Cloud and API Deployment of Laptop Price Prediction System

Report date: 5 September 2023
Internship Batch: LISUM24
Version: 1.0
Data intake by: Riwaj Neupane
Data intake reviewer: Data Glacier
Data storage location: **https://github.com/Riwaj22/Data-Glacier/tree/main/Week%205**

From kaggle:https://www.kaggle.com/code/vikramb/mobile-price-prediction

Before cleaning:

	Rating ?/5	Number of Ratings	RAM	ROM/Storage	Front Camera	Battery	Processor	Price in INR	Name of Phone	Color	Camera Resolutions	Camera Types	Year of Scraping	Month of Scraping
0	4.2	33561	2.0	32.0	5.0	5000.0	Mediatek	5649.0	POCO C50	Royal Blue	8.0	Unknown	2023	6
1	4.2	77128	4.0	64.0	8.0	5000.0	Mediatek	11999.0	POCO M4 5G	Cool Blue	50.0	Unknown	2023	6
2	4.3	15175	4.0	64.0	5.0	5000.0	Helio	6999.0	POCO C51	Royal Blue	8.0	Unknown	2023	6
3	4.2	22621	4.0	64.0	5.0	5000.0	Mediatek	7749.0	POCO C55	Cool Blue	50.0	Unknown	2023	6
4	4.3	15175	4.0	64.0	5.0	5000.0	Helio	6999.0	POCO C51	Power Black	8.0	Unknown	2023	6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1831	4.3	25582	4.0	64.0	16.0	5000.0	MediaTek	14999.0	Infinix Note 7	Forest Green	48.0	AI Lens Camera	2023	6
1832	4.3	25582	4.0	64.0	16.0	5000.0	MediaTek	14999.0	Infinix Note 7	Bolivia Blue	48.0	AI Lens Camera	2023	6
1833	4.3	25582	4.0	64.0	16.0	5000.0	MediaTek	14999.0	Infinix Note 7	Aether Black	48.0	AI Lens Camera	2023	6
1834	4.2	7117	8.0	128.0	16.0	4500.0	MediaTek	18999.0	Infinix Zero 8i	Silver Diamond	48.0	AI Lens Camera	2023	6
1835	4.3	15701	4.0	64.0	32.0	4000.0	Helio	10999.0	Infinix S5	Quetzal Cyan	16.0	Unknown	2023	6

After Cleaning:

	Rating ?/5	Number of Ratings	RAM	ROM/Storage	Front Camera	Battery	Processor	Price in INR	Name of Phone	Camera Resolutions	Camera Types
0	4.2	33561	2.0	32.0	5.0	5000.0	Mediatek	5649.0	POCO C50	8.0	Unknown
1	4.2	77128	4.0	64.0	8.0	5000.0	Mediatek	11999.0	POCO M4 5G	50.0	Unknown
2	4.3	15175	4.0	64.0	5.0	5000.0	Helio	6999.0	POCO C51	8.0	Unknown
3	4.2	22621	4.0	64.0	5.0	5000.0	Mediatek	7749.0	POCO C55	50.0	Unknown
4	4.3	15175	4.0	64.0	5.0	5000.0	Helio	6999.0	POCO C51	8.0	Unknown
...	...	...	...	...	...	...	...	...	...	...	...
1505	4.3	25582	4.0	64.0	16.0	5000.0	MediaTek	14999.0	Infinix Note 7	48.0	AI Lens Camera
1506	4.3	25582	4.0	64.0	16.0	5000.0	MediaTek	14999.0	Infinix Note 7	48.0	AI Lens Camera
1507	4.3	25582	4.0	64.0	16.0	5000.0	MediaTek	14999.0	Infinix Note 7	48.0	AI Lens Camera
1508	4.2	7117	8.0	128.0	16.0	4500.0	MediaTek	18999.0	Infinix Zero 8i	48.0	AI Lens Camera
1509	4.3	15701	4.0	64.0	32.0	4000.0	Helio	10999.0	Infinix S5	16.0	Unknown

