Data Intake Report

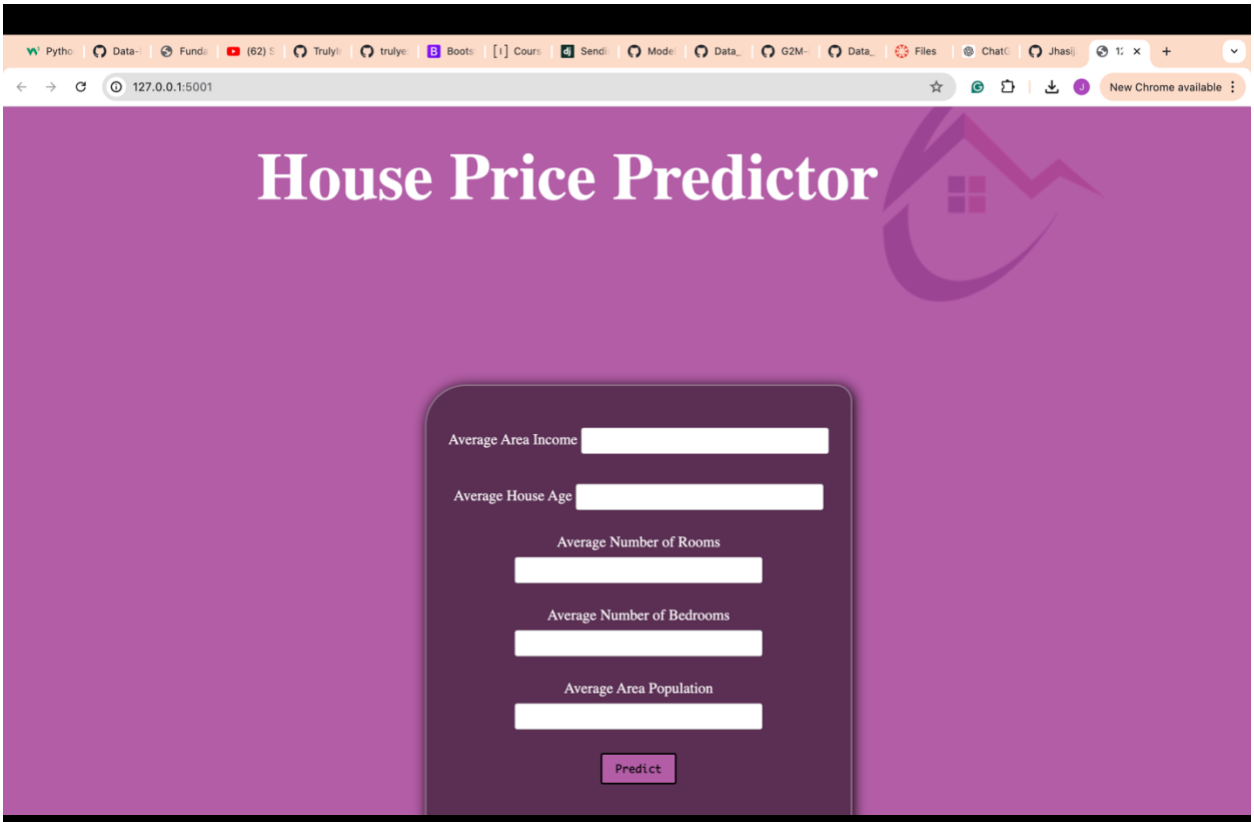
Name: House Prediction
Report date: 29 July
Internship Batch: LISUM35
Version:<1.0>
Data intake by:Janesh Hasija
Data intake reviewer: Data Glacier
Data storage location: https://github.com/Jhasija9/Week-4.git

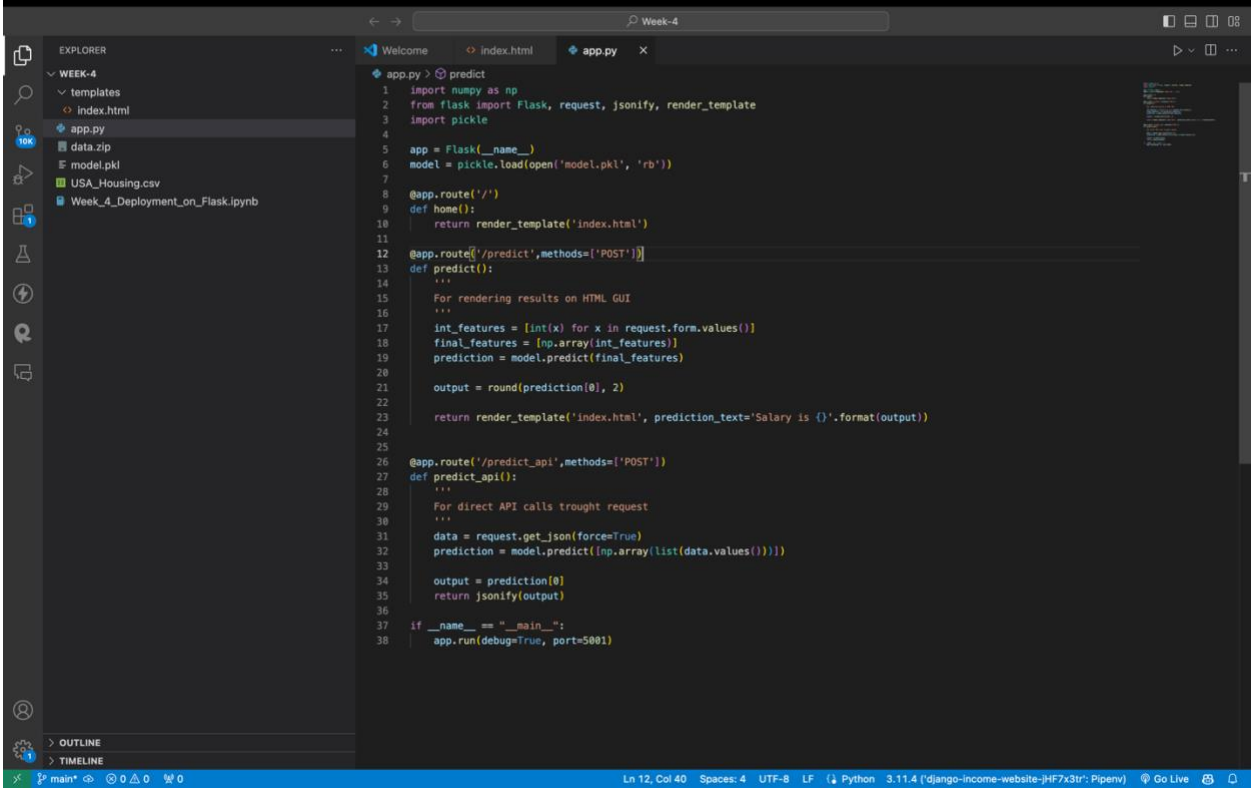
Tabular data details:

