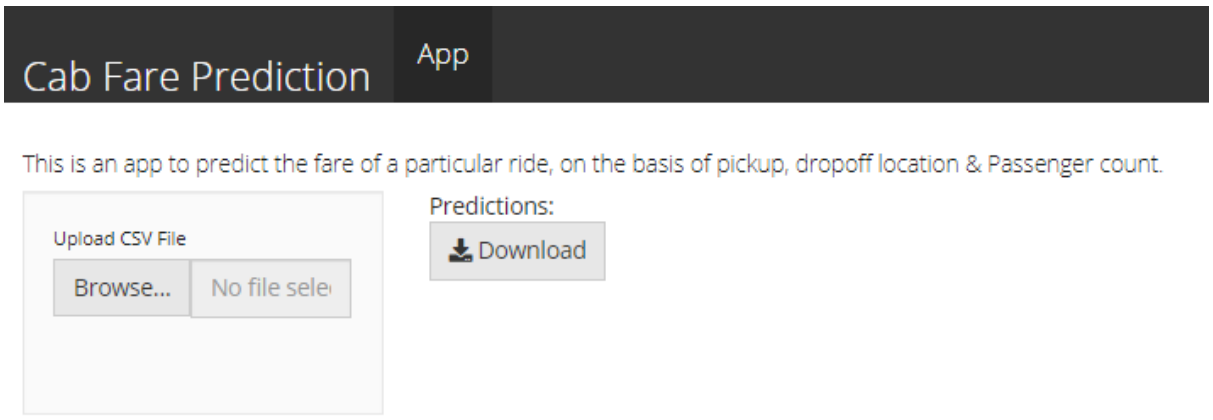
   - To run Open the DOS command shell & direct to the directory containing **Cab_Fare_Prediction.R**.
   - Run the **Cab_Fare_Prediction.R** by using command
     >> Rscript **Cab_Fare_Prediction.R**

3. **Deployment**
   - Open the DOS command shell & direct to the directory containing app.R.
   - Run the app.R by using command

     >> Rscript **app.R**

     This will deploy the model on the local server : "http://127.0.0.1:5000/" or "http://localhost:5000/".

   - Open "http://127.0.0.1:5000/" or "http://localhost:5000/" in the browser. This will open the web application.



- Click on **Browse** & select the .csv file to be uploaded for predictions.
- After upload the predictions will be displayed on the screen.
- Click on Download button to download the predictions result in .csv format.

**********END**********