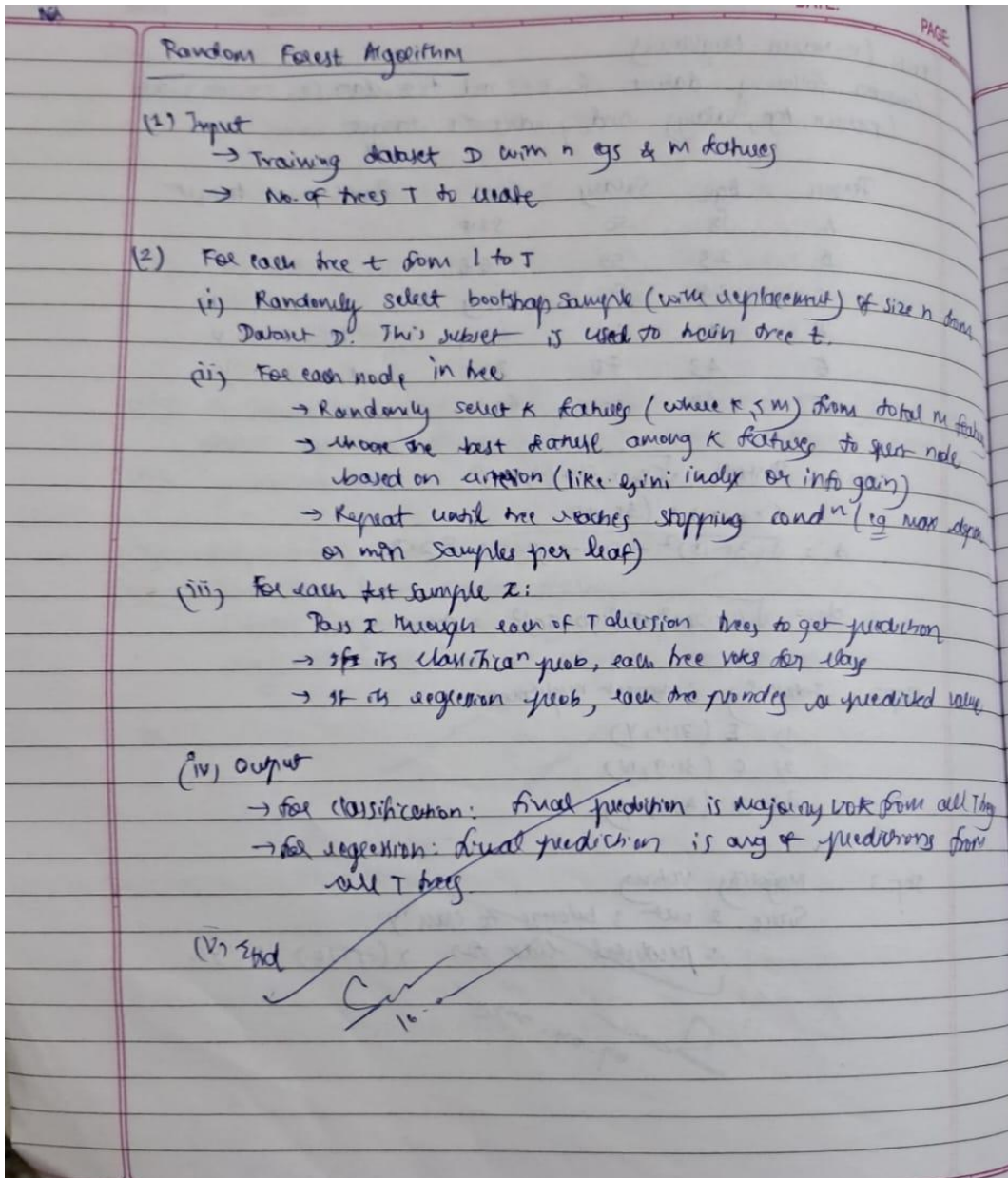


Program 8

Implement Random forest ensemble method on a given dataset

Screenshot:



S.No.	c_gpa	Interactiveness	Communication	Practical knowledge	Job
1	≥ 9	Yes	good	good	Yes
2	< 9	No	moderate	avg good	Yes
3	≥ 9	No	Moderate	avg	No
4	≥ 9	No	Moderate	avg	No
5	≥ 9	Yes	Moderate	good	Yes

(1)

```

graph TD
    A[c_gpa] -->|< 9| B{Yes}
    A -->|≥ 9| C[Interactiveness]
    C -->|Yes| D{Yes}
    C -->|No| E{No}
  
```

(2)

```

graph TD
    A[Interactiveness] -->|Yes| B{Yes}
    A -->|No| C[Practical Knowledge]
    C -->|good| D{Yes}
    C -->|avg| E{No}
  
```

Code:

```

import pandas as pd

from sklearn.model_selection import train_test_split

from sklearn.ensemble import RandomForestClassifier

from sklearn.metrics import accuracy_score

```

```

df = pd.read_csv('/content/iris (3).csv')

```

Prepare the data

```

X = df.drop('species', axis=1)

```

```

y = df['species']

```

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

```
# Build and evaluate the Random Forest classifier with default n_estimators
```

```
rf_classifier_default = RandomForestClassifier(random_state=42)
```

```
rf_classifier_default.fit(X_train, y_train)
```

```
y_pred_default = rf_classifier_default.predict(X_test)
```

```
default_accuracy = accuracy_score(y_test, y_pred_default)
```

```
print(f"Accuracy with default n_estimators (10): {default_accuracy}")
```

```
# Fine-tune the model by varying the number of trees
```

```
best_accuracy = 0
```

```
best_n_estimators = 0
```

```
for n_estimators in range(1, 101): # Try different number of trees
```

```
    rf_classifier = RandomForestClassifier(n_estimators=n_estimators, random_state=42)
```

```
    rf_classifier.fit(X_train, y_train)
```

```
    y_pred = rf_classifier.predict(X_test)
```

```
    accuracy = accuracy_score(y_test, y_pred)
```

```
    if accuracy > best_accuracy:
```

```
        best_accuracy = accuracy
```

```
        best_n_estimators = n_estimators
```

```
print(f"\nBest Accuracy: {best_accuracy} achieved with n_estimators = {best_n_estimators}").
```