

Iris Flower Classification Project

This project uses the famous Iris dataset to build a classification model that predicts the species of an iris flower based on its sepal and petal dimensions. The model is built using logistic regression from scikit-learn and evaluated with accuracy, confusion matrix, and classification report.

1. Import Required Libraries

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

from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import classification_report, confusion_matrix, accuracy_score
```

2. Load the Dataset

```
iris = load_iris()
X = pd.DataFrame(iris.data, columns=iris.feature_names)
y = pd.Series(iris.target, name="species")

species_map = dict(zip(range(3), iris.target_names))
y = y.map(species_map)
```

3. Exploratory Data Analysis (EDA)

```
# Combine features and target for visualization
df = pd.concat([X, y], axis=1)

# Pairplot
sns.pairplot(df, hue="species")
plt.show()

# Correlation heatmap
plt.figure(figsize=(8, 5))
sns.heatmap(X.corr(), annot=True, cmap='coolwarm')
plt.show()
```

4. Split the Dataset

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

scaler = StandardScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)
```

5. Train Logistic Regression Model

```
model = LogisticRegression()
model.fit(X_train_scaled, y_train)
y_pred = model.predict(X_test_scaled)
```

6. Evaluate the Model

```
print(confusion_matrix(y_test, y_pred))
print(classification_report(y_test, y_pred))
print("Accuracy Score:", accuracy_score(y_test, y_pred))
```