Data Import:

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

        from sklearn import pipeline
        from sklearn.model_selection import train_test_split
```

```
In [2]: data = pd.read_csv('mobile_dataset.csv')
```

Target Variable: Price

Data Split:

```
X_train , X_test, y_train, y_test = train_test_split(X, y , test_size=0.2)
```

Model Building:

```
import numpy as np
import pandas as pd
from matplotlib import pyplot as plt
import seaborn as sns

from sklearn.preprocessing import MinMaxScaler, StandardScaler, OneHotEncoder, Normalizer
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression, LassoLarsCV, RANSACRegressor, ElasticNet, Lasso, SGDClassifier,ARDRegres
from sklearn.tree import DecisionTreeRegressor
from sklearn.kernel_ridge import KernelRidge
from sklearn.ensemble import HistGradientBoostingRegressor,BaggingRegressor, GradientBoostingRegressor

from sklearn.metrics import *
from sklearn.pipeline import Pipeline, make_pipeline
from sklearn.compose import ColumnTransformer
from sklearn.decomposition import PCA

step1 = ColumnTransformer(
    transformers=[
        ('col_tnf', OneHotEncoder( sparse = False,drop='first', handle_unknown='ignore'),cat_features.columns),
        ('num_tnf', MinMaxScaler(feature_range=(0,1
                                                )), num_features.columns)
    ],
    remainder='passthrough'
)
```

```python
# Create a function to evaluate different models
def evaluate_model(model, X_train, y_train, X_test, y_test):
        pipe = Pipeline([
            ('Transform', step1),
            ('model', model),
        ])

        pipe.fit(X_train, y_train)
        y_pred = pipe.predict(X_test)
        r2 = r2_score(y_test, y_pred)
        return r2

# Split the dataset into train and test sets


# Initialize different models
models = {
    'Linear Regression': LinearRegression(),
    'Poisson Regressor': PoissonRegressor(),
    'Random Forest Regressor': RandomForestRegressor(),
    'Gradient Boosting Regressor': GradientBoostingRegressor(),
    'AdaBoost Regressor': AdaBoostRegressor(),
    'Bagging Regressor': BaggingRegressor(),
    'Extra Trees Regressor': ExtraTreesRegressor(),
    'Support Vector Regressor': SVR(),

}

# Evaluate and print R2 scores for different models
for model_name, model in models.items():
    r2 = evaluate_model(model, X_train, y_train, X_test, y_test)
    print(f'R2 Score for {model_name}: {r2:.4f}')
```

```
R2 Score for Bagging Regressor: 0.9185
```

```
C:\Users\97798\anaconda3\lib\site-packages\skle
umns [0, 1] during transform. These unknown cat
  warnings.warn(
C:\Users\97798\anaconda3\lib\site-packages\skle
se_output` in version 1.2 and will be removed i
e.
  warnings.warn(
```

```
R2 Score for Extra Trees Regressor: 0.9418
```

```
C:\Users\97798\anaconda3\lib\site-packages\skle
umns [0, 1] during transform. These unknown cat
  warnings.warn(
```

```
R2 Score for Support Vector Regressor: -0.1118
```

Selection of Extra Trees Regressor

Cross Validation Result

