Week 5: Cloud and API deployment

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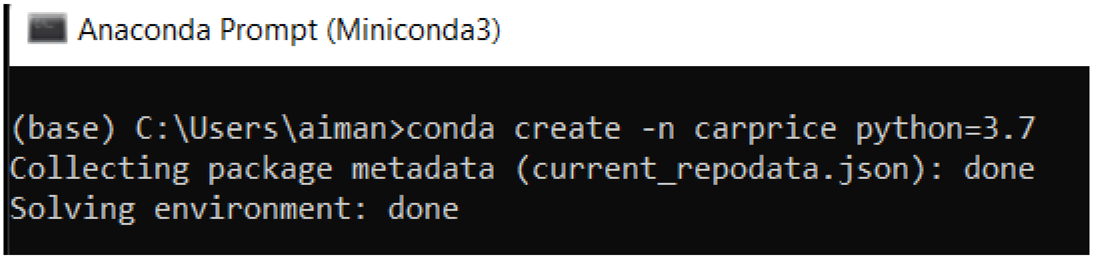
Submitted to: Data Glacier

1. **Creating and new environment and activating the environment:** First, I created a new environment in Anaconda Prompt by using the command below:

   - conda create -n carprice python=3.7

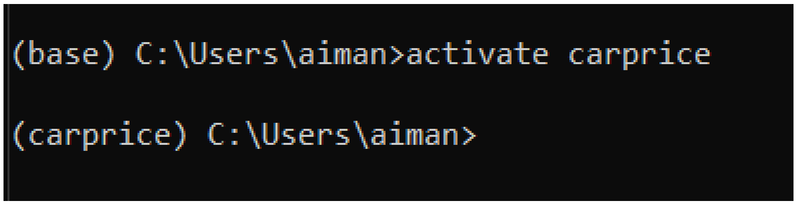
   

   Anaconda Prompt (Miniconda3)

   ```
   (base) C:\Users\aiman>conda create -n carprice python=3.7
   Collecting package metadata (current_repodata.json): done
   Solving environment: done
   ```

   Then I activated the environment by using the command below:

   - activate carprice

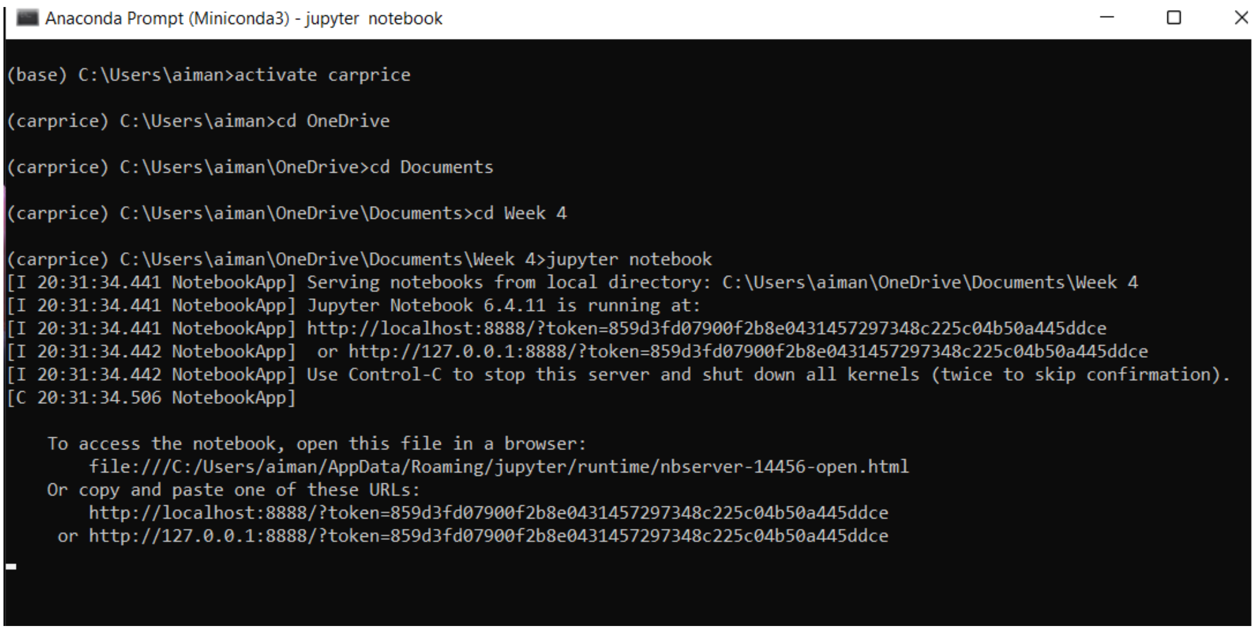
   

   ```
   (base) C:\Users\aiman>activate carprice

   (carprice) C:\Users\aiman>
   ```

