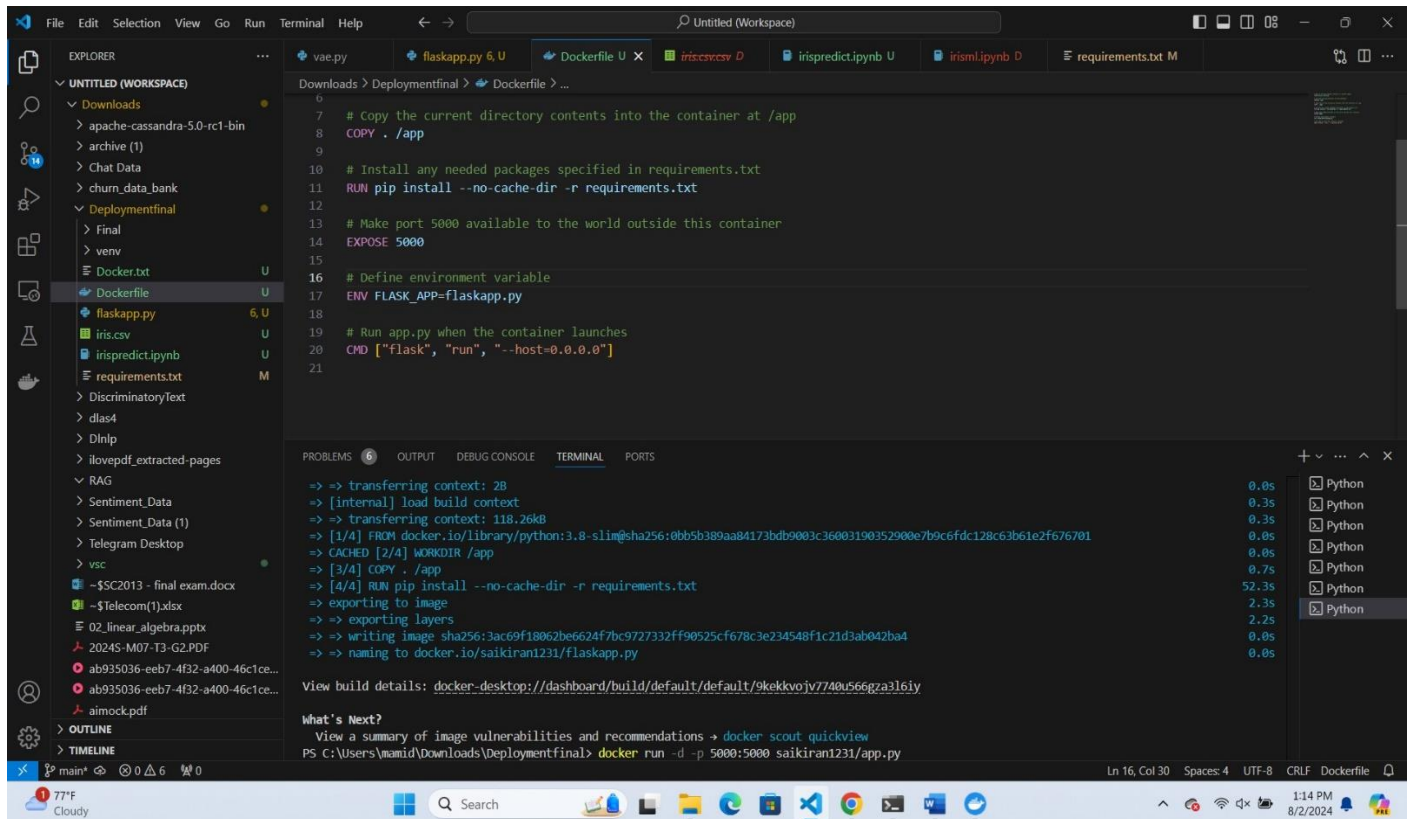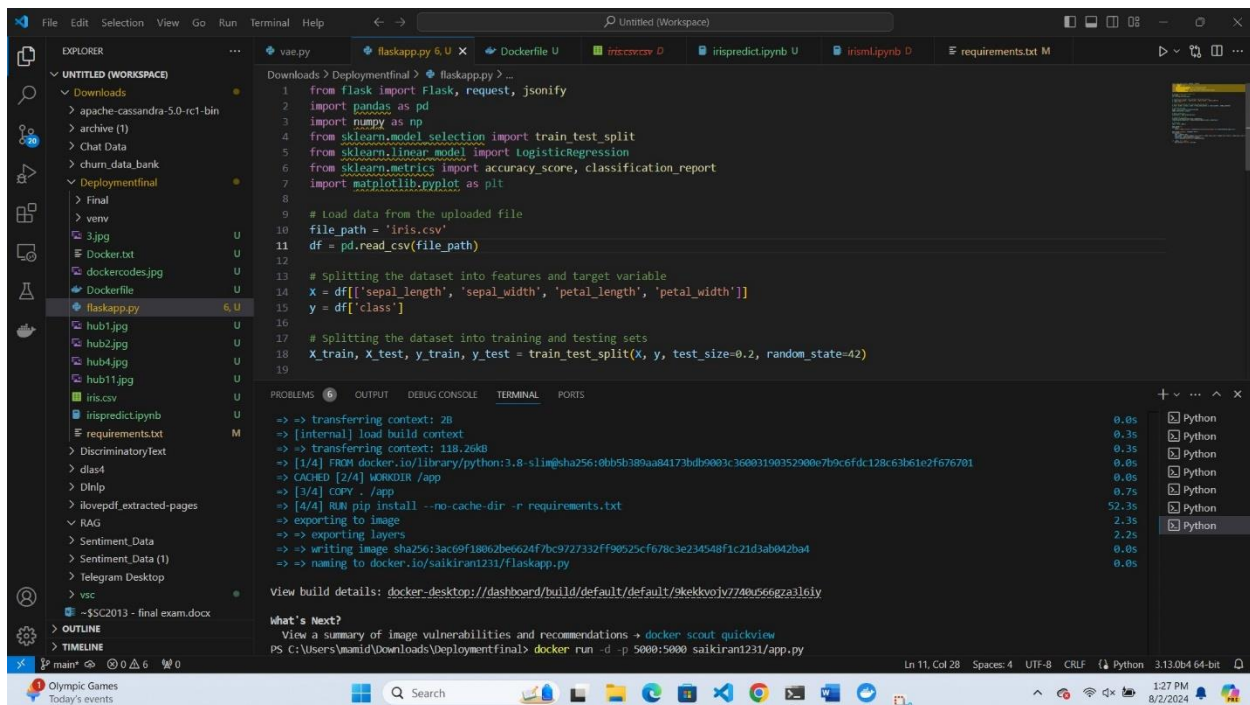Github url: https://github.com/MSK-hash/Final.git

