Assignment No. 5 ### ### Name :- Temgire Vaishnav Kalidas Roll No.:-23107127 Class :- AI-B Batch:- B

```
import pandas as pd
import numpy as np

from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.impute import SimpleImputer

from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, precision_score, recall_score,
f1_score, classification_report
from sklearn.datasets import fetch_openml


cover_data = fetch_openml(name="covertype", version=3, as_frame=True)
X = cover_data.data
y = cover_data.target.astype(int)


imputer = SimpleImputer(strategy="mean")
X = imputer.fit_transform(X)


scaler = StandardScaler()
X = scaler.fit_transform(X)


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


rf_model = RandomForestClassifier(
    n_estimators=200,
    random_state=42,
    n_jobs=-1,
    max_depth=None
)


rf_model.fit(X_train, y_train)
```

```
RandomForestClassifier(n_estimators=200, n_jobs=-1, random_state=42)
```

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

```python
accuracy = accuracy_score(y_test, y_pred)
precision = precision_score(y_test, y_pred, average="weighted")
recall = recall_score(y_test, y_pred, average="weighted")
f1 = f1_score(y_test, y_pred, average="weighted")

print("Random Forest Classification Results:")
print(f"Accuracy : {accuracy:.4f}")
print(f"Precision: {precision:.4f}")
print(f"Recall   : {recall:.4f}")
print(f"F1 Score : {f1:.4f}")
print("\nClassification Report:\n", classification_report(y_test, y_pred))
```

```
Random Forest Classification Results:
Accuracy : 0.9541
Precision: 0.9542
Recall   : 0.9541
F1 Score : 0.9539

Classification Report:
               precision    recall  f1-score   support

           1       0.96      0.94      0.95     42368
           2       0.95      0.97      0.96     56661
           3       0.94      0.96      0.95      7151
           4       0.92      0.85      0.88       549
           5       0.95      0.78      0.85      1899
           6       0.93      0.89      0.91      3473
           7       0.97      0.95      0.96      4102

    accuracy                           0.95    116203
   macro avg       0.95      0.91      0.92    116203
weighted avg       0.95      0.95      0.95    116203
```