Iris Model Deployment

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Project Overview

This project focuses on building and deploying a Flask model for a toy dataset. Key steps include data loading, exploratory data analysis (EDA), model training, saving, and web deployment. The chosen dataset for this project is Iris dataset and model is build to determine which specie of the flower given features.

1. Loading the Dataset

The Iris dataset from scikit-learn was downloaded for data determination and model training.

```
[22]: # importing libraries
    from sklearn.datasets import load_iris
    from sklearn.model_selection import train_test_split
    from sklearn.ensemble import RandomForestClassifier
    from sklearn.metrics import accuracy_score
    import pickle

[23]: # 1. Loading the dataset
    data = load_iris()
    X = data.data # Feature variables
    y = data.target # Target variable
```

2. Exploratory Data Analysis (EDA)

Basic statistical analysis were performed to understand the data structure.

```
[24]: # 2. Exploratory Data Analysis (EDA)

# For simplicity, we'll print dataset shape and a few sample records
print("Dataset Shape:", X.shape)
print("Sample Records:", X[:5])

Dataset Shape: (150, 4)
Sample Records: [[5.1 3.5 1.4 0.2]
[4.9 3. 1.4 0.2]
[4.7 3.2 1.3 0.2]
[4.6 3.1 1.5 0.2]
[5. 3.6 1.4 0.2]]
```

3. Model Building

A machine learning model was developed to classify iris species based on petal and sepal measurements. The accuracy of the model was also tested to verify the accuracy.

```
[25]: # Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
# Initialize the model
model = RandomForestClassifier(n_estimators=100, random_state=42)
model.fit(X_train, y_train)
# Evaluate the model
y_pred = model.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)
print(f"Model Accuracy: {accuracy:.2f}")
Model Accuracy: 1.00
```

4. Saving The Model

The trained model was saved using pickle library.

```
[26]: with open("iris_model.pkl", "wb") as file:
    pickle.dump(model, file)
print("Model saved as iris_model.pkl")

Model saved as iris_model.pkl
```

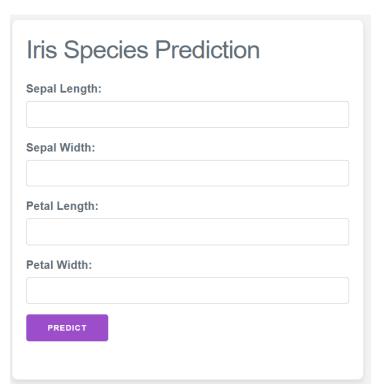
5. Deploying the Model Using Flask

The Flask application was created along with an HTML interface to input features and display model predictions.

The app.py code:

```
from flask import Flask, request, render_template
import numpy as np
app = Flask(__name__)
# Load the model
with open("iris_model.pkl", "rb") as file:
    model = pickle.load(file)
@app.route("/")
def home():
    return render_template("index.html")
@app.route("/predict", methods=["POST"])
def predict():
         features = [float(request.form[feature]) for feature in ["sepal_length", "sepal_width", "petal_length", "petal_width"]]
         input_features = np.array(features).reshape(1, -1)
         prediction = model.predict(input_features)[0]
        # Map prediction to species name
species_map = {0: "Setosa", 1: "Versicolor", 2: "Virginica"}
prediction_text = f"The predicted iris species is {species_map[prediction]}."
        return render_template("index.html", prediction_text=prediction_text)
    except Exception as e:
        return render_template("index.html", prediction_text=f"Error in processing prediction: {e}")
   __name__ == "__main__":
    app.run(debug=True, port=5002)
```

The HTML interface:



6. Testing