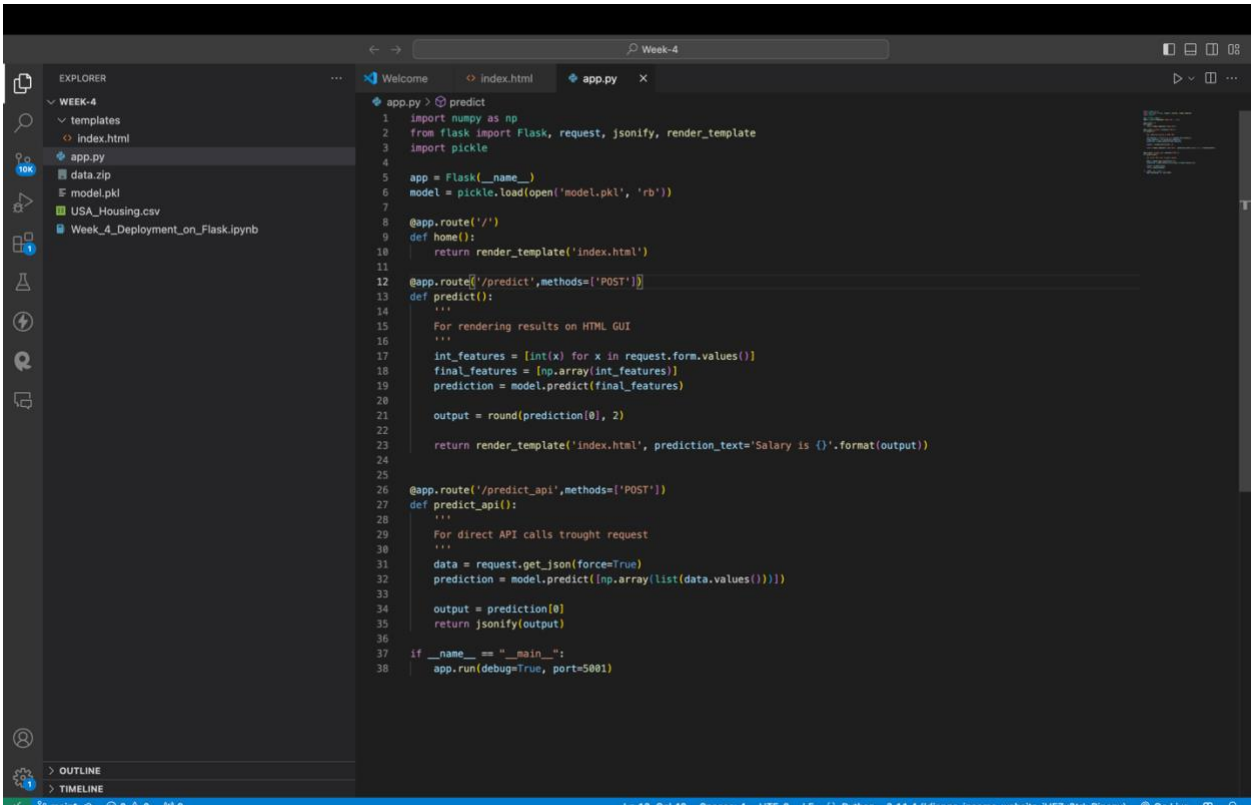
Total number of observations	5000
Total number of files	1
Total number of features	7
Base format of the file	csv
Size of the data	709 KB

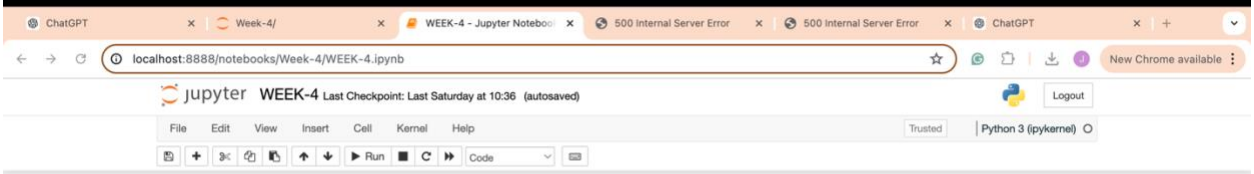
Note: Replicate same table with file name if you have more than one file.