Saikiran_Mamidala-500209412

Provide the Docker commands used along with screenshots:

docker build -t saikiran1231/app.py .

docker run -d -p 5000:5000 saikiran1231/app.py

This Python script is a Flask web application that loads a machine learning model to classify iris flowers based on their features. The application provides two main functionalities:

1. Displaying the model's accuracy and classification report.

2. Predicting the class of an iris flower based on user-provided features.

**Detailed Explanation**

1. **Import Libraries**:

   o The script imports necessary libraries for data manipulation (pandas), numerical operations (numpy), machine learning (sklearn), visualization (matplotlib), and web development (flask).

2. **Load Dataset**:

   o The Iris dataset is loaded from a file named iris.csv using pandas.

3. **Data Preparation**:

   o The dataset is split into features (X) and the target variable (y).

   o The features include sepal_length, sepal_width, petal_length, and petal_width.

   o The target variable is the class of the iris flower.

4. **Split Data**:

   o   The dataset is divided into training and testing sets using train_test_split from sklearn. This ensures that the model can be trained and evaluated on separate data.

5. **Train Model**:

   o   A Logistic Regression model is instantiated and trained on the training data (X_train, y_train).

6. **Make Predictions**:

   o   The trained model is used to make predictions on the test data (X_test).

7. **Evaluate Model**:

   o   The accuracy of the model is calculated using accuracy_score.

   o   A detailed classification report is generated using classification_report.

