# AD CAMPAIGN RECOMMENDER-MODEL DEPLOYMENT

FROM –DEEPAK SINGH PANWAR

- 1 Choose the best model based on the evaluation metrics for only scenario 1[For age and gender prediction]
  - a. Export the models as pickle files and save the pickle files

1. The Random Forest Classifier model has been saved into scenario1_gender.pkl file

**Saving the Model for future use**

In [79]:

```
# Save the model as a pickle file
with open('scenario1_gender_model.pkl', 'wb') as file:
    pickle.dump(rf, file)
```

2. The Random Forest Regressor model has been saved into scenario1_age.pkl file

**Saving the Model for future use**

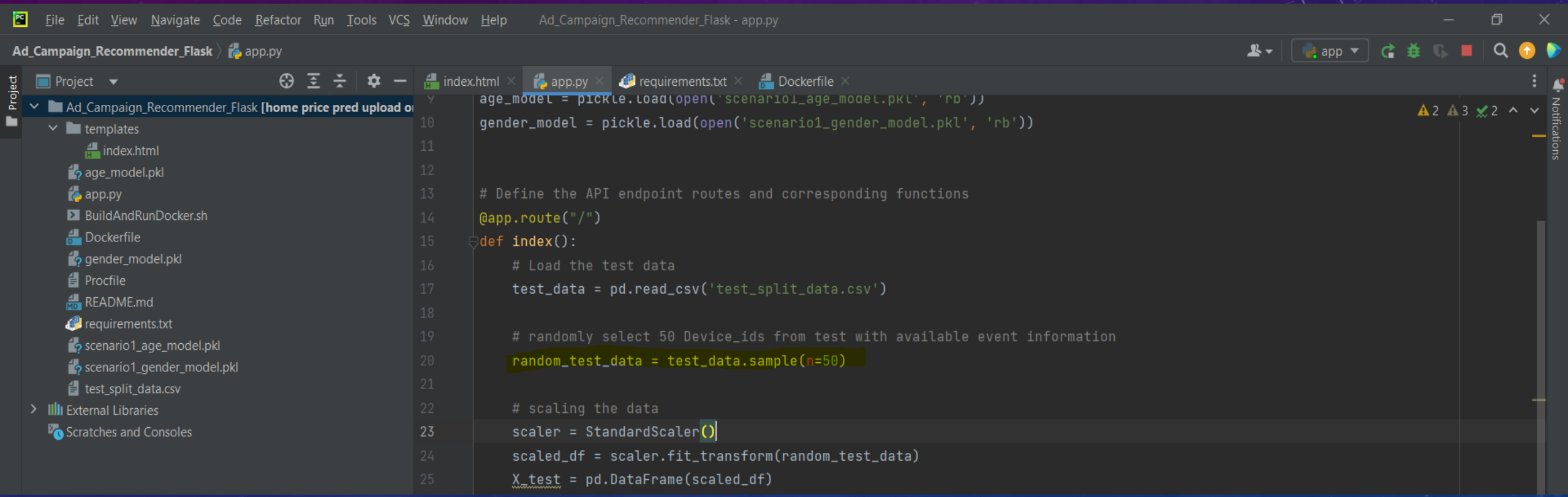
In [70]:

```
# # Save the model as a pickle file
with open('scenario1_age_model.pkl', 'wb') as file:
    pickle.dump(rf_regressor, file)
```

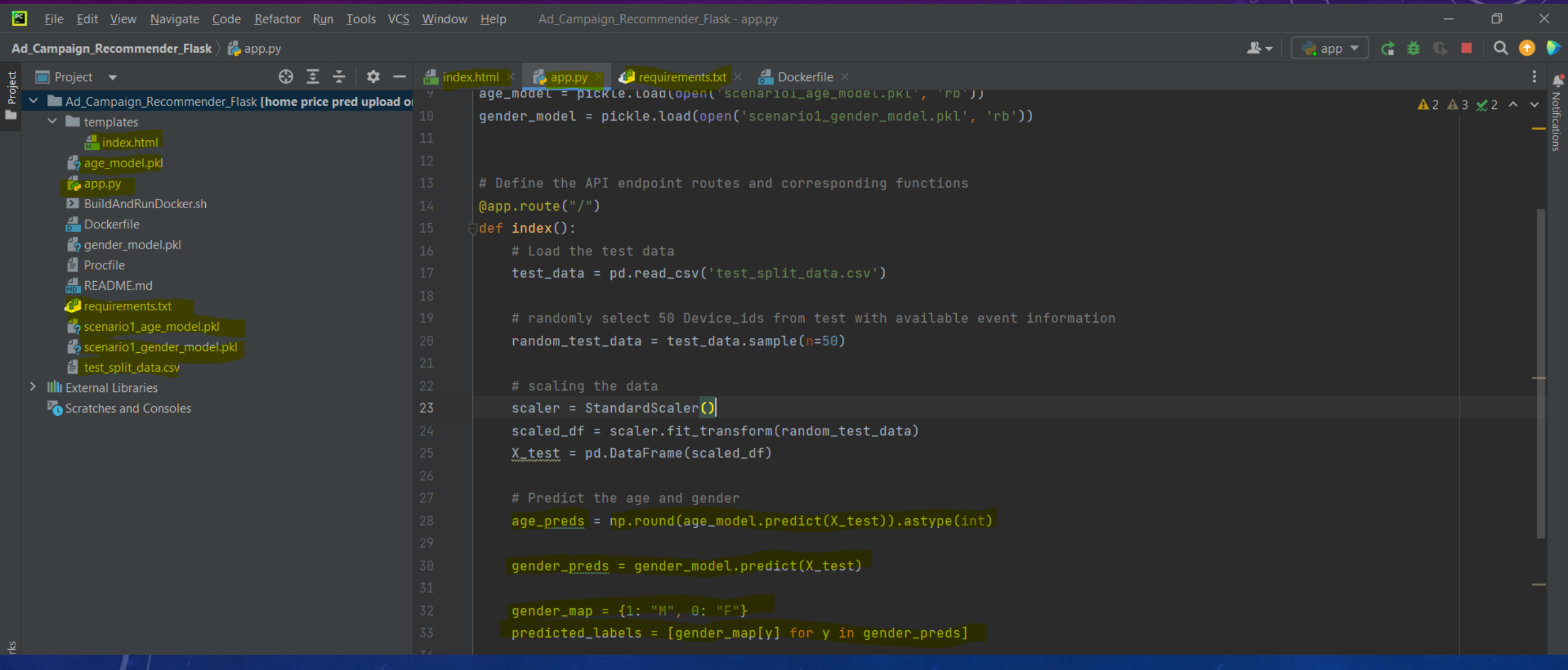
- 1 Choose the best model based on the evaluation metrics for only scenario 1[For age and gender prediction]
  - b. The test split created prior to model building need to be kept safely for integration with the flask application

```
# writing the test data into test_split_data.csv
#so that we can use it for testing the model
X_test.to_csv('test_split_data.csv',index=False)
```

