Model Development Phase Template

Date	15 July 2024
Team ID	739713
Project Title	Beansense: Precision Bean Classification For Enhanced Agricultural And Culinary Applications
Maximum Marks	4 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include classification reports, accuracy, and confusion matrices for multiple models, presented through respective screenshots.

Initial Model Training Code:

```python
from sklearn.ensemble import RandomForestClassifier
model3 = RandomForestClassifier()
model3.fit(xtrain,ytrain)

  ▾ RandomForestClassifier
  RandomForestClassifier()
```

```python
from sklearn.metrics import accuracy_score,precision_score,recall_score,f1_score,confusion_matrix
ypred = model3.predict(xtest)
accuracy = accuracy_score(ytest, ypred)
precision = precision_score(ytest, ypred,average="weighted")
recall = recall_score(ytest, ypred,average="weighted")
f1 = f1_score(ytest, ypred,average="weighted")
confusion = confusion_matrix(ytest, ypred)

print("Accuracy:", accuracy)
print("Precision:", precision)
print("Recall:", recall)
print("F1 Score:", f1)
print("Confusion Matrix:\n", confusion)
```

```python
ypred_t=model2.predict(xtrain)
acc2=accuracy_score(ytrain,ypred_t)
acc2
```

```
from sklearn.tree import DecisionTreeClassifier

model2=DecisionTreeClassifier()

model2.fit(xtrain,ytrain)

  ▾ DecisionTreeClassifier
  DecisionTreeClassifier()

ypred=model2.predict(xtest)

accuracy2=accuracy_score(ytest,ypred)
precision2=precision_score(ytest,ypred,average="weighted")
recall2=recall_score(ytest,ypred,average="weighted")
conf2=confusion_matrix(ytest,ypred)
classrep2=classification_report(ytest,ypred)

accuracy2,precision2,recall2,conf2,classrep2
```

Model Validation and Evaluation Report

Model	Classification Report	F1 Score	Confusion Matrix
Random Forest	Accuracy: 0.9130266718206417 Precision: 0.9133037264533918 Recall: 0.9130266718206417 F1 Score: 0.9130395511643149	1.0	Confusion Matrix: [[245 19 0 1 2 4] [14 291 0 9 1 4] [0 0 630 1 5 42] [2 12 2 347 0 5] [2 0 16 0 380 10] [3 3 51 10 7 469]]

Decision Tree	(classification report, illegible)	1.0	array([[237, 24, 0, 2, 3, 5],
			       [26, 277, 0, 11, 1, 4],
			       [0, 0, 601, 5, 9, 63],
			       [7, 14, 4, 334, 0, 9],
			       [2, 0, 22, 0, 372, 12],
			       [6, 0, 58, 15, 12, 452]])