8. **Flask Web Application**:

   o   The Flask app is initialized and configured to run on host 0.0.0.0 and port 80.

9. **Home Route (/)**:

   o   The home route (/) returns the model's accuracy and classification report in HTML format.

10. **Prediction Route (/predict)**:

   o   The prediction route (/predict) accepts POST requests with JSON data containing the features of an iris flower.

   o   It extracts the features from the JSON data, reshapes them into the required format, and uses the trained model to predict the class of the iris flower.

   o   The predicted class is returned as a JSON response.

Screenshots of your application running in the container:

1. **Dockerfile**:
   - The Dockerfile defines the instructions to build the Docker image, including the base image (Python 3.9-slim), setting the working directory, copying the application files, installing dependencies, and exposing the necessary port.
2. **Building the Docker Image**:
   - The Docker image is built using the command docker build -t iris-classifier ., which packages the application and its dependencies into an image.
3. **Running the Docker Container**:
   - The application is run inside a Docker container using the command docker run -p 4000:80 iris-classifier. This maps port 80 inside the container to port 4000 on the host machine, allowing access to the application via http://localhost:4000.
4. **Accessing the Application**:
   - Once the container is running, users can access the application in their web browser. The home page displays the model's accuracy and classification report. Additionally, the /predict endpoint can be used to make predictions by sending POST requests with iris flower features.

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Search

Delete   Space to be reclaimed   **379.94 MB**

| | Name | Tag | Status | Created | Size | Actions |
|---|---|---|---|---|---|---|
| ☑ | saikiran1231/flaskapp.py<br>3ac69f18062b | latest | In use | 9 minutes ago | 521.44 MB | ▶ ⋮ 🗑 |
| ☐ | saikiran1231/app.py<br>4969e9a03329 | latest | In use | 13 minutes ago | 521.44 MB | ▶ ⋮ 🗑 |
| ☐ | airflow<br>a4c0f359076c | latest | In use | 3 months ago | 1.52 GB | ▶ ⋮ 🗑 |
| ☐ | sleek-airflow1<br>a4c0f359076c | latest | In use | 3 months ago | 1.52 GB | ▶ ⋮ 🗑 |
| ☐ | sleek-airflow<br>a4c0f359076c | latest | In use | 3 months ago | 1.52 GB | ▶ ⋮ 🗑 |
| ☐ | sleek-ariflow2<br>a4c0f359076c | latest | In use | 3 months ago | 1.52 GB | ▶ ⋮ 🗑 |

Selected 1 of 6

Engine running   RAM 2.35 GB   CPU 2.51%   Signed in   New version available   4

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## Docker Desktop — Container: loving_rhodes

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**loving_rhodes**

saikiran1231/flaskapp.py:latest
20bbafcbd013

STATUS
Running (2 seconds ago)

⏹ ▶ ↻ 🗑

Logs   Inspect   Bind mounts   Exec   **Files**   Stats

Open file editor

| Name ↑ | Note | Size | Last modified | Mode |
|---|---|---|---|---|
| 📄 .dockerenv | | 0 Bytes | 15 seconds ago | -rwxr-xr-x |
| › 📁 app | MODIFIED | | 14 seconds ago | drwxr-xr-x |
| 📄 bin -> usr/bin | | 7 Bytes | 12 days ago | Lrwxrwxrwx |
| › 📁 boot | | | 4 months ago | drwxr-xr-x |
| › 📁 dev | | | 4 seconds ago | drwxr-xr-x |
| › 📁 etc | | | 15 seconds ago | drwxr-xr-x |
| › 📁 home | | | 4 months ago | drwxr-xr-x |
| 📄 lib -> usr/lib | | 7 Bytes | 12 days ago | Lrwxrwxrwx |
| 📄 lib64 -> usr/lib64 | | 9 Bytes | 12 days ago | Lrwxrwxrwx |
| › 📁 media | | | 12 days ago | drwxr-xr-x |
| › 📁 mnt | | | 12 days ago | drwxr-xr-x |
| › 📁 opt | | | 12 days ago | drwxr-xr-x |
| › 📁 proc | | | 4 seconds ago | dr-xr-xr-x |
| › 📁 root | MODIFIED | | 13 seconds ago | drwx------ |
| › 📁 run | | | 12 days ago | drwxr-xr-x |
| 📄 sbin -> usr/sbin | | 8 Bytes | 12 days ago | Lrwxrwxrwx |
| › 📁 srv | | | 12 days ago | drwxr-xr-x |