- 2. Design flask application
  - a. As a first step, you can randomly select 50 Device_ids from test with available event information
    - Written the code in the app.py file to select 50 Device_ids from the test available event information

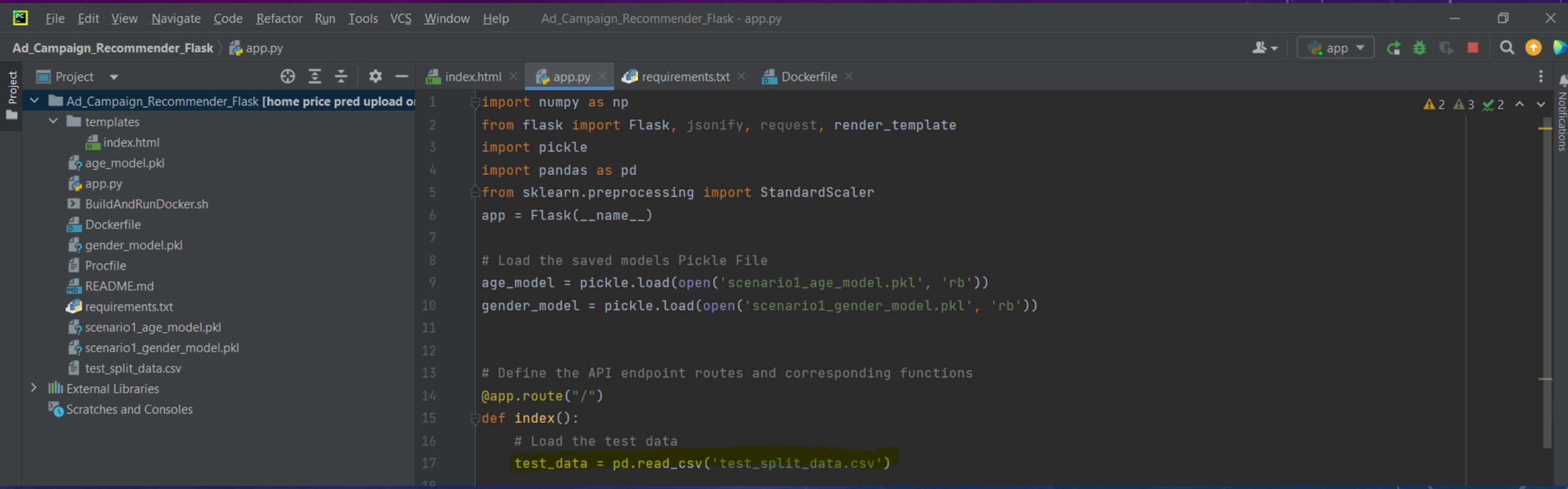


- 2. Design flask application
  - 2. Develop different components of the flask application
    a. Write the Main app.py that includes logic for making predictions