Proposed Approach:


127.0.0.1:5001
New Chrome available
House Price Predictor
Average Area Income
Average House Age
Average Number of Rooms
Average Number of Bedrooms
Average Area Population
Predict


Week-4
EXPLORER
WEEK-4
templates
index.html
app.py
data.zip
model.pkl
USA_Housing.csv
Week_4_Deployment_on_Flask.ipynb
Welcome
index.html
app.py
app.py > predict
import numpy as np
from flask import Flask, request, jsonify, render_template
import pickle
app = Flask(__name__)
model = pickle.load(open('model.pkl', 'rb'))
@app.route('/')
def home():
return render_template('index.html')
@app.route('/predict',methods=['POST'])
def predict():
'''
For rendering results on HTML GUI
'''
int_features = [int(x) for x in request.form.values()]
final_features = [np.array(int_features)]
prediction = model.predict(final_features)
output = round(prediction[0], 2)
return render_template('index.html', prediction_text='Salary is {}'.format(output))
@app.route('/predict_api',methods=['POST'])
def predict_api():
'''
For direct API calls trought request
'''
data = request.get_json(force=True)
prediction = model.predict([np.array(list(data.values()))])
output = prediction[0]
return jsonify(output)
if __name__ == "__main__":
app.run(debug=True, port=5001)
OUTLINE
TIMELINE
main*
Ln 12, Col 40
Spaces: 4
UTF-8
LF
Python
3.11.4 ('django-income-website-jHF7x3tr': Pipenv)
Go Live