Engine running   RAM 2.91 GB   CPU 33.29%   Signed in   New version available   5

77°F Cloudy   Search   1:17 PM 8/2/2024

# loving_rhodes

saikiran1231/flaskapp.py:latest

20bbafcbd013

**STATUS**
Exited (1) (16 seconds ago)

Logs    Inspect    Bind mounts    Exec    Files    Stats

Raw JSON

Platform    Cmd    State    Image    PortBindings    Runtime    Mounts    Volumes    Env    Labels    Networks

```
 1  {
 2      "Id": "20bbafcbd0138abd0f858e6e58522ba536d1b2ad1143999050606e88c29e56a0",
 3      "Created": "2024-08-02T17:17:36.588734274Z",
 4      "Path": "flask",
 5      "Args": [
 6          "run",
 7          "--host=0.0.0.0"
 8      ],
 9      "State": {
10          "Status": "exited",
11          "Running": false,
12          "Paused": false,
13          "Restarting": false,
14          "OOMKilled": false,
15          "Dead": false,
16          "Pid": 0,
17          "ExitCode": 1,
18          "Error": "",
19          "StartedAt": "2024-08-02T17:17:47.972114543Z",
20          "FinishedAt": "2024-08-02T17:17:53.060702068Z"
21      },
22      "Image": "sha256:3ac69f18062be6624f7bc9727332ff90525cf678c3e234548f1c21d3ab042ba4",
23      "ResolvConfPath": "/var/lib/docker/containers/20bbafcbd0138abd0f858e6e58522ba536d1b2ad1143999050606e88c29e56a0/resolv.conf",
24      "HostnamePath": "/var/lib/docker/containers/20bbafcbd0138abd0f858e6e58522ba536d1b2ad1143999050606e88c29e56a0/hostname",
25      "HostsPath": "/var/lib/docker/containers/20bbafcbd0138abd0f858e6e58522ba536d1b2ad1143999050606e88c29e56a0/hosts",
26      "LogPath": "/var/lib/docker/containers/20bbafcbd0138abd0f858e6e58522ba536d1b2ad1143999050606e88c29e56a0/20bbafcbd0138abd0f858e6e58522ba536d
27      "Name": "/loving_rhodes",
28      "RestartCount": 0,
29      "Driver": "overlay2",
```

Docker in Hub:

**Pull the Docker Image from Docker Hub**

First, ensure that you have Docker installed on your machine. Then, pull your Docker image from Docker Hub

