Model Development Phase Template

Date	15 March 2024
Team ID	740139
Project Title	Acoustic Fire Extinguishing Prediction
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

```
[ ] def model_evaluation(classifier):
        cm = confusion_matrix(y_test, classifier.predict(x_test))
        counts = [value for value in cm.flatten()]
        labels = [f'{v1}' for v1 in counts]
        labels = np.asarray(labels).reshape(2,2)
        sns.heatmap(cm, annot = labels, cmap = 'Greens', fmt = '')
        y_pred = classifier.predict(x_test)
        yt_pred = classifier.predict(x_train)
        print('The Training Accuracy of the algorithm is', accuracy_score(y_train, yt_pred))
        print('The Testing Accuracy of the algorithm is', accuracy_score(y_test, y_pred))
        return [(accuracy_score(y_train * 100, yt_pred * 100) * 100), (accuracy_score(y_test * 100, y_pred * 100) * 100),precision_score(y_test,y_pred,average='macro')]
```

Training the model in multiple Algorithms (K Nearest Neighbors Model)

```
[ ]  knn = KNeighborsClassifier()
     knn.fit(x_train,y_train)
```

```
KNeighborsClassifier
KNeighborsClassifier()
```

(SVM Model)

```
[ ]  Svm = SVC()
     Svm.fit(x_train,y_train)
```

```
SVC
SVC()
```

(Naive Bayes)

```
[ ]  gnb = GaussianNB()
     gnb.fit(x_train, y_train)
```

```
GaussianNB
GaussianNB()
```

(Logistic Regression)

```
lr = LogisticRegression()
lr.fit(x_train, y_train)
```

```
LogisticRegression
LogisticRegression()
```

Decision Tree Model

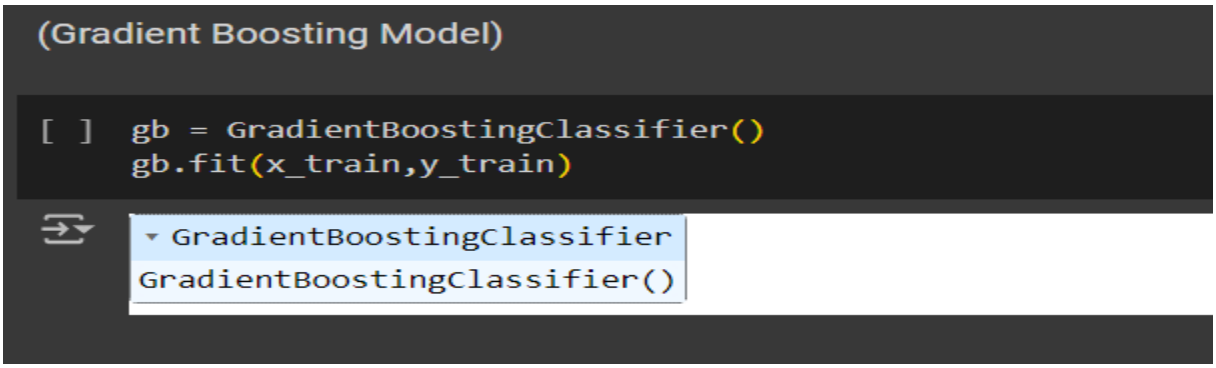
```
[ ] dt = DecisionTreeClassifier(max_depth= 11)
    dt.fit(x_train, y_train)
```

```
DecisionTreeClassifier
DecisionTreeClassifier(max_depth=11)
```

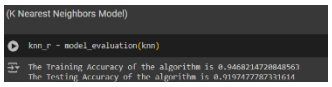
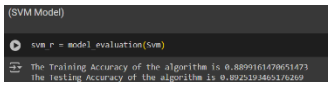
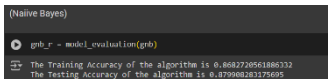
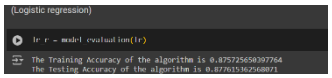
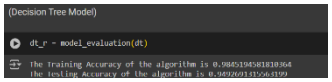
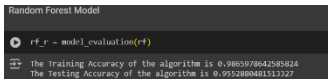
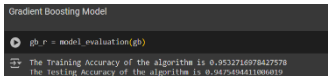
(Random Forest Model)

```
[ ] rf = RandomForestClassifier(max_depth=11)
    rf.fit(x_train, y_train)
```

```
RandomForestClassifier
RandomForestClassifier(max_depth=11)
```



Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
KNN		94&91	-
SVM		88&89	-
Naïve bayes		86&87	-
Logistic regression		87&87	-
Decision Tree		98&94	-
Random Forest Model		98&95	-
Gradient boosting model		95&94	-