In [1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import datetime as dt
```

In [2]:
```
data=pd.read_csv("/Users/jhasija9/Documents/Data Glacier Internship/Week-4/USA_Housing.csv")
```

In [3]:
```
data.head()
```

Out[3]:

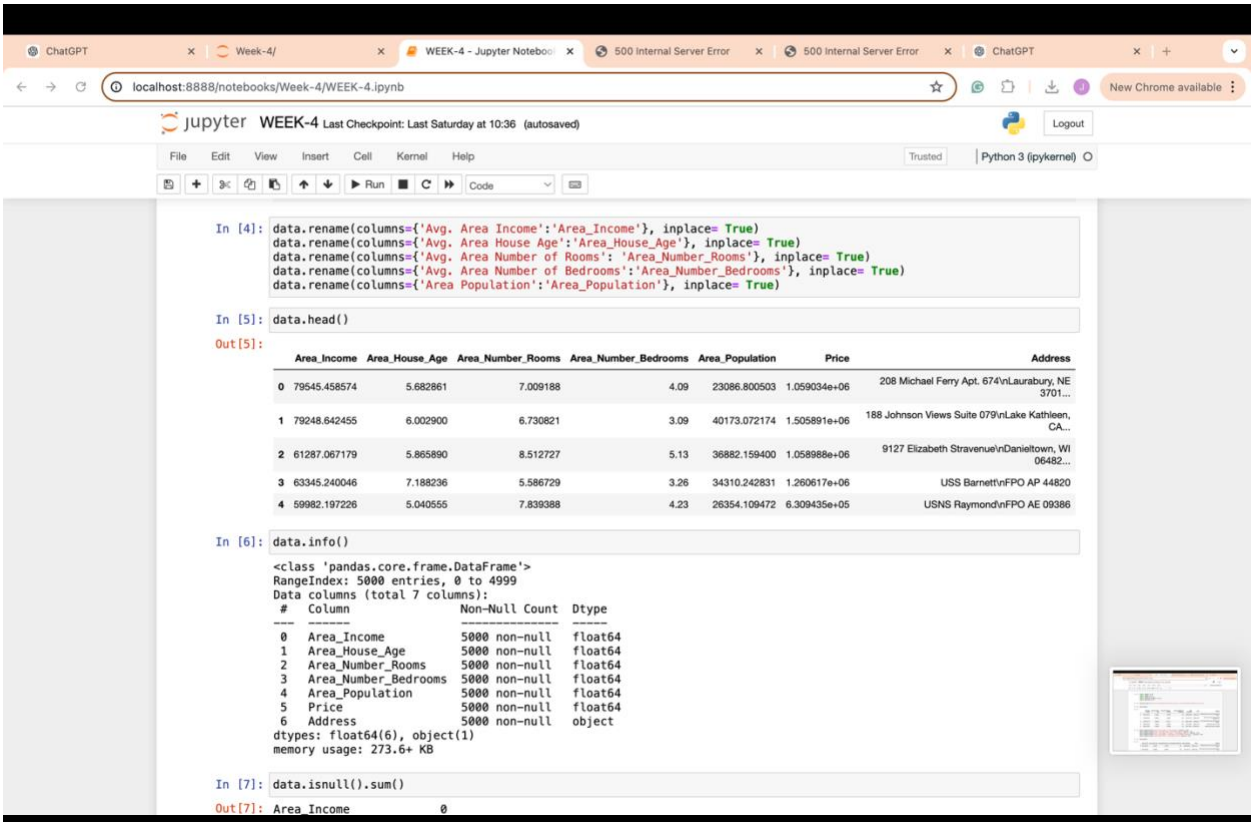
	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price	Address
0	79545.458574	5.682861	7.009188	4.09	23086.800503	1.059034e+06	208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
1	79248.642455	6.002900	6.730821	3.09	40173.072174	1.505891e+06	188 Johnson Views Suite 079\nLake Kathleen, CA...
2	61287.067179	5.865890	8.512727	5.13	36882.159400	1.058988e+06	9127 Elizabeth Stravenue\nDanieltown, WI 06482...
3	63345.240046	7.188236	5.586729	3.26	34310.242831	1.260617e+06	USS Barnett\nFPO AP 44820
4	59982.197226	5.040555	7.839388	4.23	26354.109472	6.309435e+05	USNS Raymond\nFPO AE 09386

In [4]:
```
data.rename(columns={'Avg. Area Income':'Area_Income'}, inplace= True)
data.rename(columns={'Avg. Area House Age':'Area_House_Age'}, inplace= True)
data.rename(columns={'Avg. Area Number of Rooms': 'Area_Number_Rooms'}, inplace= True)
data.rename(columns={'Avg. Area Number of Bedrooms':'Area_Number_Bedrooms'}, inplace= True)
data.rename(columns={'Area Population':'Area_Population'}, inplace= True)
```

In [5]:
```
data.head()
```

Out[5]:

	Area_Income	Area_House_Age	Area_Number_Rooms	Area_Number_Bedrooms	Area_Population	Price	Address
0	79545.458574	5.682861	7.009188	4.09	23086.800503	1.059034e+06	208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
1	79248.642455	6.002900	6.730821	3.09	40173.072174	1.505891e+06	188 Johnson Views Suite 079\nLake Kathleen, CA...



In [4]:
```
data.rename(columns={'Avg. Area Income':'Area_Income'}, inplace= True)
data.rename(columns={'Avg. Area House Age':'Area_House_Age'}, inplace= True)
data.rename(columns={'Avg. Area Number of Rooms': 'Area_Number_Rooms'}, inplace= True)
data.rename(columns={'Avg. Area Number of Bedrooms':'Area_Number_Bedrooms'}, inplace= True)
data.rename(columns={'Area Population':'Area_Population'}, inplace= True)
```

In [5]:
```
data.head()
```

Out[5]:

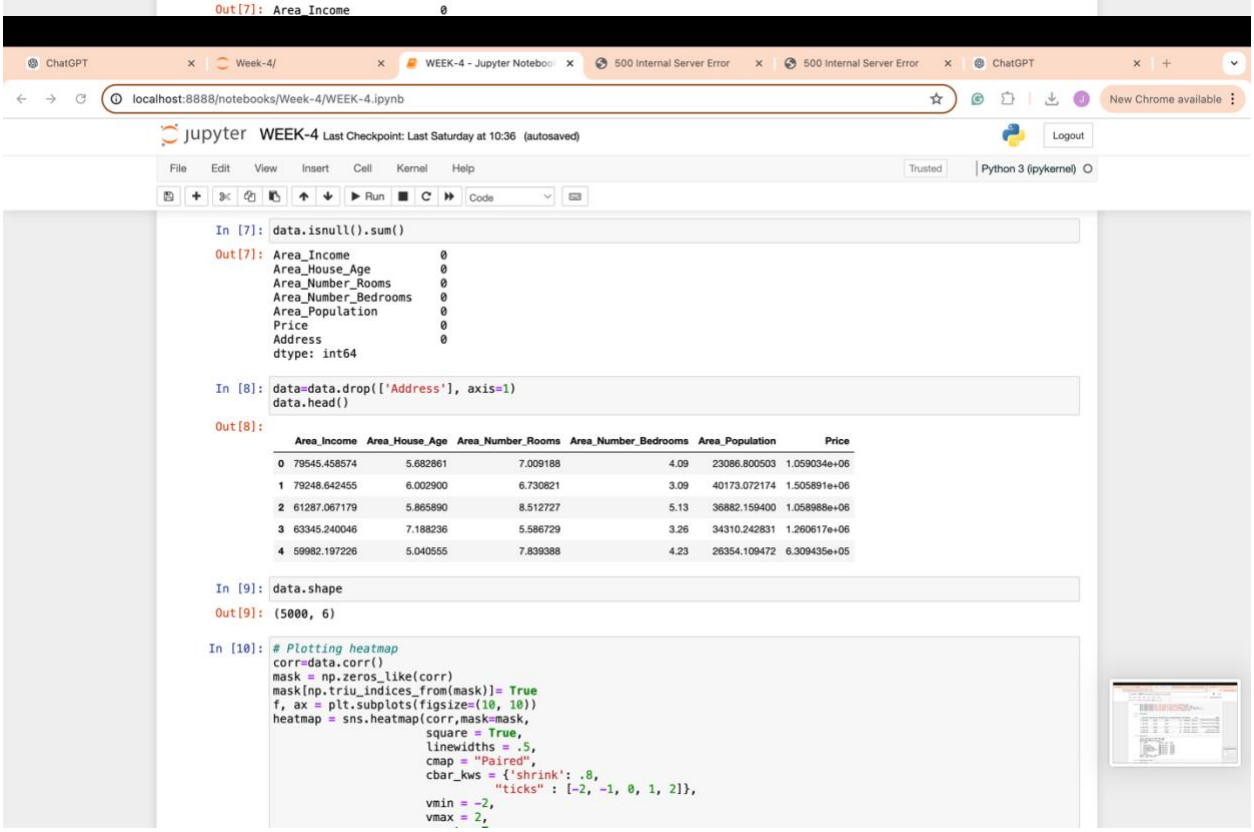
	Area_Income	Area_House_Age	Area_Number_Rooms	Area_Number_Bedrooms	Area_Population	Price	Address
0	79545.458574	5.682861	7.009188	4.09	23086.800503	1.059034e+06	208 Michael Ferry Apt. 674\nLaurabury, NE 3701...
1	79248.642455	6.002900	6.730821	3.09	40173.072174	1.505891e+06	188 Johnson Views Suite 079\nLake Kathleen, CA...
2	61287.067179	5.865890	8.512727	5.13	36882.159400	1.058988e+06	9127 Elizabeth Stravenue\nDanieltown, WI 06482...
3	63345.240046	7.188236	5.586729	3.26	34310.242831	1.260617e+06	USS Barnett\nFPO AP 44820
4	59982.197226	5.040555	7.839388	4.23	26354.109472	6.309435e+05	USNS Raymond\nFPO AE 09386

In [6]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5000 entries, 0 to 4999
Data columns (total 7 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   Area_Income           5000 non-null   float64
 1   Area_House_Age        5000 non-null   float64
 2   Area_Number_Rooms     5000 non-null   float64
 3   Area_Number_Bedrooms  5000 non-null   float64
 4   Area_Population       5000 non-null   float64
 5   Price                 5000 non-null   float64
 6   Address               5000 non-null   object 
dtypes: float64(6), object(1)
memory usage: 273.6+ KB
```