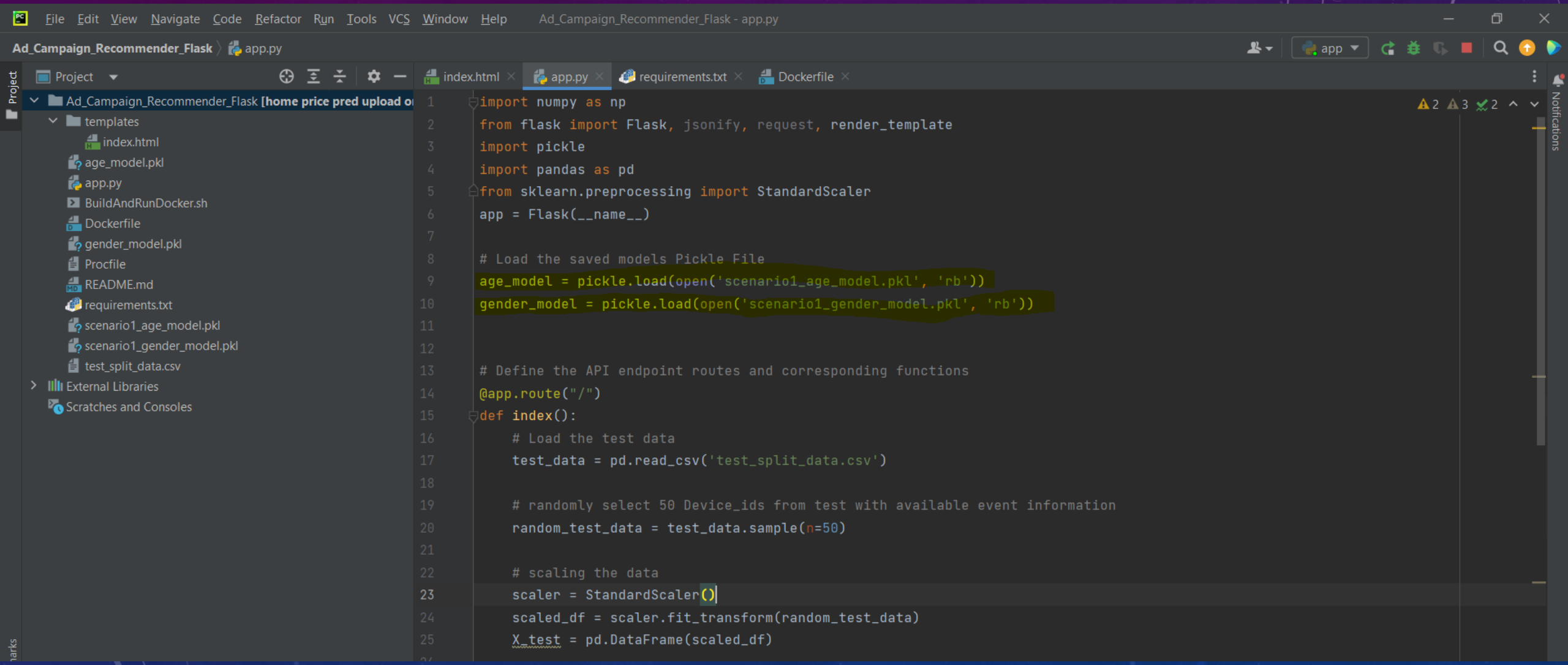
- 2. Design flask application

    3. Load the saved test data



- 2. Design flask application

    4. Load the Pickle File



- 2. Design flask application

5. Their corresponding age and gender predictions [Prob/Pred value appearing in the form of a table]

127.0.0.1:5000

# Age and Gender Predictions

| Device ID | Event ID | Latitude | Longitude | Predicted Age | Predicted Gender |
|---|---|---|---|---|---|
| 2850275100987250000 | 2376053.0 | 39.64 | 118.16 | 34 | M |
| 6055738551289950000 | 151565.0 | 30.42 | 114.43 | 32 | M |
| -7804296101691450000 | 1115799.0 | 31.31 | 121.5 | 34 | M |
| 8313284150517560000 | 65827.0 | 24.84 | 116.92 | 33 | M |
| -4548680328900550000 | 422453.0 | 31.14 | 121.41 | 35 | M |
| -7882183570062080000 | 1525263.0 | 33.53 | 117.55 | 33 | M |
| -2345381605524850000 | 2756033.0 | 33.55 | 119.11 | 34 | M |
| 5175180143525780000 | 2376110.0 | 40.11 | 116.65 | 35 | M |
| -4600768613323190000 | 1541488.0 | 35.98 | 115.14 | 34 | M |
| 4603375593299160000 | 765602.0 | 23.1 | 113.25 | 31 | M |
| 2419337893932920000 | 3033615.0 | 30.7 | 104.01 | 31 | M |
| -6127113861188220000 | 2066742.0 | 39.91 | 116.33 | 35 | M |
| -4864412200268150000 | 800389.0 | 26.14 | 108.42 | 33 | M |
| -7752582024345670000 | 2254314.0 | 30.0 | 104.0 | 32 | M |
| -1551787085431880000 | 409386.0 | 22.98 | 114.7 | 37 | M |

- 2. Design flask application

  6. Business logic to map the specific campaigns for different device IDs

     a. Gender Predictions[Utilize bottom three deciles(8,9,10) for class 0 and top three deciles(1,2,3) for class 1

```
KS statistic for top 3 deciles: 0.137
KS statistic for bottom 3 deciles: 0.000
Probability band for top 3 deciles: (0.9836879041154521, 1.0)
Probability band for bottom 3 deciles: (0.0, 0.11180531796640825)
```

```
gender_preds = gender_model.predict(X_test)

gender_map = {1: "M", 0: "F"}
predicted_labels = [gender_map[y] for y in gender_preds]
```

```
['M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F',
'M', 'F', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'F', 'F', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M',
'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'F', 'M',
'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'F', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M',
'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M',
'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'F', 'M', 'M',
'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'F', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M',
'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M',
'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M',
'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'F', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F',
'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M',
'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'F', 'M', 'M', 'M',
'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'F', 'F', 'M', 'M', 'M',
'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M',
'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'F', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M',
'F', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M',
'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M',
'F', 'M', 'M', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M',
'M', 'M', 'M', 'M', 'M', 'F', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'M', 'F', 'F', 'M', 'M', 'M', 'M', 'M',
```

- 2. Design flask application

    6. Business logic to map the specific campaigns for different device IDs

        b. Age Prediction[In case of regression , use the exact prediction information and in case of classification, assign the class with maximum Probability]

```
# Predict the age and gender
age_preds = np.round(age_model.predict(X_test)).astype(int)
```

```
array([34, 32, 34, ..., 31, 33, 35])
```

- 2. Design flask application
    - 6. Business logic to map the specific campaigns for different device IDs
        - c. Mapping marketing campaigns to gender and predictions for a given device_id
            - 1. Mapping Marketing Campaign to Gender predictions

```
#Mapping Marketting Campaigns to Gender predictions
gender_campaign_map = {1: "Campaign 3- Personalized call/data packs",
                       0: "Campaign 1 - Specific personalized fashion-related campigns"}
gender_campaign_info = [gender_campaign_map[y] for y in gender_preds]
```