```
Mean Absolute Error: 1767.5213438189844
Mean Squared Error: 31968803.107698556
R-squared Score: 0.9307750916515932
```

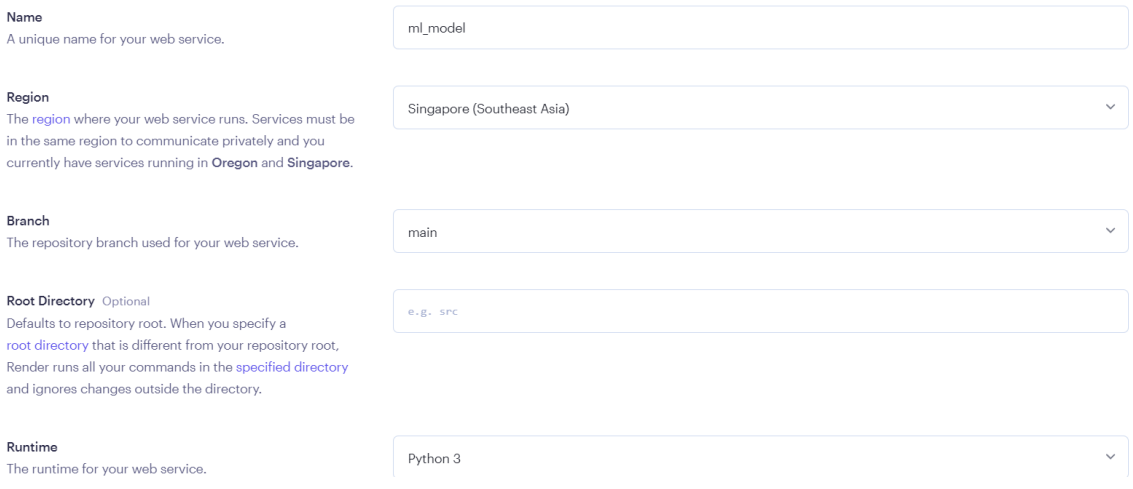
Saving model:

```python
import pickle

# Save the trained pipeline as a .pkl model using pickle
model_filename = 'mobile_trained_model.pkl'
with open(model_filename, 'wb') as model_file:
    pickle.dump(pipe, model_file)

print(f"Model saved as {model_filename}")
```

```
Model saved as mobile_trained_model.pkl
```

Deployment:

Cloud Deployment:



Build Command
This command runs in the root directory of your repository when a new version of your code is pushed, or when you deploy manually. It is typically a script that installs libraries, runs migrations, or compiles resources needed by your app.

```
$ pip install -r requirements.txt
```

Start Command
This command runs in the root directory of your app and is responsible for starting its processes. It is typically used to start a webserver for your app. It can access environment variables defined by you in Render.