In [7]:
```
data.isnull().sum()
```

Out[7]:
```
Area_Income             0
```



In [7]:
```
data.isnull().sum()
```

Out[7]:
```
Area_Income             0
Area_House_Age          0
Area_Number_Rooms       0
Area_Number_Bedrooms    0
Area_Population         0
Price                   0
Address                 0
dtype: int64
```

In [8]:
```
data=data.drop(['Address'], axis=1)
data.head()
```

Out[8]:

	Area_Income	Area_House_Age	Area_Number_Rooms	Area_Number_Bedrooms	Area_Population	Price
0	79545.458574	5.682861	7.009188	4.09	23086.800503	1.059034e+06
1	79248.642455	6.002900	6.730821	3.09	40173.072174	1.505891e+06
2	61287.067179	5.865890	8.512727	5.13	36882.159400	1.058988e+06
3	63345.240046	7.188236	5.586729	3.26	34310.242831	1.260617e+06
4	59982.197226	5.040555	7.839388	4.23	26354.109472	6.309435e+05

In [9]:
```
data.shape
```

Out[9]:
```
(5000, 6)
```

In [10]:
```
# Plotting heatmap
corr=data.corr()
mask = np.zeros_like(corr)
mask[np.triu_indices_from(mask)]= True
f, ax = plt.subplots(figsize=(10, 10))
heatmap = sns.heatmap(corr,mask=mask,
                      square = True,
                      linewidths = .5,
                      cmap = "Paired",
                      cbar_kws = {'shrink': .8,
                                  "ticks" : [-2, -1, 0, 1, 2]},
                      vmin = -2,
                      vmax = 2,
```

ChatGPT | Week-4/ | WEEK-4 - Jupyter Notebook | 500 Internal Server Error | 500 Internal Server Error | ChatGPT

localhost:8888/notebooks/Week-4/WEEK-4.ipynb

New Chrome available

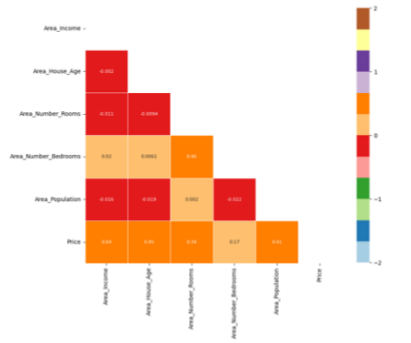
jupyter WEEK-4 Last Checkpoint: Last Saturday at 10:36 (autosaved)

File Edit View Insert Cell Kernel Help

Logout

Trusted | Python 3 (ipykernel)

In [10]:
```
# Plotting heatmap
corr=data.corr()
mask = np.zeros_like(corr)
mask[np.triu_indices_from(mask)]= True
f, ax = plt.subplots(figsize=(10, 10))
heatmap = sns.heatmap(corr,mask=mask,
                      square = True,
                      linewidths = .5,
                      cmap = "Paired",
                      cbar_kws = {'shrink' : .8,
                                  'ticks' : [-2, -1, 0, 1, 2]},
                      vmin = -2,
                      vmax = 2,
                      annot = True,
                      annot_kws = {"size":10})
# Add the column names as labels
ax.set_yticklabels(corr.columns)
ax.set_xticklabels(corr.columns)
sns.set_style({'xtick.bottom': True}, {'ytick.left': True});
```



Build Model

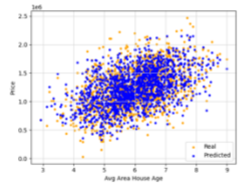
In [11]:
```
from sklearn.model_selection import train_test_split
x=data.drop(['Price'], axis=1)
y=data['Price']

X_train, X_test, y_train, y_test=train_test_split(x,y, train_size=0.70, test_size=0.30, random_state=0)
print(X_train.shape, X_test.shape)
```

```
(3500, 5) (1500, 5)
```

In [12]:
```
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import mean_absolute_percentage_error
from sklearn import metrics

RFR_model=RandomForestRegressor(n_estimators=100, random_state=42)
RFR_model.fit(X_train, y_train)
y_pred= RFR_model.predict(X_test)

print("R2 Value:", metrics.r2_score(y_test, y_pred))
print("Accuracy is", 100- (np.mean(np.abs((y_test - y_pred ) / y_test)) * 100))

imp=pd.Series(RFR_model.feature_importances_,index=x.columns).sort_values(ascending=False)
print("The important features are:")
print(imp)
```