2. **Running jupyter notebook in that particular environment:** Then I wrote the following commands in Anaconda Prompt to run the jupyter notebook:

   - activate carprice
   - cd OneDrive
   - cd Documents
   - cd Week 4

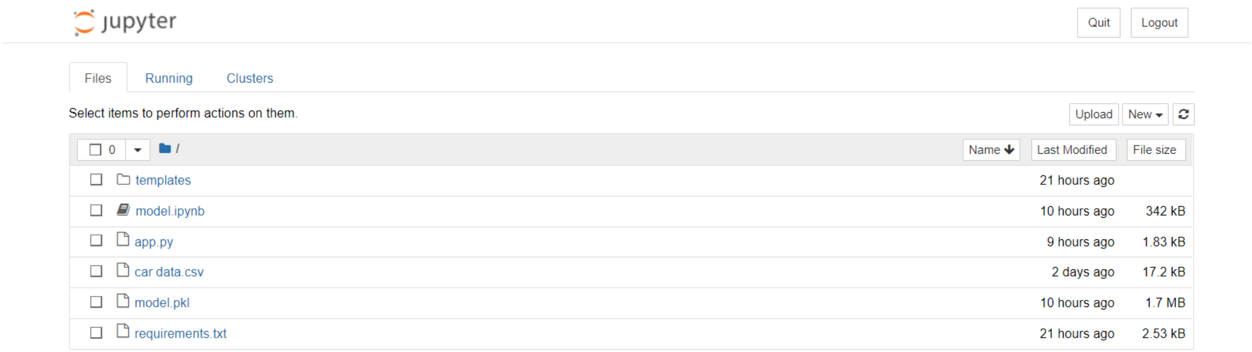
   Since the files of this assignment were saved in the Week 4 folder in Documents, I need to access the folder location to run the jupyter notebook to create a model on the car dataset.



```
(base) C:\Users\aiman>activate carprice

(carprice) C:\Users\aiman>cd OneDrive

(carprice) C:\Users\aiman\OneDrive>cd Documents

(carprice) C:\Users\aiman\OneDrive\Documents>cd Week 4

(carprice) C:\Users\aiman\OneDrive\Documents\Week 4>jupyter notebook
[I 20:31:34.441 NotebookApp] Serving notebooks from local directory: C:\Users\aiman\OneDrive\Documents\Week 4
[I 20:31:34.441 NotebookApp] Jupyter Notebook 6.4.11 is running at:
[I 20:31:34.441 NotebookApp] http://localhost:8888/?token=859d3fd07900f2b8e0431457297348c225c04b50a445ddce
[I 20:31:34.442 NotebookApp]  or http://127.0.0.1:8888/?token=859d3fd07900f2b8e0431457297348c225c04b50a445ddce
[I 20:31:34.442 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 20:31:34.506 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///C:/Users/aiman/AppData/Roaming/jupyter/runtime/nbserver-14456-open.html
    Or copy and paste one of these URLs:
        http://localhost:8888/?token=859d3fd07900f2b8e0431457297348c225c04b50a445ddce
     or http://127.0.0.1:8888/?token=859d3fd07900f2b8e0431457297348c225c04b50a445ddce
```

However, The dataset was a car dataset with different features of different car models. The dataset was downloaded from kaggle (Vehicle dataset | Kaggle).

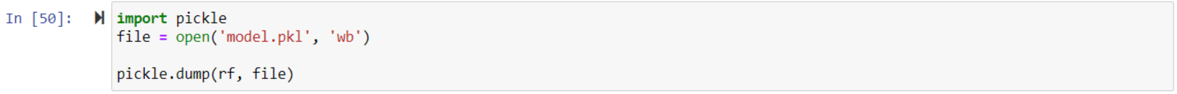
After writing the commands, the jupyter notebook opened in the browser as shown below:



Select items to perform actions on them.

Name	Last Modified	File size
templates	21 hours ago	
model.ipynb	10 hours ago	342 kB
app.py	9 hours ago	1.83 kB
car data.csv	2 days ago	17.2 kB
model.pkl	10 hours ago	1.7 MB
requirements.txt	21 hours ago	2.53 kB

3. **Creating a Machine Learning model for the dataset:** Then I applied a few exploratory data analysis techniques to the dataset and implemented a Random Forest model to predict the selling price of the cars based on the other features. After implementing the model, I created a pickle file at the end of the notebook as shown below to store all the information of the data.

