Machine Learning
Assignment 7
Aakanksha Darekar
202200733
A1   09

Implement the Random Forest algorithm using the Iris dataset

Code:

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix

# Load the dataset
df = pd.read_csv("C:/Users/admin/OneDrive/Desktop/6SEM/ML/Iris.csv")  # Make sure the file name is
correct

# Drop the 'Sno' column
df.drop('Sno', axis=1, inplace=True)

# Features and target
X = df.drop('Species', axis=1)
y = df['Species']

# Split the dataset
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Initialize and train the Random Forest classifier
rf_clf = RandomForestClassifier(n_estimators=100, random_state=42)
rf_clf.fit(X_train, y_train)

# Make predictions
y_pred = rf_clf.predict(X_test)

# Evaluate the model
print("Accuracy:", accuracy_score(y_test, y_pred))
print("\nClassification Report:\n", classification_report(y_test, y_pred))
print("Confusion Matrix:\n", confusion_matrix(y_test, y_pred))

# Feature importance
```

```python
import matplotlib.pyplot as plt
import seaborn as sns

feature_importances = pd.Series(rf_clf.feature_importances_, index=X.columns)
feature_importances.sort_values().plot(kind='barh', title='Feature Importance')
plt.xlabel("Importance Score")
plt.ylabel("Features")
plt.tight_layout()
plt.show()
```

Output:

```
PS C:\Users\admin\Onedrive\Desktop\6SEM\ML> python ass4.py
Accuracy: 1.0

Classification Report:
                 precision    recall  f1-score   support

    Iris-setosa       1.00      1.00      1.00        10
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:
 [[10  0  0]
 [ 0  9  0]
 [ 0  0 11]]
```


Feature Importance