```
$ gunicorn main:app
```

WEB SERVICE

riwaj_model

Python 3 | Free

Connect | Manual Deploy

Riwaj22 / Mobile-Price-Predictor main

https://riwaj-model.onrender.com

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Free instance types will spin down with inactivity. Upgrade to a paid instance type to prevent this behavior. Learn more.

September 6, 2023 at 8:35 AM Building

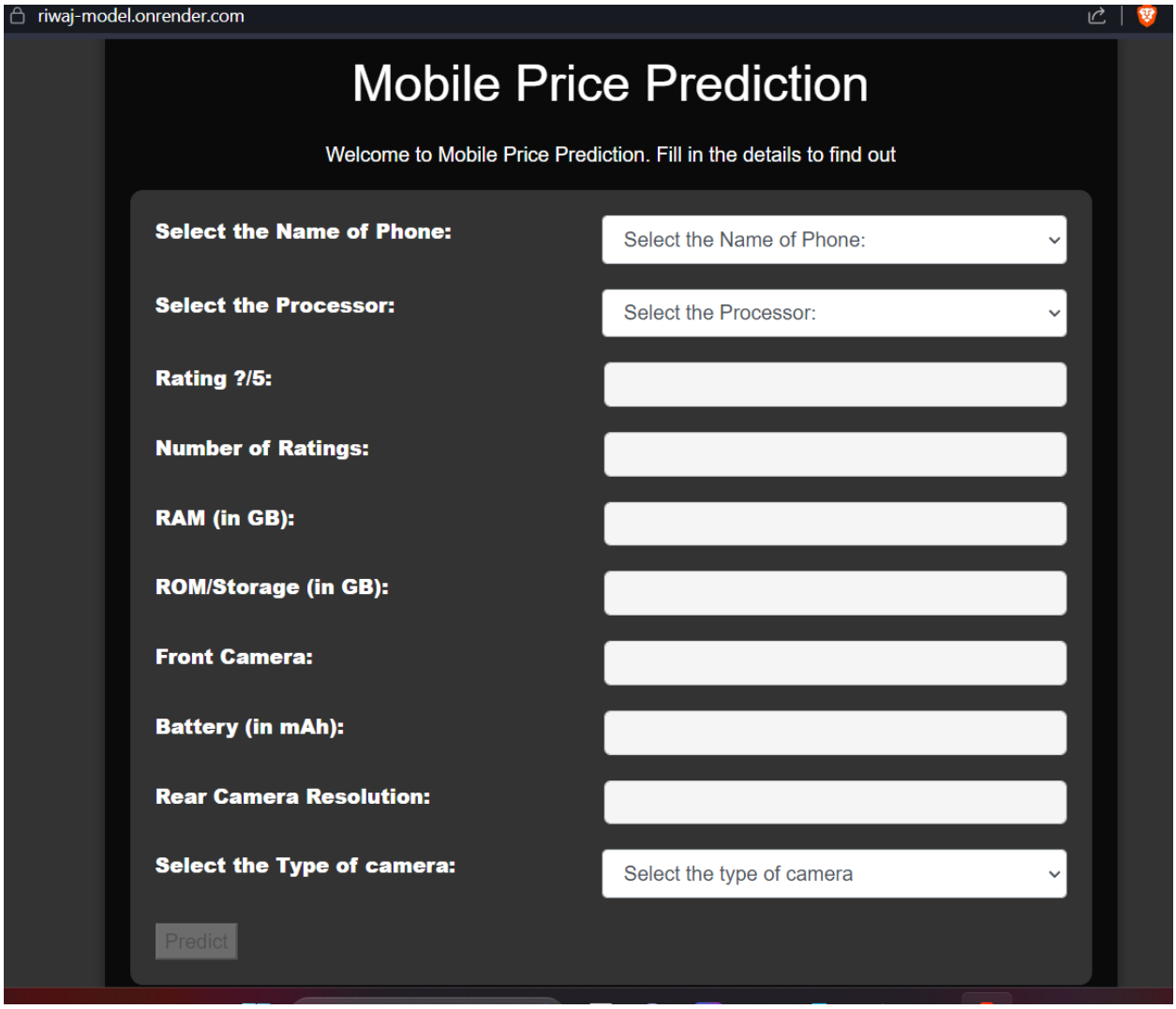
21f2a2f Update main.py

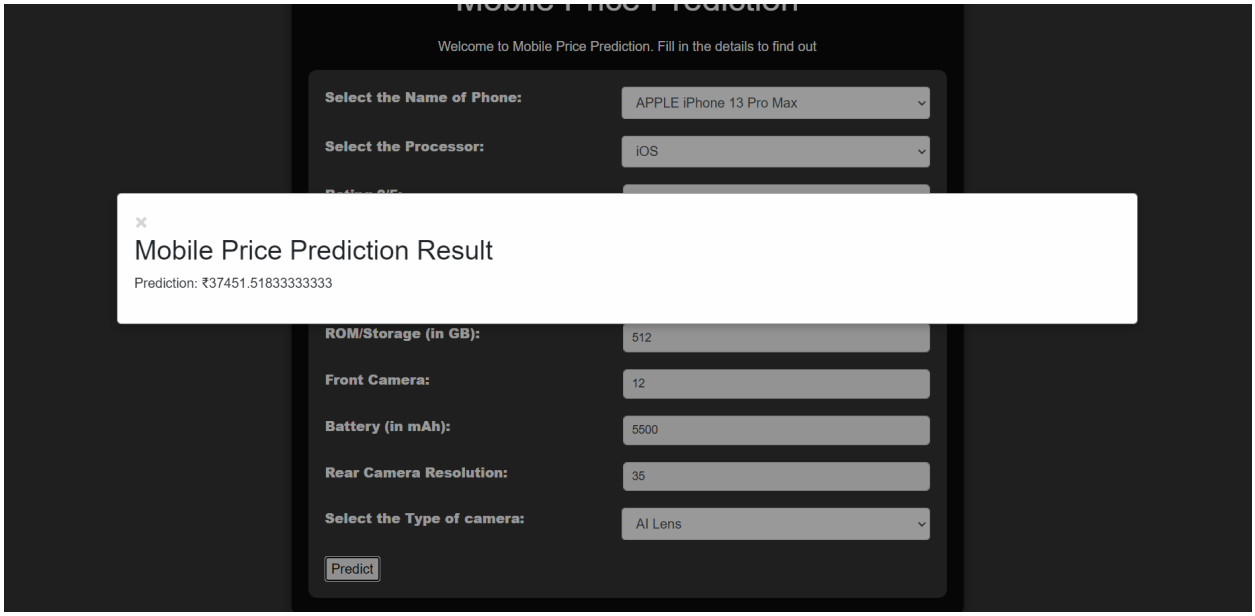
Cancel deploy

Search logs | Search | Maximize | Scroll to top