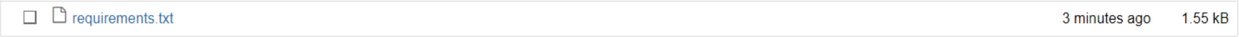


```
In [50]:  import pickle
          file = open('model.pkl', 'wb')

          pickle.dump(rf, file)
```

☐ model.pkl seconds ago 1.7 MB

4. **Creating the requirements.txt file:** Then I created the requirements.text file to view all the libraries that were required to build the model in jupyter notebook by using the commands below:

- activate carprice
- cd OneDrive
- cd Documents
- cd Week 4
- pip freeze > requirements.txt

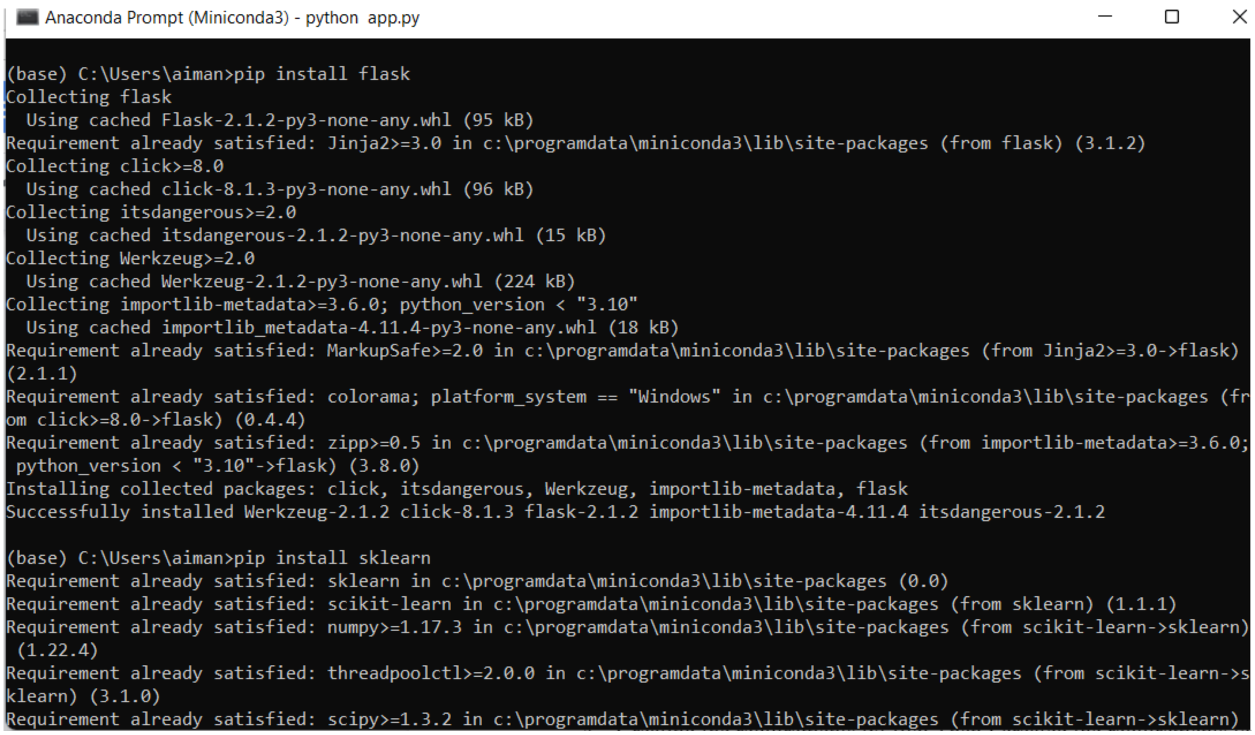


☐ requirements.txt 3 minutes ago 1.55 kB

5. **Creating the frontend using html:** Then I wrote codes to create the frontend of the website using html in Visual studio Code and saved the file as app.py in that particular folder.