**Run the Docker Container**

Run a container from the pulled Docker image

By containerizing the application with Docker, we ensure a reliable and reproducible deployment process, making it easier to manage and scale the application in different environments, including local development, staging, and production.
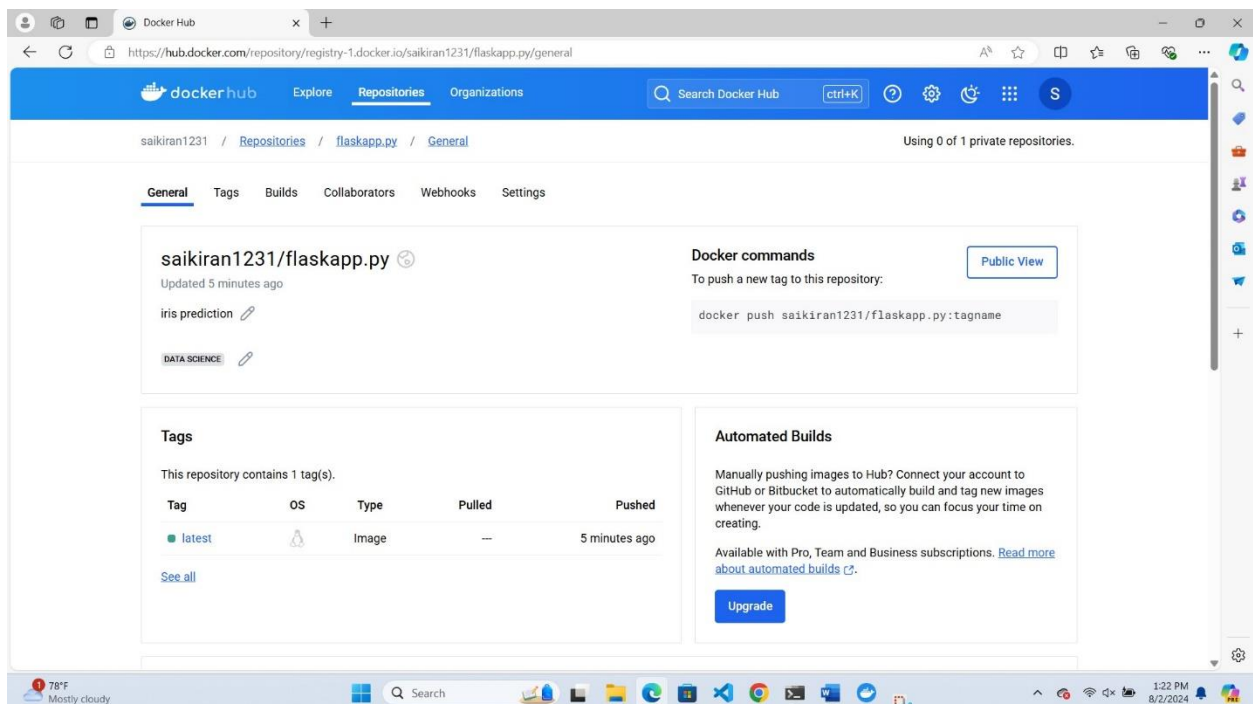
dockerhub    Explore    Repositories    Organizations          Q  Search Docker Hub    ctrl+K    ⑦  ⚙  ☾  ⠿    S

saikiran1231  /  Repositories  /  flaskapp.py  /  latest

### saikiran1231/flaskapp.py:latest

`DATA SCIENCE`

MANIFEST DIGEST  sha256:1fd465a8e3e02d79e5734a192904eb7bc554da2d6bc8b42a3b0b8afafc91f417  ⎘

Delete Tag

| OS/ARCH | COMPRESSED SIZE ⓘ | LAST PUSHED | TYPE | MANIFEST DIGEST |
|---|---|---|---|---|
| linux/amd64 | 164.6 MB | 6 minutes ago by saikiran1231 | Image | sha256:1fd465a8... ⎘ |

**Image Layers**    Vulnerabilities

**Image Layers** ⓘ

| | |
|---|---|
| 1 ADD file ... in / | 27.78 MB |
| 2 CMD ["bash"] | 0 B |
| 3 ENV PATH=/usr/local/bin:/usr/local/sbin:/usr/local/... | 0 B |
| 4 ENV LANG=C.UTF-8 | 0 B |
| 5 RUN /bin/sh -c set -eux; | 3.35 MB |

**Command**

```
ADD file:6c4730e7b12278bc7eb83b3b9d659437c92c42fc7ee70922ae8c4bebfb56a602 in /
```

78°F
Mostly cloudy

Q Search

1:23 PM
8/2/2024

https://hub.docker.com/repository/registry-1.docker.io/saikiran1231/flaskapp.py/tags

**docker** hub    Explore    Repositories    Organizations

Search Docker Hub    ctrl+K

saikiran1231 / Repositories / flaskapp.py / Tags

Using 0 of 1 private repositories.