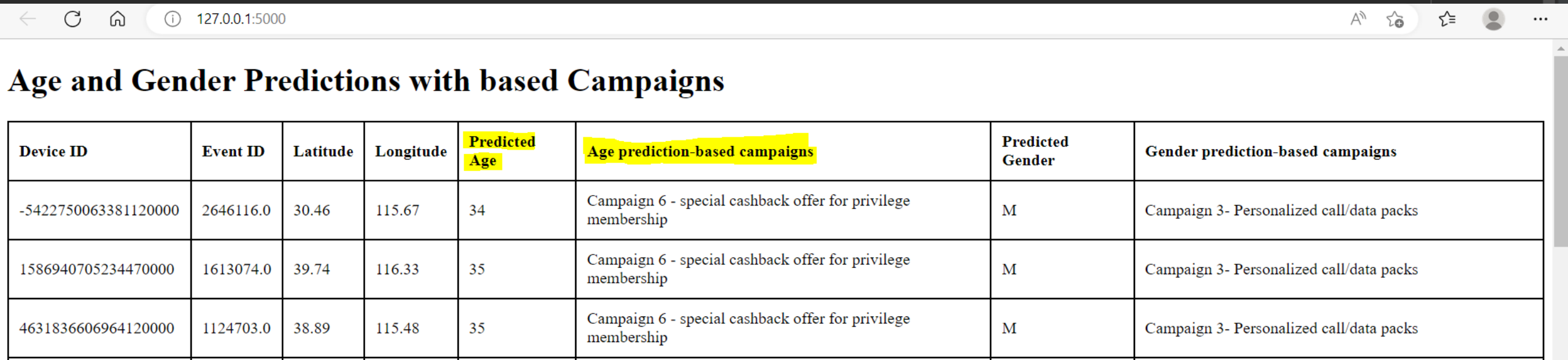
## Age and Gender Predictions with based Campaigns

| Device ID | Event ID | Latitude | Longitude | Predicted Age | Age prediction-based campaigns | Predicted Gender | Gender prediction-based campaigns |
|---|---|---|---|---|---|---|---|
| -5422750063381120000 | 2646116.0 | 30.46 | 115.67 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 1586940705234470000 | 1613074.0 | 39.74 | 116.33 | 35 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 4631836606964120000 | 1124703.0 | 38.89 | 115.48 | 35 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -1503580149817940000 | 181519.0 | 23.14 | 113.3 | 30 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| 7257872498700550000 | 1277861.0 | 27.03 | 114.92 | 32 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| 2508922768609340000 | 2548078.0 | 34.01 | 113.81 | 35 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -2311756878023590000 | 2310964.0 | 32.45 | 119.93 | 35 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 3516007766582930000 | 2061151.0 | 28.77 | 121.47 | 31 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| 2360178808011230000 | 1181100.0 | 23.14 | 113.3 | 30 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| 4601919243830000000 | 2608440.0 | 32.91 | 115.77 | 35 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -1291777568991350000 | 922604.0 | 22.51 | 114.03 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |

- 2. Design flask application
    - 6. Business logic to map the specific campaigns for different device IDs
        - c. Mapping marketing campaigns to gender and predictions for a given device_id
            - 2. Mapping Marketing Campaign to Age predictions

```python
# Mapping Marketting Campaigns to Age predictions
# Define the age groups
age_groups = {
    "Campaign 4 - Bundled smartphone offers": range(0, 25),
    "Campaign 5 - special offers for payment wallet": range(25, 33),
    "Campaign 6 - special cashback offer for privilege membership": range(33, 120)  # assuming the maximum age is 120
}

# Map the age predictions to campaign labels
campaign_preds = []
for age_pred in age_preds:
    for campaign, age_range in age_groups.items():
        if age_pred in age_range:
            campaign_preds.append(campaign)
            break
```



- 3. Dockerize the application

File Edit View Navigate Code Refactor Run Tools VCS Window Help  Ad_Campaign_Recommender_Flask - Dockerfile

Ad_Campaign_Recommender_Flask 〉 Dockerfile

index.html | app.py | requirements.txt | Dockerfile

```
# Create the base image
FROM python:3.7-slim

# Copy the requirements file and install the dependencies
COPY requirements.txt .
RUN pip3 install --no-cache-dir -r requirements.txt

# Copy the Flask app files to the container
COPY app.py /app/
COPY scenario1_age_model.pkl /app/
COPY scenario1_gender_model.pkl /app/
COPY test_split_data.csv /app/
COPY templates/index.html /app/templates/index.html
# Set the working directory
WORKDIR /app

# Set "python" as the entry point
ENTRYPOINT ["python"]

# Set the command as the script name
CMD ["app.py"]

#Expose the post 5000.
EXPOSE 5000
```

File Edit View Navigate Code Refactor Run Tools VCS Window Help  Ad_Campaign_Recommender_Flask - requirements.txt

Ad_Campaign_Recommender_Flask 〉 requirements.txt

index.html | app.py | requirements.txt | Dockerfile

```
Flask==2.2.3
gunicorn==20.1.0
itsdangerous==2.1.2
Jinja2==3.1.2
MarkupSafe==2.1.2
Werkzeug==2.2.3
numpy==1.21.6
scipy>=0.15.1
scikit-learn>=0.18
matplotlib>=1.4.3
pandas==1.3.5
mlxtend
xgboost
```

- 3. Dockerize the application

Command to build dockerfile to create image : docker build -t adcampaignrecommendersystem .

```
PS C:\Users\kq250f\Desktop\Desktop\Data Science\UOA\Capastone1\Capastone\Ad_Campaign_Recommender_Flask> docker build -t adcampaignrecommendersystem .

 => [7/9] COPY test_split_data.csv /app/
 => [8/9] COPY templates/index.html /app/templates/index.html
 => [9/9] WORKDIR /app
 => exporting to image
 => => exporting layers
 => => writing image sha256:44b0f2f4bcb207f9d72e25a53c306cf0063be1c8f78ffb64859353e412f5886d
 => => naming to docker.io/library/adcampaignrecommendersystem

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
```

Command to run image to create container : docker run -p 5000:5000 adcampaignrecommendersystem

```
PS C:\Users\kq250f\Desktop\Desktop\Data Science\UOA\Capastone1\Capastone\Ad_Campaign_Recommender_Flask> docker run -p 5000:5000 adcampaignrecommendersystem
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on all addresses (0.0.0.0)
 * Running on http://127.0.0.1:5000
 * Running on http://172.17.0.2:5000
Press CTRL+C to quit
```

- 3. Dockerize the application

  After clicking on the link we can see the application is running at : http://127.0.0.1:5000/