☐ app.py 9 hours ago 1.83 kB

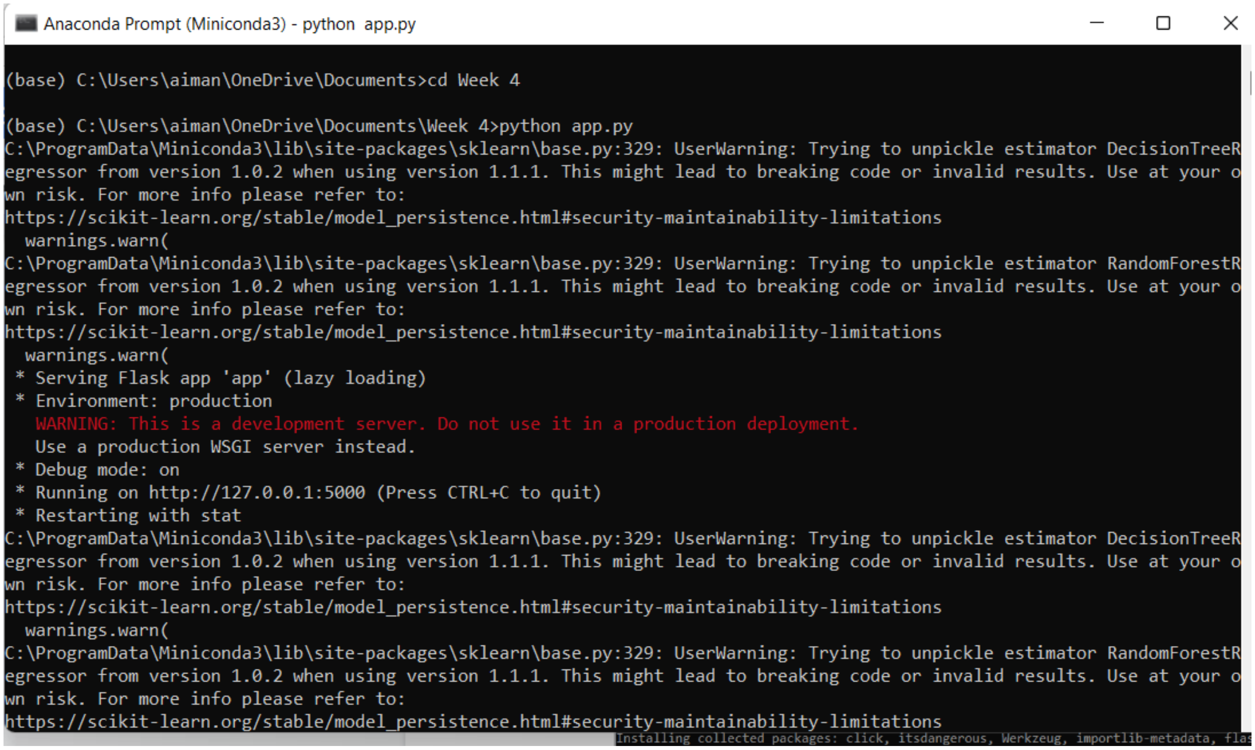
6. **Installing the required libraries in Anaconda Prompt:** I installed required libraries such as flask, sklearn before running the app.py file.



```
(base) C:\Users\aiman>pip install flask
Collecting flask
  Using cached Flask-2.1.2-py3-none-any.whl (95 kB)
Requirement already satisfied: Jinja2>=3.0 in c:\programdata\miniconda3\lib\site-packages (from flask) (3.1.2)
Collecting click>=8.0
  Using cached click-8.1.3-py3-none-any.whl (96 kB)
Collecting itsdangerous>=2.0
  Using cached itsdangerous-2.1.2-py3-none-any.whl (15 kB)
Collecting Werkzeug>=2.0
  Using cached Werkzeug-2.1.2-py3-none-any.whl (224 kB)
Collecting importlib-metadata>=3.6.0; python_version < "3.10"
  Using cached importlib_metadata-4.11.4-py3-none-any.whl (18 kB)
Requirement already satisfied: MarkupSafe>=2.0 in c:\programdata\miniconda3\lib\site-packages (from Jinja2>=3.0->flask)
(2.1.1)
Requirement already satisfied: colorama; platform_system == "Windows" in c:\programdata\miniconda3\lib\site-packages (fr
om click>=8.0->flask) (0.4.4)
Requirement already satisfied: zipp>=0.5 in c:\programdata\miniconda3\lib\site-packages (from importlib-metadata>=3.6.0;
 python_version < "3.10"->flask) (3.8.0)
Installing collected packages: click, itsdangerous, Werkzeug, importlib-metadata, flask
Successfully installed Werkzeug-2.1.2 click-8.1.3 flask-2.1.2 importlib-metadata-4.11.4 itsdangerous-2.1.2

(base) C:\Users\aiman>pip install sklearn
Requirement already satisfied: sklearn in c:\programdata\miniconda3\lib\site-packages (0.0)
Requirement already satisfied: scikit-learn in c:\programdata\miniconda3\lib\site-packages (from sklearn) (1.1.1)
Requirement already satisfied: numpy>=1.17.3 in c:\programdata\miniconda3\lib\site-packages (from scikit-learn->sklearn)
 (1.22.4)
Requirement already satisfied: threadpoolctl>=2.0.0 in c:\programdata\miniconda3\lib\site-packages (from scikit-learn->s
klearn) (3.1.0)
Requirement already satisfied: scipy>=1.3.2 in c:\programdata\miniconda3\lib\site-packages (from scikit-learn->sklearn)
```