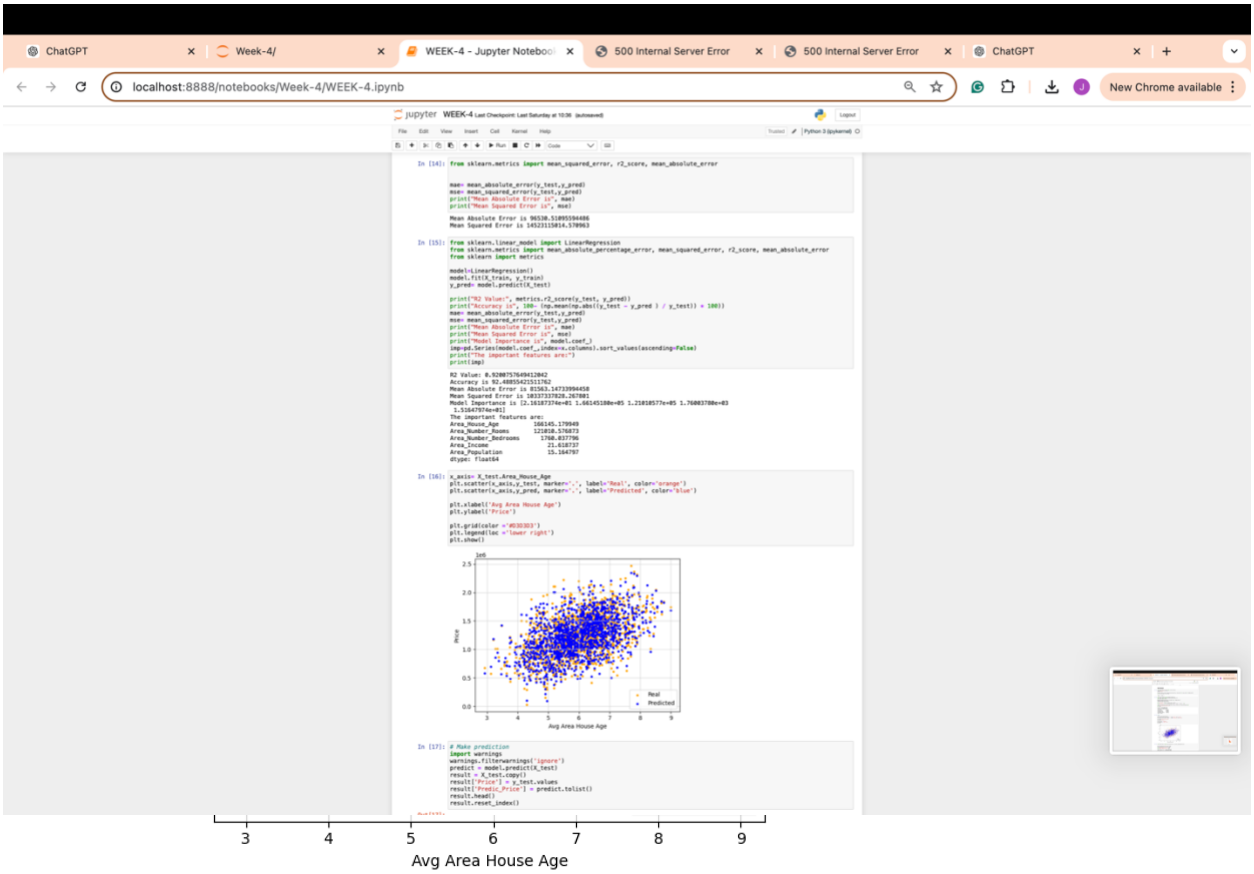
```
R2 Value: 0.8877129881217885
Accuracy is 90.30626176248242
The important features are:
Area_Income          0.429871
Area_House_Age       0.236319
Area_Population      0.187462
Area_Number_Rooms    0.128552
Area_Number_Bedrooms 0.017796
dtype: float64
```

In [13]:
```
#graph

x_axis= X_test.Area_House_Age
plt.scatter(x_axis,y_test, marker='.', label='Real', color='orange')
plt.scatter(x_axis,y_pred, marker='.', label='Predicted', color='blue')

plt.xlabel('Avg Area House Age')
plt.ylabel('Price')

plt.grid(color ='#030303')
plt.legend(loc ='lower right')
plt.show()
```



In [14]:
```
from sklearn.metrics import mean_squared_error, r2_score, mean_absolute_error

mae= mean_absolute_error(y_test,y_pred)
mse= mean_squared_error(y_test,y_pred)
print("Mean Absolute Error is", mae)
print("Mean Squared Error is", mse)
```

```
Mean Absolute Error is 96530.51095594486
Mean Squared Error is 14523115814.570963
```



In [17]:
```
# Make prediction
import warnings
warnings.filterwarnings('ignore')
predict = model.predict(X_test)
result = X_test.copy()
result['Price'] = y_test.values
result['Predic_Price'] = predict.tolist()
result.head()
result.reset_index()
```

Out[17]:

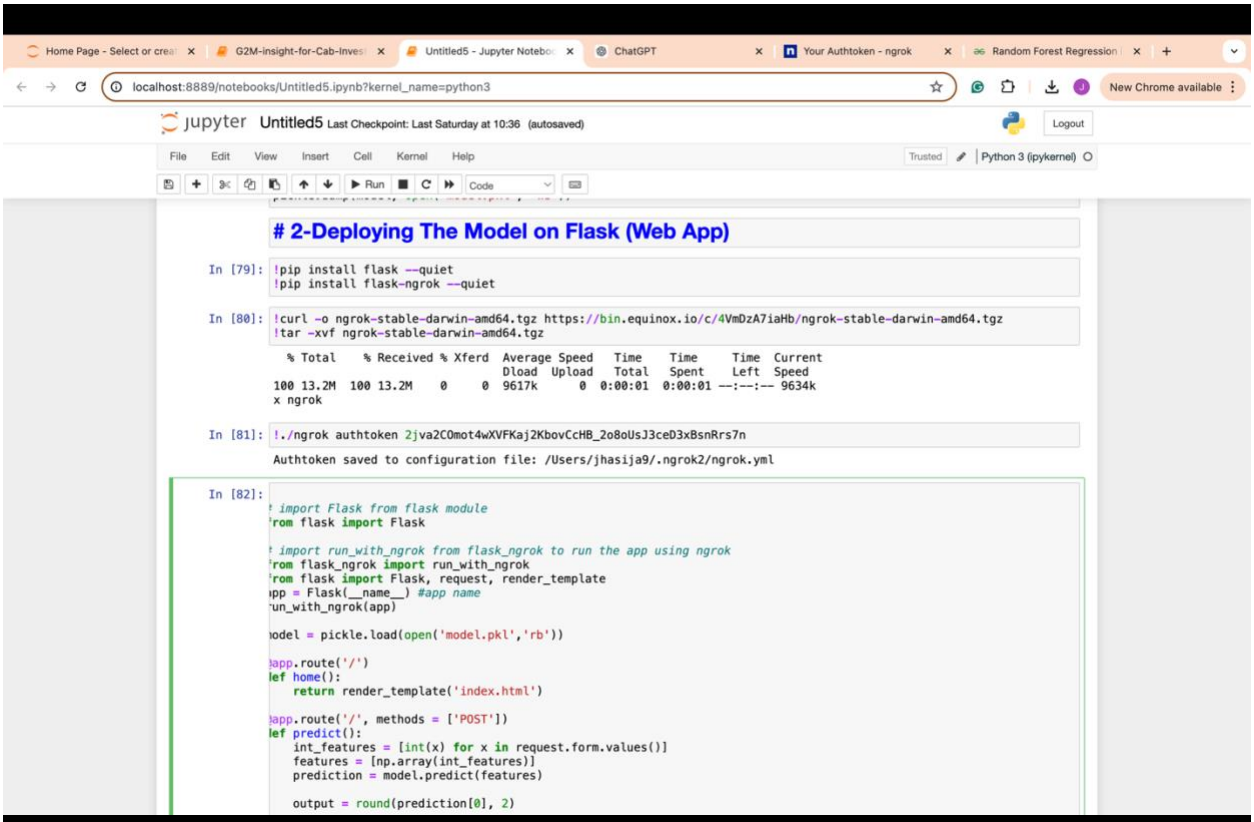
	index	Area_Income	Area_House_Age	Area_Number_Rooms	Area_Number_Bedrooms	Area_Population	Price	Predic_Price
0	398	61200.726175	5.299694	6.234615	4.23	42789.692217	8.942511e+05	9.696083e+05
1	3833	63380.814670	5.344664	6.001574	2.45	40217.333577	9.329794e+05	9.538682e+05
2	4836	71208.269301	5.300326	6.077989	4.01	25696.361741	9.207479e+05	9.075063e+05
3	4572	50343.763518	6.027468	5.160240	4.35	27445.876739	6.918549e+05	4.933253e+05
4	636	54535.453719	5.278065	6.871038	4.41	30852.207006	7.327332e+05	7.182212e+05
...	...	...	...	...	...	...	...	...
1495	4554	75654.777016	7.077079	6.501047	3.15	49451.178541	1.900789e+06	1.708751e+06
1496	4807	81742.851389	5.796218	7.222546	6.18	40562.498774	1.630435e+06	1.585405e+06
1497	1073	63324.581619	7.725266	6.213021	4.42	43281.572742	1.372994e+06	1.423701e+06
1498	2906	54673.521184	4.496193	7.081934	5.31	39160.553270	7.707706e+05	7.444009e+05
1499	1357	40185.733891	5.949763	5.753579	4.01	37766.667572	5.292821e+05	4.885258e+05