# Age and Gender Predictions with based Campaigns

| Device ID | Event ID | Latitude | Longitude | Predicted Age | Age prediction-based campaigns | Predicted Gender | Gender prediction-based campaigns |
|---|---|---|---|---|---|---|---|
| 82747801649063400 | 2298010.0 | 25.7 | 119.52 | 31 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| 4229754489691870000 | 3054593.0 | 29.91 | 121.44 | 34 | Campaign 6 - special cashback offer for privilege membership | F | Campaign 1 - Specific personalized fashion-related campigns |
| 6392800660170700000 | 2234194.0 | 39.53 | 116.75 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 2183896859328040000 | 1849799.0 | 23.19 | 112.61 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -5055183777931850000 | 1598640.0 | 31.75 | 117.2 | 36 | Campaign 6 - special cashback offer for privilege membership | F | Campaign 1 - Specific personalized fashion-related campigns |
| -6388737433201960000 | 1788206.0 | 31.57 | 118.5 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -8340098378141150000 | 2008632.0 | 34.74 | 111.92 | 32 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| -3101169503069420000 | 52763.0 | 30.31 | 112.26 | 32 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| 5360495261858370000 | 1413283.0 | 22.68 | 113.85 | 40 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 6823400298846460000 | 1828143.0 | 36.69 | 117.05 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 7180704268982110000 | 1117038.0 | 31.39 | 118.37 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |

- 4. Deploy the application on EC2

  Installation of Docker in EC2

  Command to install docker on EC2: sudo amazon-linux-extras install docker

```
ec2-user@ip-172-31-25-107:~
login as: ec2-user
Authenticating with public key "adcampaignrecommender_putty"

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-25-107 ~]$ sudo amazon-linux-extras install docker
Installing docker
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
Cleaning repos: amzn2-core amzn2extra-docker amzn2extra-kernel-5.10
17 metadata files removed
6 sqlite files removed
0 metadata files removed
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
amzn2-core                                                                | 3.7 kB  00:00:00
amzn2extra-docker                                                         | 3.0 kB  00:00:00
amzn2extra-kernel-5.10                                                    | 3.0 kB  00:00:00
(1/7): amzn2-core/2/x86_64/group_gz                                       | 2.5 kB  00:00:00
(2/7): amzn2-core/2/x86_64/updateinfo                                     | 598 kB  00:00:00
(3/7): amzn2extra-docker/2/x86_64/primary_db                              | 106 kB  00:00:00
(4/7): amzn2extra-kernel-5.10/2/x86_64/updateinfo                         |  29 kB  00:00:00
(5/7): amzn2extra-docker/2/x86_64/updateinfo                              | 9.1 kB  00:00:00
(6/7): amzn2extra-kernel-5.10/2/x86_64/primary_db                         |  17 MB  00:00:00
(7/7): amzn2-core/2/x86_64/primary_db                                     |  71 MB  00:00:01
Resolving Dependencies
--> Running transaction check
---> Package docker.x86_64 0:20.10.23-1.amzn2.0.1 will be installed
--> Processing Dependency: runc >= 1.0.0 for package: docker-20.10.23-1.amzn2.0.1.x86_64
--> Processing Dependency: libcgroup >= 0.40.rc1-5.15 for package: docker-20.10.23-1.amzn2.0.1.x86_64
--> Processing Dependency: containerd >= 1.3.2 for package: docker-20.10.23-1.amzn2.0.1.x86_64
--> Processing Dependency: pigz for package: docker-20.10.23-1.amzn2.0.1.x86_64
--> Running transaction check
---> Package containerd.x86_64 0:1.6.19-1.amzn2.0.1 will be installed
---> Package libcgroup.x86_64 0:0.41-21.amzn2 will be installed
---> Package pigz.x86_64 0:2.3.4-1.amzn2.0.1 will be installed
---> Package runc.x86_64 0:1.1.4-1.amzn2.0.1 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

Installed:
  docker.x86_64 0:20.10.23-1.amzn2.0.1

Dependency Installed:
  containerd.x86_64 0:1.6.19-1.amzn2.0.1          libcgroup.x86_64 0:0.41-21.amzn2          pigz.x86_64 0:2.3.4-1.amzn2.0.1          runc.x86_64 0:1.1.4-1.amzn2.0.1

Complete!
  0  ansible2               available    \
       [ =2.4.2  =2.4.6  =2.8  =stable ]
  2  httpd_modules          available    [ =1.0  =stable ]
  3  memcached1.5           available    \
       [ =1.5.1  =1.5.16  =1.5.17 ]
```

- 4. Deploy the application on EC2

  Installation of Docker in EC2

  Command to start to docker service on EC2: sudo service docker start

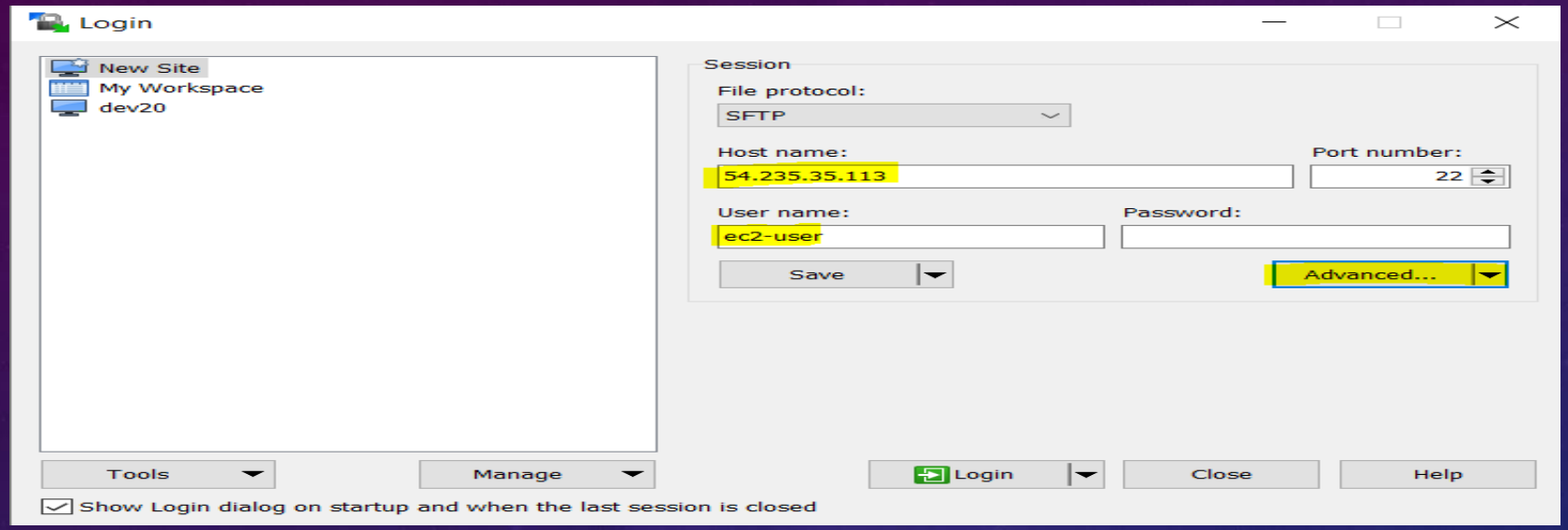
```
[ec2-user@ip-172-31-25-107 ~]$ sudo service docker start
Redirecting to /bin/systemctl start docker.service
[ec2-user@ip-172-31-25-107 ~]$
```