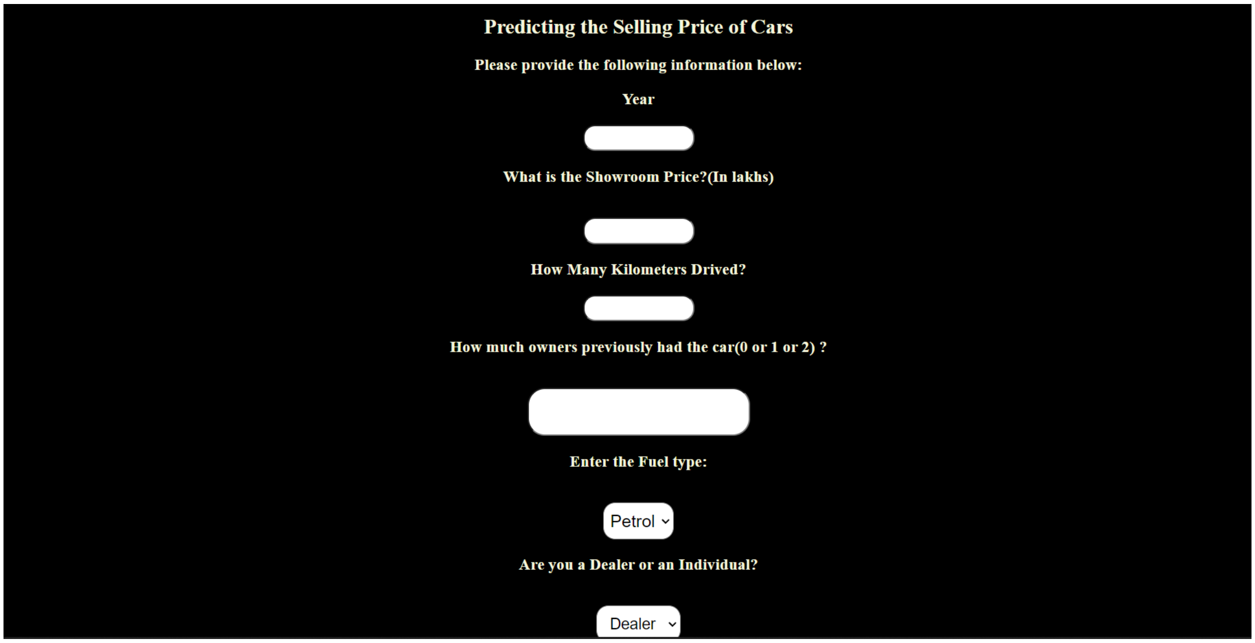
7. **Running app.py in Anaconda Prompt:** Then I wrote the command to run the app.py file as shown below:

   - python app.py



```
(base) C:\Users\aiman\OneDrive\Documents>cd Week 4

(base) C:\Users\aiman\OneDrive\Documents\Week 4>python app.py
C:\ProgramData\Miniconda3\lib\site-packages\sklearn\base.py:329: UserWarning: Trying to unpickle estimator DecisionTreeR
egressor from version 1.0.2 when using version 1.1.1. This might lead to breaking code or invalid results. Use at your o
wn risk. For more info please refer to:
https://scikit-learn.org/stable/model_persistence.html#security-maintainability-limitations
  warnings.warn(
C:\ProgramData\Miniconda3\lib\site-packages\sklearn\base.py:329: UserWarning: Trying to unpickle estimator RandomForestR
egressor from version 1.0.2 when using version 1.1.1. This might lead to breaking code or invalid results. Use at your o
wn risk. For more info please refer to:
https://scikit-learn.org/stable/model_persistence.html#security-maintainability-limitations
  warnings.warn(
 * Serving Flask app 'app' (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://127.0.0.1:5000 (Press CTRL+C to quit)
 * Restarting with stat
C:\ProgramData\Miniconda3\lib\site-packages\sklearn\base.py:329: UserWarning: Trying to unpickle estimator DecisionTreeR
egressor from version 1.0.2 when using version 1.1.1. This might lead to breaking code or invalid results. Use at your o
wn risk. For more info please refer to:
https://scikit-learn.org/stable/model_persistence.html#security-maintainability-limitations
  warnings.warn(
C:\ProgramData\Miniconda3\lib\site-packages\sklearn\base.py:329: UserWarning: Trying to unpickle estimator RandomForestR
egressor from version 1.0.2 when using version 1.1.1. This might lead to breaking code or invalid results. Use at your o
wn risk. For more info please refer to:
https://scikit-learn.org/stable/model_persistence.html#security-maintainability-limitations
                                                            Installing collected packages: click, itsdangerous, Werkzeug, importlib-metadata, flas
```

Then I copy-pasted the given link (http://127.0.0.1:5000/) on the browser and got the website to input data for car price prediction.



Predicting the Selling Price of Cars

Please provide the following information below:

Year

What is the Showroom Price?(In lakhs)

How Many Kilometers Drived?

How much owners previously had the car(0 or 1 or 2) ?

