Deployment Guide for FastAPI App using Docker and Azure

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1. Setup and Prepare the Environment

1. Create a project directory:

```
bash
Copy code
mkdir ImagoAI
cd ImagoAI
mkdir deploy
cd deploy
```

2. Create a virtual environment and activate it:

- Windows:

```
bash
Copy code
python -m venv venv
.\venv\Scripts\activate
```

- MacOS/Linux:

```
bash
Copy code
python -m venv venv
source venv/bin/activate
```

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2. Create the Application Code

1. **Create main.py**
   Create a `main.py` file and add the following code:

```
python
Copy code
import numpy as np
import pickle
import os
from fastapi import FastAPI, HTTPException
from pydantic import BaseModel
from tensorflow.keras.models import load_model
from sklearn.preprocessing import StandardScaler

app = FastAPI()

class InputData(BaseModel):
    features: list[float]

@app.post("/predict/")
async def predict(input_data: InputData):
    new_input = np.array(input_data.features).reshape(1, -1)
```

```
    new_input_scaled = scaler.transform(new_input)
    prediction = model.predict(new_input_scaled)
    return {"predicted_target": float(prediction[0, 0])}

if __name__ == "__main__":
    import uvicorn
    uvicorn.run("main:app", host="0.0.0.0", port=8000)
```

2. **Create requirements.txt**
   Create a `requirements.txt` file with the following:

```
makefile
Copy code
numpy==1.26.4
scikit-learn==1.6.1
tensorflow==2.18.0
fastapi==0.115.11
uvicorn==0.29.0
python-multipart
```

3. **Create Dockerfile**
   Create a `Dockerfile` with the following:

```
Dockerfile
Copy code
FROM python:3.11-slim
WORKDIR /app
COPY requirements.txt .
RUN pip install --no-cache-dir -r requirements.txt
COPY . .
EXPOSE 8000
CMD ["uvicorn", "main:app", "--host", "0.0.0.0", "--port", "8000"]
```

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3. Build and Run the Docker Container

1. **Build Docker Image**

```
bash
Copy code
docker build -t imagoai-app .
```

2. **Run Docker Container**

```
bash
Copy code
docker run -d -p 8000:8000 imagoai-app
```

3. **Check Running Container**

```
bash
Copy code
docker ps
```

4. **Test Application**
   Open your browser and test the FastAPI app:
   `http://localhost:8000/docs`

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4. Push Docker Image to Docker Hub

1. **Login to Docker Hub**

```
bash
Copy code
docker login
```

2. **Tag Docker Image**

```
bash
Copy code
docker tag imagoai-app kpshukla3/imagoai-app:latest
```

3. **Push Docker Image**

```
bash
Copy code
docker push kpshukla3/imagoai-app:latest
```

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5. Deploy to Azure

1. **Login to Azure**

```
bash
Copy code
az login
```

2. **Create Resource Group**

```
bash
Copy code
az group create --name imagoai-group --location "West Europe"
```

3. **Create Azure Web App**

```
bash
Copy code
az webapp create --resource-group imagoai-group --plan imagoai-plan --name
imagoai-app --deployment-container-image-name kpshukla3/imagoai-app:latest
```

4. **Configure Environment Variables**

```
bash
Copy code
```

```
az webapp config appsettings set --resource-group imagoai-group --name
imagoai-app --settings WEBSITES_PORT=8000
```

5. **Start the App**

```
bash
Copy code
az webapp restart --name imagoai-app --resource-group imagoai-group
```

6. **Get App URL**

```
bash
Copy code
az webapp show --name imagoai-app --resource-group imagoai-group --query
"defaultHostName" -o tsv
```

Test the app at: `https://imagoai-app.azurewebsites.net/docs`