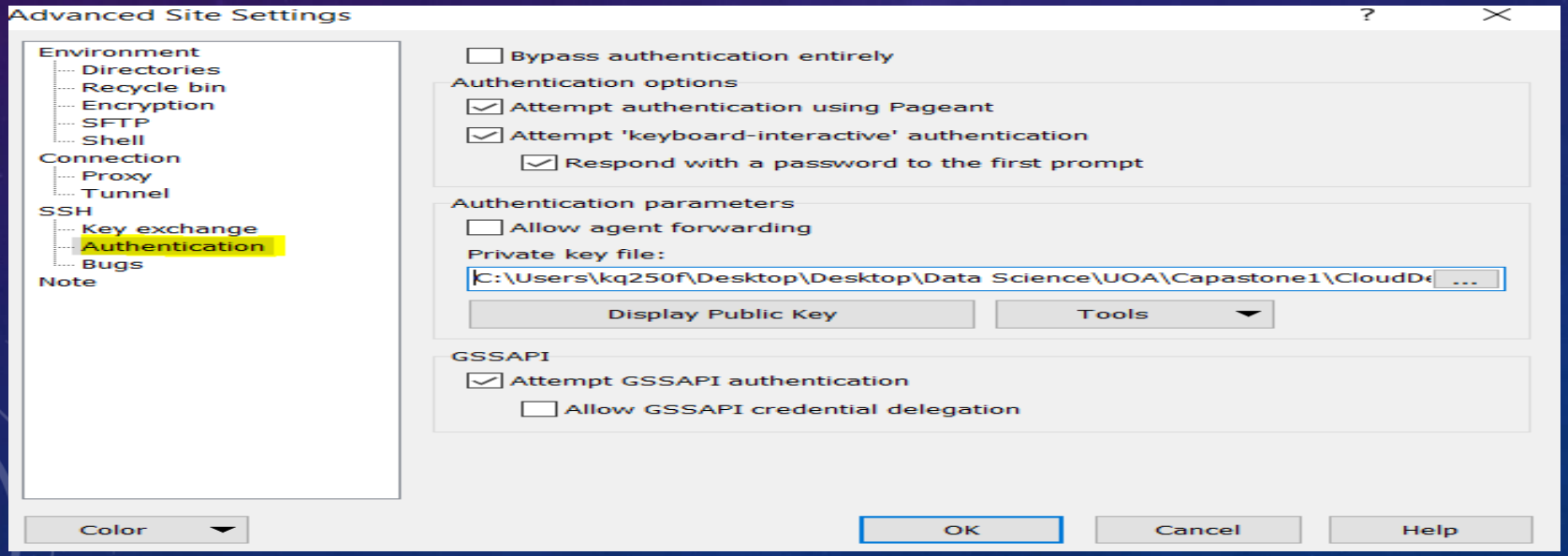
  Command to change the user permissions on EC2: sudo usermod -a -G docker ec2-user

```
[ec2-user@ip-172-31-25-107 ~]$ sudo usermod -a -G docker ec2-user
[ec2-user@ip-172-31-25-107 ~]$
```

- 4. Deploy the application on EC2

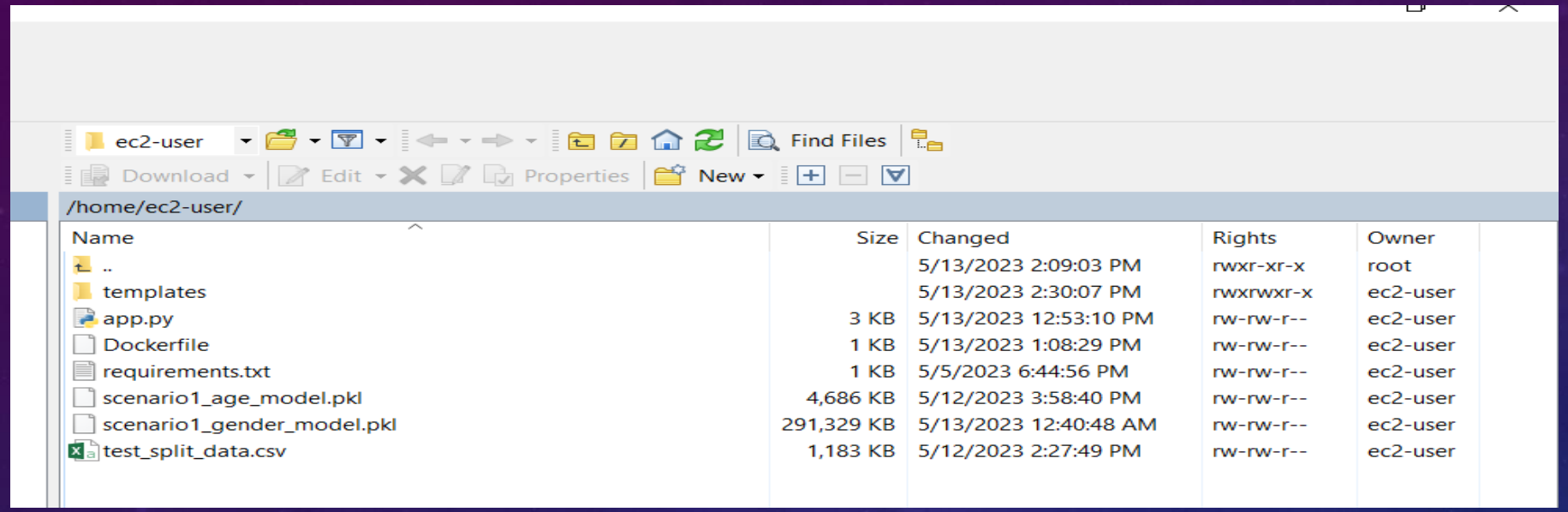
  Login to win-scp so that we can deploy all the files into EC2 instance