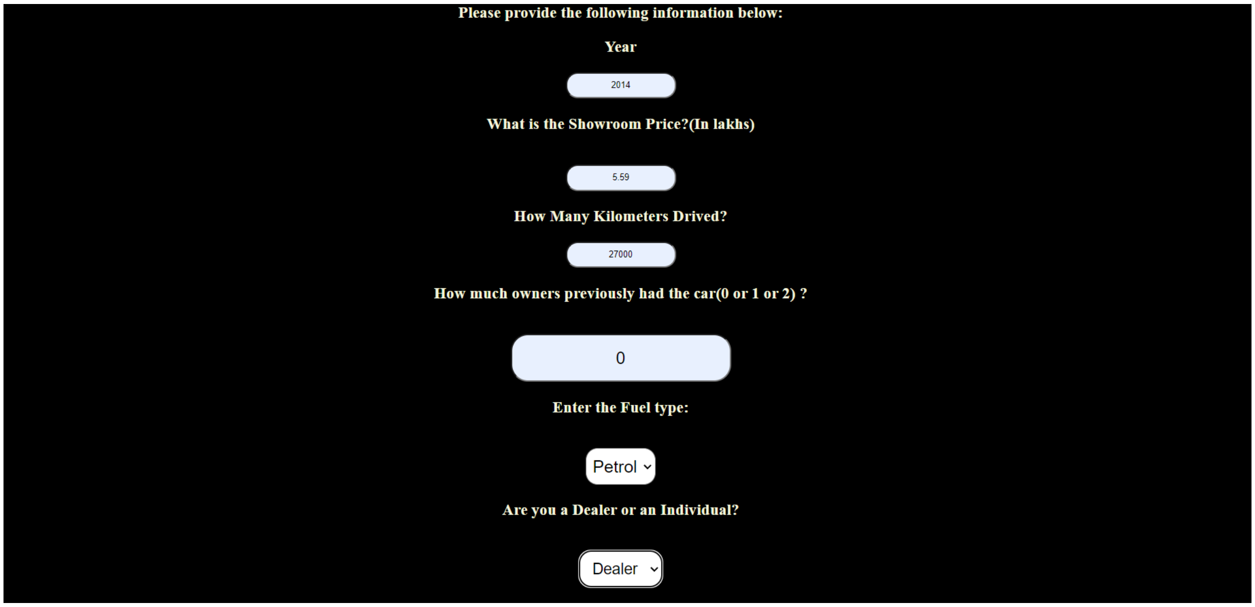
Enter the Fuel type:

Petrol

Are you a Dealer or an Individual?

Dealer

8. **Providing necessary information to get the selling price:** Then I provided the required information to get the selling price of a car and got the result when I clicked on the "Get the Selling Price" button.



Please provide the following information below:

Year

2014

What is the Showroom Price?(In lakhs)

5.59

How Many Kilometers Drived?

27000

How much owners previously had the car(0 or 1 or 2) ?

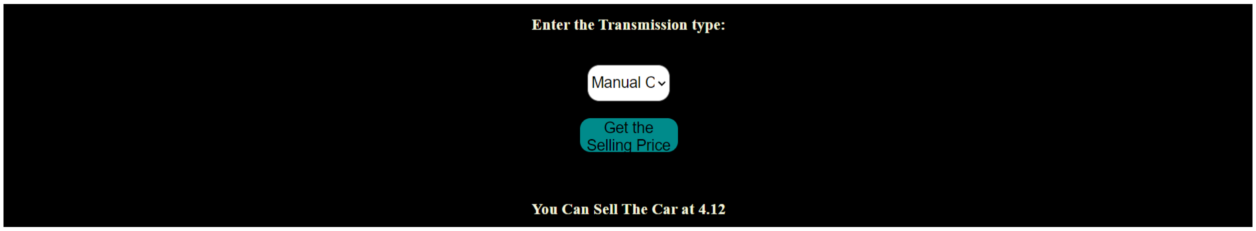
0

Enter the Fuel type:

Petrol

Are you a Dealer or an Individual?

Dealer



Enter the Transmission type:

Manual C

You Can Sell The Car at 4.12

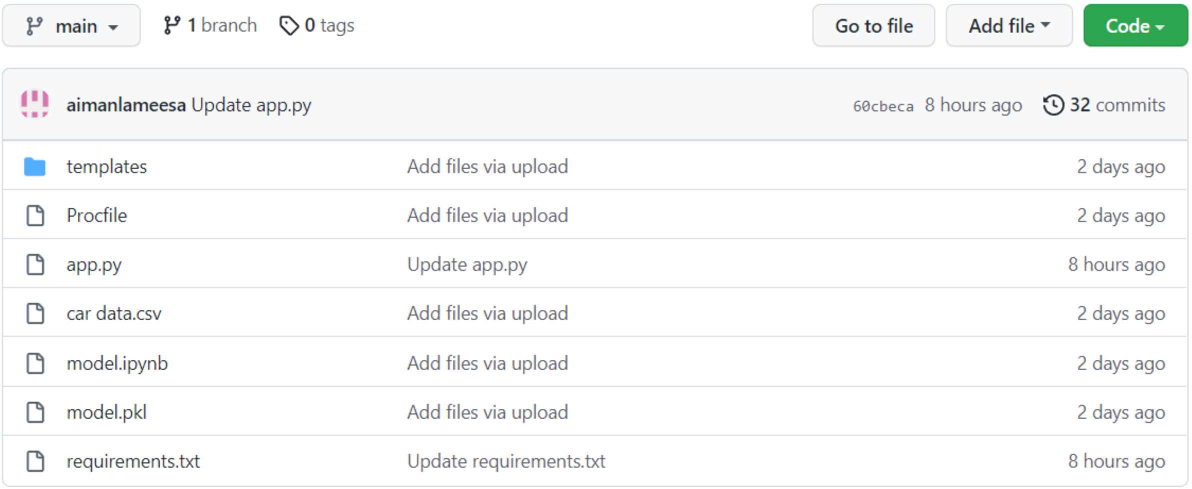
9. **Creating Procfile:** In this step, I had to specify the file name that I wanted to run using flask on Heroku. For this step, I wrote the following command:

   - web: gunicorn app: app

   Then, I again created the requirements.txt file using the same command as before:

   - pip freeze > requirements.txt

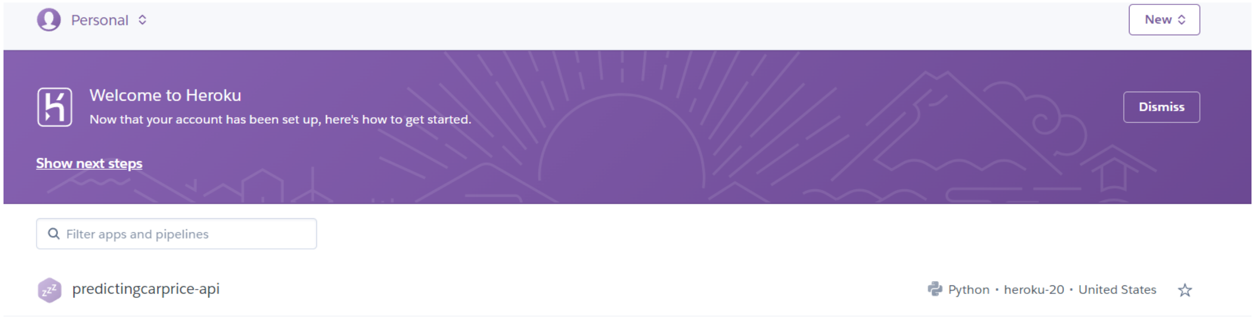
10. **Uploading the files in my github repository:** Then I uploaded the files for this project into my github repository.



aimanlameesa Update app.py 60cbeca 8 hours ago 32 commits

templates	Add files via upload	2 days ago
Procfile	Add files via upload	2 days ago
app.py	Update app.py	8 hours ago
car data.csv	Add files via upload	2 days ago
model.ipynb	Add files via upload	2 days ago
model.pkl	Add files via upload	2 days ago
requirements.txt	Update requirements.txt	8 hours ago

11. **Creating a new app in Heroku:** I created a new app in Heroku after signing up and saved the app name as predictingcarprice-api for the model deployment.

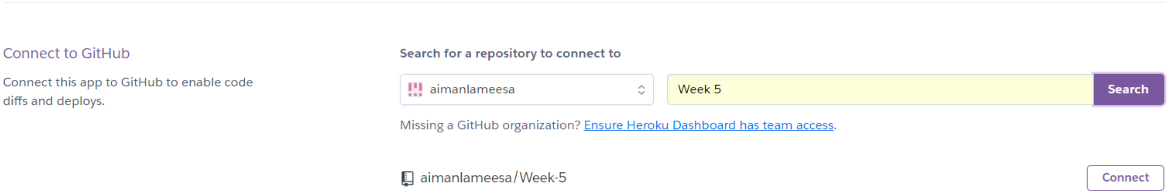


Welcome to Heroku

Now that your account has been set up, here's how to get started.

predictingcarprice-api Python • heroku-20 • United States

12. **Connecting the github repository to Heroku:** Then I searched for and connected the following github repository in Heroku.



Connect to GitHub

Connect this app to GitHub to enable code diffs and deploys.

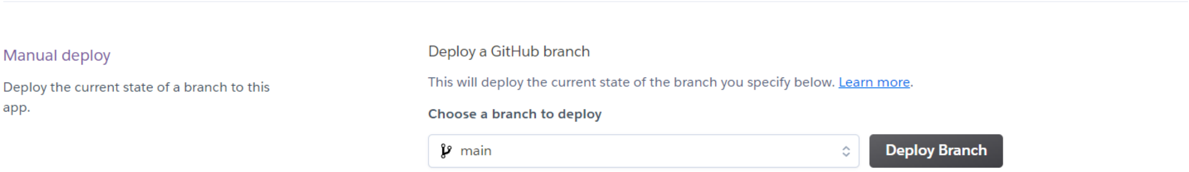
Search for a repository to connect to

aimanlameesa | Week 5 | Search

Missing a GitHub organization? Ensure Heroku Dashboard has team access.

aimanlameesa/Week-5 Connect

13. **Deploying branch:** After connecting the github repository to Heroku, I clicked on the option to deploy the main branch next.