```
Sep 6 08:35:43 AM    Downloading scipy-1.7.3-cp37-cp37m-manylinux_2_12_x86_64.manylinux2010_x86_64.whl (38.1 MB)
Sep 6 08:35:45 AM  Collecting typing-extensions>=3.6.4; python_version < "3.8"
Sep 6 08:35:45 AM    Downloading typing_extensions-4.7.1-py3-none-any.whl (33 kB)
Sep 6 08:35:45 AM  Collecting zipp>=0.5
Sep 6 08:35:45 AM    Downloading zipp-3.15.0-py3-none-any.whl (6.8 kB)
Sep 6 08:35:45 AM  Collecting six>=1.5
Sep 6 08:35:45 AM    Downloading six-1.16.0-py2.py3-none-any.whl (11 kB)
Sep 6 08:35:45 AM  Installing collected packages: blinker, typing-extensions, zipp, importlib-metadata, click, colorama, Markup
```

```
Sep 6 08:37:26 AM  ==> Using Node version 14.17.0 (default)
Sep 6 08:37:26 AM  ==> Docs on specifying a Node version: https://render.com/docs/node-version
Sep 6 08:37:32 AM  ==> Starting service with 'gunicorn main:app'
Sep 6 08:37:48 AM  Your service is live 🎉
Sep 6 08:37:46 AM  /opt/render/project/src/.venv/lib/python3.7/site-packages/sklearn/base.py:315: UserWarning: Trying to unpick
le estimator OneHotEncoder from version 1.2.2 when using version 0.24.2. This might lead to breaking code or invalid results. U
se at your own risk.
Sep 6 08:37:46 AM    UserWarning)
Sep 6 08:37:46 AM  /opt/render/project/src/.venv/lib/python3.7/site-packages/sklearn/base.py:315: UserWarning: Trying to unpick
le estimator MinMaxScaler from version 1.2.2 when using version 0.24.2. This might lead to breaking code or invalid results. Us
e at your own risk.
```


riwaj-model.onrender.com
Mobile Price Prediction
Welcome to Mobile Price Prediction. Fill in the details to find out
Select the Name of Phone:
Select the Name of Phone:
Select the Processor:
Select the Processor:
Rating ?/5:
Number of Ratings:
RAM (in GB):
ROM/Storage (in GB):
Front Camera:
Battery (in mAh):
Rear Camera Resolution:
Select the Type of camera:
Select the type of camera
Predict


Welcome to Mobile Price Prediction. Fill in the details to find out
Select the Name of Phone:
APPLE iPhone 13 Pro Max
Select the Processor:
iOS
Mobile Price Prediction Result
Prediction: ₹37451.51833333333
ROM/Storage (in GB):
512
Front Camera:
12
Battery (in mAh):
5500
Rear Camera Resolution:
35
Select the Type of camera:
AI Lens
Predict