- 4. Deploy the application on EC2

  All the files has been deployed to EC2 instance location




| Name | Size | Changed | Rights | Owner |
|---|---|---|---|---|
| .. | | 5/13/2023 2:09:03 PM | rwxr-xr-x | root |
| templates | | 5/13/2023 2:30:07 PM | rwxrwxr-x | ec2-user |
| app.py | 3 KB | 5/13/2023 12:53:10 PM | rw-rw-r-- | ec2-user |
| Dockerfile | 1 KB | 5/13/2023 1:08:29 PM | rw-rw-r-- | ec2-user |
| requirements.txt | 1 KB | 5/5/2023 6:44:56 PM | rw-rw-r-- | ec2-user |
| scenario1_age_model.pkl | 4,686 KB | 5/12/2023 3:58:40 PM | rw-rw-r-- | ec2-user |
| scenario1_gender_model.pkl | 291,329 KB | 5/13/2023 12:40:48 AM | rw-rw-r-- | ec2-user |
| test_split_data.csv | 1,183 KB | 5/12/2023 2:27:49 PM | rw-rw-r-- | ec2-user |

Command to check all the installed files and Folders : ls

```
[ec2-user@ip-172-31-25-107 ~]$ ls
app.py  Dockerfile  requirements.txt  scenario1_age_model.pkl  scenario1_gender_model.pkl  templates  test_split_data.csv
[ec2-user@ip-172-31-25-107 ~]$
```

- 4. Deploy the application on EC2

  Build and run the docker

Command to change the permission so that we can build and run docker : sudo chmod 666 /var/run/docker.sock

```
[ec2-user@ip-172-31-25-107 ~]$ sudo chmod 666 /var/run/docker.sock
[ec2-user@ip-172-31-25-107 ~]$
```

Command to build dockerfile to create image : docker build -t adcampaignrecommendersystem .

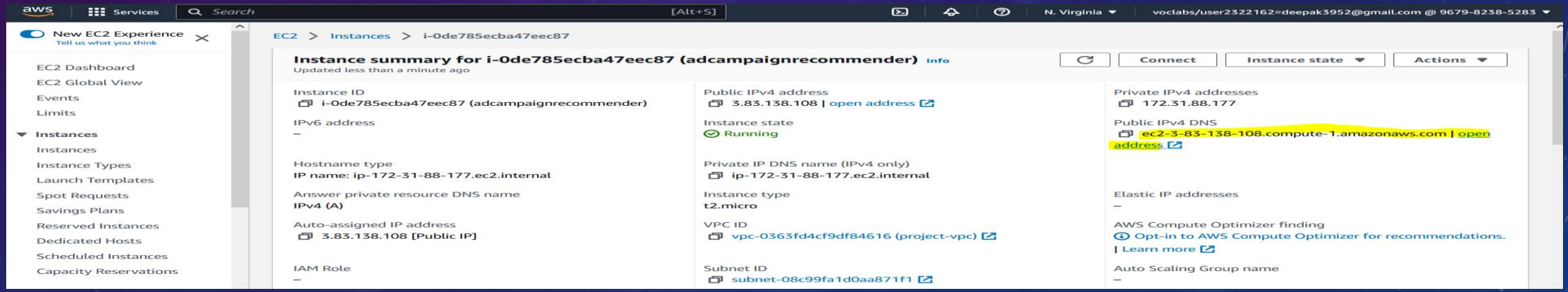
```
[ec2-user@ip-172-31-25-107 ~]$ docker build -t adcampaignrecommendersystem .
Sending build context to Docker daemon  309.5MB
Step 1/12 : FROM python:3.7-slim
3.7-slim: Pulling from library/python
9e3ea8720c6d: Pull complete
fe9f5cfcf49b: Pull complete
1db94969ba78: Pull complete
40c7c86228f6: Pull complete
681a9cca6b22: Pull complete
Digest: sha256:11ef837910463d30937d9a9248ab38cfcad3f68ebeb2f6d7c0ea3d07f4d80837
Status: Downloaded newer image for python:3.7-slim
 ---> 46bea07535e6
Step 2/12 : COPY requirements.txt .
 ---> 6963edf60f18
Step 3/12 : RUN pip3 install --no-cache-dir -r requirements.txt
 ---> Running in ea5759b9871d
Collecting Flask==2.2.3
  Downloading Flask-2.2.3-py3-none-any.whl (101 kB)
     ---------------------------------------- 101.8/101.8 KB 50.2 MB/s eta 0:00:00
Collecting gunicorn==20.1.0
  Downloading gunicorn-20.1.0-py3-none-any.whl (79 kB)
     ---------------------------------------- 79.5/79.5 KB 139.4 MB/s eta 0:00:00
Collecting itsdangerous==2.1.2
  Downloading itsdangerous-2.1.2-py3-none-any.whl (15 kB)
Collecting Jinja2==3.1.2
  Downloading Jinja2-3.1.2-py3-none-any.whl (133 kB)
     ---------------------------------------- 133.1/133.1 KB 144.4 MB/s eta 0:00:00
Step 11/12 : CMD ["app.py"]
 ---> Running in 0a66feec79f1
Removing intermediate container 0a66feec79f1
 ---> 53ea0e5450e7
Step 12/12 : EXPOSE 5000
 ---> Running in 43c8f2191729
Removing intermediate container 43c8f2191729
 ---> 11375794fa57
Successfully built 11375794fa57
Successfully tagged adcampaignrecommendersystem:latest
```