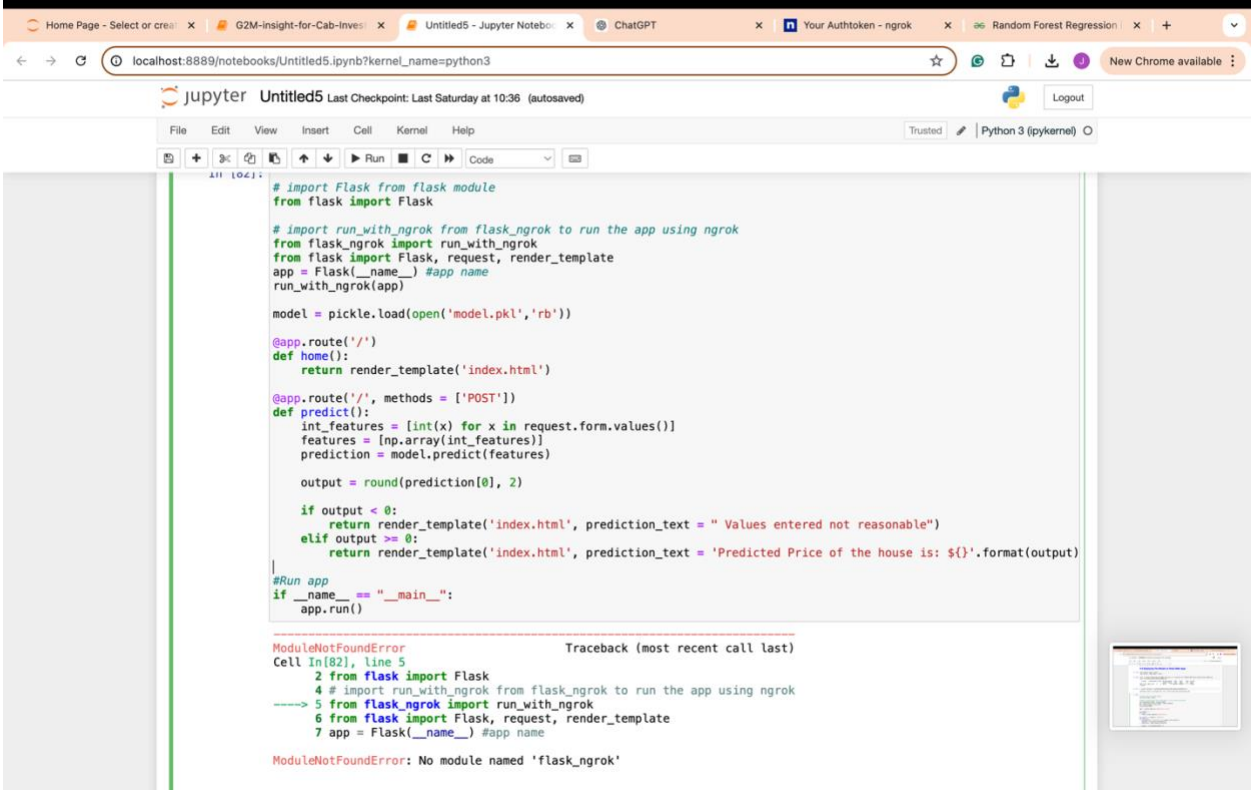
1500 rows × 8 columns

In [18]:
```
#saving the model
import pickle
pickle.dump(model, open('model.pkl', 'wb'))
```

Type *Markdown* and LaTeX: α^2

In [ ]:


Home Page - Select or crea
G2M-insight-for-Cab-Inves
Untitled5 - Jupyter Noteb
ChatGPT
Your Authtoken - ngrok
Random Forest Regression
localhost:8889/notebooks/Untitled5.ipynb?kernel_name=python3
New Chrome available
jupyter Untitled5 Last Checkpoint: Last Saturday at 10:36 (autosaved)
Logout
File Edit View Insert Cell Kernel Help
Trusted
Python 3 (ipykernel)
Run
Code
2-Deploying The Model on Flask (Web App)
In [79]:
!pip install flask --quiet
!pip install flask-ngrok --quiet
In [80]:
!curl -o ngrok-stable-darwin-amd64.tgz https://bin.equinox.io/c/4VmDzA7iaHb/ngrok-stable-darwin-amd64.tgz
!tar -xvf ngrok-stable-darwin-amd64.tgz
% Total % Received % Xferd Average Speed Time Time Time Current
Dload Upload Total Spent Left Speed
100 13.2M 100 13.2M 0 0 9617k 0 0:00:01 0:00:01 --:--:-- 9634k
x ngrok
In [81]:
!./ngrok authtoken 2jva2COmot4wXVFKaj2KbovCcHB_2o8oUsJ3ceD3xBsnRrs7n
Authtoken saved to configuration file: /Users/jhasija9/.ngrok2/ngrok.yml
In [82]:
import Flask from flask module
from flask import Flask
import run_with_ngrok from flask_ngrok to run the app using ngrok
from flask_ngrok import run_with_ngrok
from flask import Flask, request, render_template
app = Flask(__name__) #app name
run_with_ngrok(app)
model = pickle.load(open('model.pkl','rb'))
@app.route('/')
def home():
return render_template('index.html')
@app.route('/', methods = ['POST'])
def predict():
int_features = [int(x) for x in request.form.values()]
features = [np.array(int_features)]
prediction = model.predict(features)
output = round(prediction[0], 2)


Home Page - Select or crea
G2M-insight-for-Cab-Inves
Untitled5 - Jupyter Noteb
ChatGPT
Your Authtoken - ngrok
Random Forest Regression
localhost:8889/notebooks/Untitled5.ipynb?kernel_name=python3
New Chrome available
jupyter Untitled5 Last Checkpoint: Last Saturday at 10:36 (autosaved)
Logout
File Edit View Insert Cell Kernel Help
Trusted
Python 3 (ipykernel)
Run
Code
In [82]:
# import Flask from flask module
from flask import Flask
# import run_with_ngrok from flask_ngrok to run the app using ngrok
from flask_ngrok import run_with_ngrok
from flask import Flask, request, render_template
app = Flask(__name__) #app name
run_with_ngrok(app)
model = pickle.load(open('model.pkl','rb'))
@app.route('/')
def home():
return render_template('index.html')
@app.route('/', methods = ['POST'])
def predict():
int_features = [int(x) for x in request.form.values()]
features = [np.array(int_features)]
prediction = model.predict(features)
output = round(prediction[0], 2)
if output < 0:
return render_template('index.html', prediction_text = " Values entered not reasonable")
elif output >= 0:
return render_template('index.html', prediction_text = 'Predicted Price of the house is: ${}'.format(output))
#Run app
if __name__ == "__main__":
app.run()
ModuleNotFoundError Traceback (most recent call last)
Cell In[82], line 5
2 from flask import Flask
4 # import run_with_ngrok from flask_ngrok to run the app using ngrok
----> 5 from flask_ngrok import run_with_ngrok
6 from flask import Flask, request, render_template
7 app = Flask(__name__) #app name
ModuleNotFoundError: No module named 'flask_ngrok'