General    Tags    Builds    Collaborators    Webhooks    Settings

Sort by    Newest ∨    Filter Tags    Delete

TAG
● latest
Last pushed 5 minutes ago by saikiran1231

```
docker pull saikiran1231/flaskapp.py:latest    Copy
```

| Digest | OS/ARCH | Last pull | Compressed Size ⓘ |
|---|---|---|---|
| 1fd465a8e3e0 | linux/amd64 | --- | 164.6 MB |

https://hub.docker.com/repository/registry-1.docker.io/saikiran1231/flaskapp.py/tags

77°F Cloudy    Q Search    1:21 PM 8/2/2024

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saikiran1231 ▾    Q Search

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| | Tags | OS | Vulnerabilities | Last pushed | Size |
|---|---|---|---|---|---|
| 🌐 saikiran1231/flaskapp.py | latest | 🐧 | 🚫 Inactive | 4 minutes ago | 172.59 MB |

Repositories per page    5 ▾    1–1 of 1  < >

Engine running    RAM 2.29 GB  CPU 0.00%    Signed in    ⓘ New version available    🔔 5

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**loving_rhodes**

< saikiran1231/flaskapp.py:latest

20bbafcbd013

STATUS
Exited (1) (16 seconds ago)

Logs    Inspect    Bind mounts    Exec    Files    Stats

Raw JSON

Platform | Cmd | State | Image | PortBindings | Runtime | Mounts | Volumes | Env | Labels | Networks

```
1  {
2      "Id": "20bbafcbd0138abd0f858e6e58522ba536d1b2ad1143999050606e88c29e56a0",
3      "Created": "2024-08-02T17:17:36.5887342742",
4      "Path": "flask",
5      "Args": [
6          "run",
7          "--host=0.0.0.0"
8      ],
9      "State": {
10         "Status": "exited",
11         "Running": false,
12         "Paused": false,
13         "Restarting": false,
14         "OOMKilled": false,
15         "Dead": false,
16         "Pid": 0,
17         "ExitCode": 1,
18         "Error": "",
19         "StartedAt": "2024-08-02T17:17:47.972114543Z",
20         "FinishedAt": "2024-08-02T17:17:53.060702068Z"
21     },
22     "Image": "sha256:3ac69f18062be6624f7bc9727332ff90525cf678c3e234548f1c21d3ab042ba4",
23     "ResolvConfPath": "/var/lib/docker/containers/20bbafcbd0138abd0f858e6e58522ba536d1b2ad1143999050606e88c29e56a0/resolv.conf",
24     "HostnamePath": "/var/lib/docker/containers/20bbafcbd0138abd0f858e6e58522ba536d1b2ad1143999050606e88c29e56a0/hostname",
25     "HostsPath": "/var/lib/docker/containers/20bbafcbd0138abd0f858e6e58522ba536d1b2ad1143999050606e88c29e56a0/hosts",
26     "LogPath": "/var/lib/docker/containers/20bbafcbd0138abd0f858e6e58522ba536d1b2ad1143999050606e88c29e56a0/20bbafcbd0138abd0f858e6e58522ba536d
27     "Name": "/loving_rhodes",
28     "RestartCount": 0,
29     "Driver": "overlay2",
```

Engine running  [►] [❚❚] [⏻] [ ]    RAM 2.29 GB   CPU 0.13%   Signed in

(i) New version available  🔔 5

77°F
Cloudy

Q Search

1:18 PM
8/2/2024

colab.research.google.com/drive/1vEdIvWQ5mfNMnIDBJ12xG_0FpDE9ZElh

irispredict.ipynb
File  Edit  View  Insert  Runtime  Tools  Help  Last saved at 1:28 PM

+ Code  + Text

Comment    Share

Connect    + Gemini

| | | | |
|---|---|---|---|
| Iris-versicolor | 1.00 | 1.00 | 1.00 | 9 |
| Iris-virginica | 1.00 | 1.00 | 1.00 | 11 |
| accuracy | | | 1.00 | 30 |
| macro avg | 1.00 | 1.00 | 1.00 | 30 |
| weighted avg | 1.00 | 1.00 | 1.00 | 30 |

**Confusion Matrix**



```
Enter the features of the iris flower:
Sepal Length: 2
Sepal Width: 3
Petal Length: 23
Petal Width: 2
The predicted species is: Iris-virginica
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:465: UserWarning: X does not have valid feature names, but LogisticRegression was fitted with feature names
  warnings.warn(
```

[ ]  Start coding or generate with AI.

[ ]  Start coding or generate with AI.