- 4. Deploy the application on EC2

  Build and run the docker

Command to run image to create container : docker run -p 5000:5000 adcampaignrecommendersystem

```
[ec2-user@ip-172-31-25-107 ~]$ docker run -p 5000:5000 adcampaignrecommendersystem
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on all addresses (0.0.0.0)
 * Running on http://127.0.0.1:5000
 * Running on http://172.17.0.2:5000
Press CTRL+C to quit
 * Restarting with stat
```



- 4. Deploy the application on EC2

  Access the application by clicking on the link : https://ec2-3-83-138-108.compute-1.amazonaws.com:5000/

# Age and Gender Predictions with based Campaigns

| Device ID | Event ID | Latitude | Longitude | Predicted Age | Age prediction-based campaigns | Predicted Gender | Gender prediction-based campaigns |
|---|---|---|---|---|---|---|---|
| 7675128010590890000 | 1304689.0 | 33.03 | 107.03 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -4399430572105930000 | 2310014.0 | 40.65 | 109.81 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -418348079937261000 | 1490912.0 | 30.61 | 104.07 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 9040442370764310000 | 1260710.0 | 47.34 | 124.03 | 36 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 3964358227080490000 | 35445.0 | 22.61 | 114.05 | 37 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 4379446096845460000 | 122842.0 | 27.57 | 112.02 | 32 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| 2487889042105920000 | 644272.0 | 30.56 | 104.03 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -3487847400917500000 | 561115.0 | 30.65 | 104.07 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 3172382863188910000 | 1726676.0 | 35.28 | 116.37 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 9189971684508340000 | 91474.0 | 30.32 | 121.24 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 3267329311080270000 | 2073463.0 | 36.65 | 116.87 | 35 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 6055738551289950000 | 1854642.0 | 30.42 | 114.43 | 32 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| -3419759584302760000 | 2259259.0 | 21.44 | 110.8 | 31 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| 2697766335073060000 | 1611163.0 | 38.17 | 114.42 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 9215085115859650000 | 1633413.0 | 41.81 | 123.46 | 38 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 182836445212489000 | 2669285.0 | 22.69 | 114.33 | 36 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -9073778680072750000 | 1436432.0 | 38.69 | 116.12 | 33 | Campaign 6 - special cashback offer for privilege membership | F | Campaign 1 - Specific personalized fashion-related campigns |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8899746358831790000 | 957948.0 | 23.37 | 116.14 | 42 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -8105377562412080000 | 2067596.0 | 32.39 | 119.51 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -459801630418552000 | 1985516.0 | 33.87 | 113.06 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -8821315644463020000 | 2364192.0 | 30.54 | 114.36 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -8340098378141150000 | 734190.0 | 34.74 | 111.92 | 31 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| -7286531410224850000 | 3159851.0 | 27.95 | 120.59 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 7663282489891260000 | 289416.0 | 41.57 | 120.43 | 33 | Campaign 6 - special cashback offer for privilege membership | F | Campaign 1 - Specific personalized fashion-related campigns |
| -6298312208561880000 | 3005881.0 | 38.29 | 117.76 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -4537233125614570000 | 2746062.0 | 30.0 | 104.0 | 32 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| -5980426926053440000 | 2492436.0 | 30.99 | 112.19 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -48202548844017600 | 2418769.0 | 28.3 | 105.24 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -8378704684140680000 | 2586804.0 | 35.49 | 112.81 | 31 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| -530118827921543000 | 140510.0 | 28.01 | 120.68 | 31 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| -2119398048597980000 | 1602167.0 | 22.65 | 113.92 | 38 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 4782582047729160000 | 1057225.0 | 38.03 | 114.47 | 35 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 686193243445452000 | 2711969.0 | 39.84 | 116.51 | 34 | Campaign 6 - special cashback offer for privilege membership | F | Campaign 1 - Specific personalized fashion-related campigns |
| -3823669716019050000 | 1621904.0 | 31.29 | 118.06 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 1012083477965010000 | 2871087.0 | 38.85 | 117.49 | 35 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -1554280910202910000 | 2945089.0 | 39.77 | 116.33 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -5495972136393800000 | 2382695.0 | 28.2 | 113.01 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -3103801178962410000 | 1211872.0 | 32.1 | 112.18 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 7614557487151820000 | 10499.0 | 29.28 | 106.28 | 32 | Campaign 5 - special offers for payment wallet | M | Campaign 3- Personalized call/data packs |
| -46084292613266800000 | 2420753.0 | 32.64 | 116.99 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 422934499231136000 | 2814073.0 | 36.85 | 111.78 | 35 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -7712291651357470000 | 1678252.0 | 34.11 | 108.58 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 5038733072524900 | 2310560.0 | 30.07 | 105.56 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -6125804697859060000 | 2842662.0 | 23.39 | 116.7 | 39 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -6243392779260070000 | 2559828.0 | 40.01 | 116.46 | 35 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -1147020914112370000 | 1335271.0 | 32.64 | 117.0 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| 2487889042105920000 | 1660455.0 | 30.59 | 104.11 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -6242501228649110000 | 1464842.0 | 27.85 | 111.21 | 33 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -7380388042901450000 | 361396.0 | 40.05 | 116.32 | 34 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |
| -1319995297521480000 | 2142754.0 | 29.87 | 121.63 | 37 | Campaign 6 - special cashback offer for privilege membership | M | Campaign 3- Personalized call/data packs |

Able to successfully develop the entire capstone1 for Ad campaign Recommender System from scratch and deployed it into EC2 instance.