Manual deploy

Deploy the current state of a branch to this app.

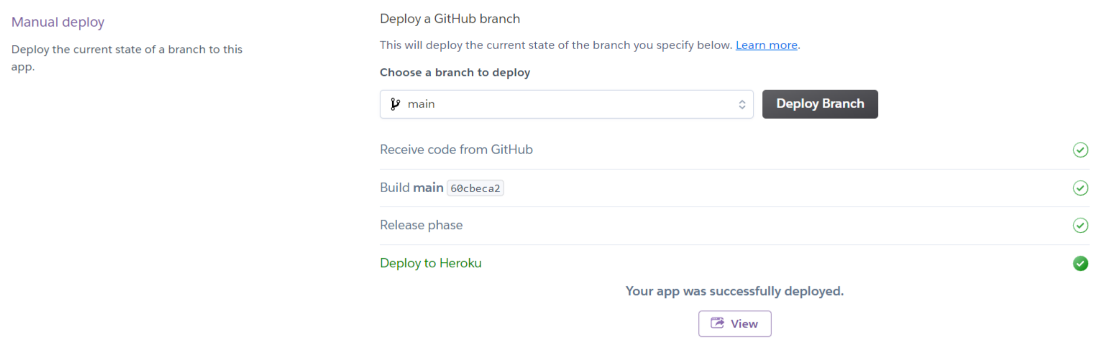
Deploy a GitHub branch

This will deploy the current state of the branch you specify below. Learn more.

Choose a branch to deploy

main | Deploy Branch

14. **Viewing the deployment on Heroku:** After waiting for a few seconds, the option to view the deployment was shown on the screen. Then I clicked on the View option to check the model deployment.



Manual deploy

Deploy the current state of a branch to this app.

Deploy a GitHub branch

This will deploy the current state of the branch you specify below. Learn more.

Choose a branch to deploy

main

Receive code from GitHub ✓

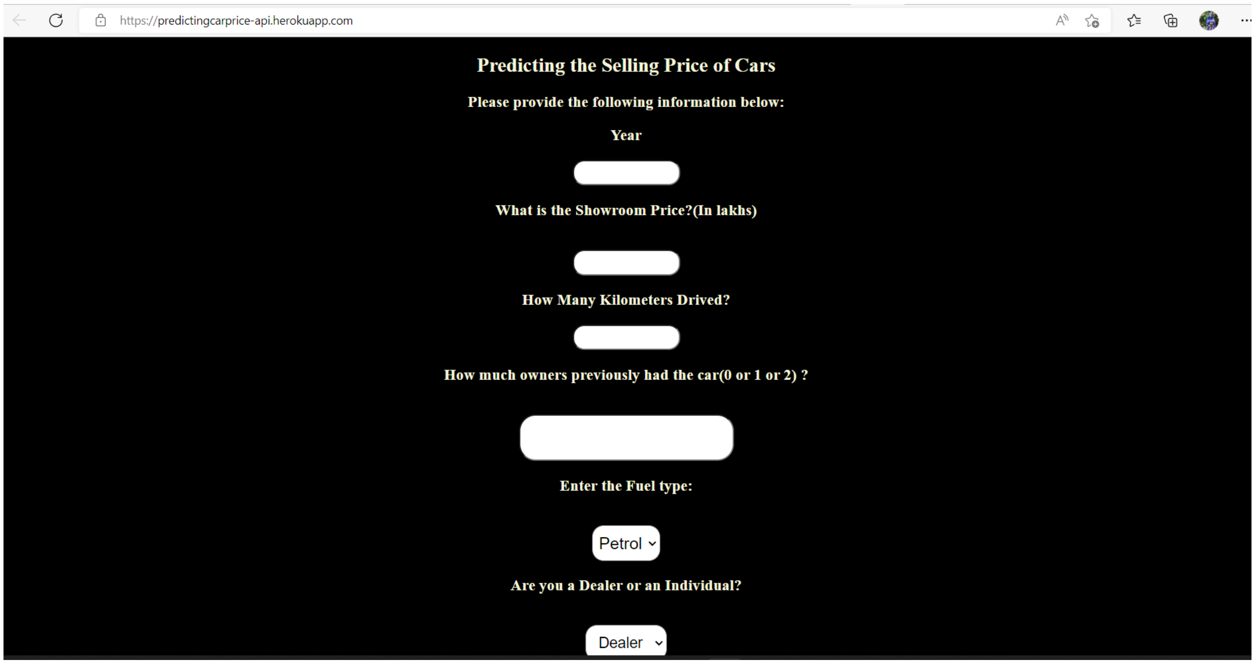
Build main 60cbeca2 ✓

Release phase ✓

Deploy to Heroku ✓

Your app was successfully deployed.

After clicking on View, I got to view the model on Heroku application and the url for the application was https://predictingcarprice-api.herokuapp.com/.



https://predictingcarprice-api.herokuapp.com

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