**Model Development Phase Template**

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| Date | 15 March 2024 |
| Team ID | 740139 |
| Project Title | Acoustic Fire Extinguishing prediction |
| Maximum Marks | 6 Marks |

**Model Selection Report**

In the forthcoming Model Selection Report, various models will be outlined, detailing their descriptions, hyperparameters, and performance metrics, including Accuracy or F1 Score. This comprehensive report will provide insights into the chosen models and their effectiveness.

**Model Selection Report:**

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| **Model** | **Description** | **Hyper**  **parameters** | **Performance Metric (e.g., Accuracy, F1 Score)** |
| **K Nearest Neighbors Model** | A variable is created with name knn which has KNeighborsClassifier() algorithm initialised in it. The knn model is trained using the .fit() function. The model is trained on the X\_train and y\_train data that is the training features and training target variables. This model is then given to the model\_evaluation function to check its performance. | - | Training accuracy:94  Testing accuracy:91 |
| **SVM Model** | A variable is created with name Svm which has SVC() algorithm initialised in it. The svm model is trained using the .fit() function. The model is trained on the X\_train and y\_train data that is the training features and training target variables. This model is then given to the model\_evaluation function to check its performance. | - | Training accuracy:88  Testing accuracy:89 |
| **Naïve Bayes** | A variable is created with name gnb which has GaussianNB() algorithm initialised in it. The gnb model is trained using the .fit() function. The model is trained on the X\_train and y\_train data that is the training features and training target variables. This model is then given to the model\_evaluation function to check its performance | - | Training accuracy:86  Testing accuracy:87 |
| **Logistic Regression** | A variable is created with name lr which has LogisticRegression() algorithm initialised in it. The lr model is trained using the .fit() function. The model is trained on the X\_train and y\_train data that is the training features and training target variables. This model is then given to the model\_evaluation function to check its performance | **-** | Training accuracy:87  Testing accuracy:87 |
| **Decision Tree Model** | A variable is created with name dt which has DecisionTreeClassifier() algorithm initialised in it with a parameter max\_depth set to 11. The dt model is trained using the .fit() function. The model is trained on the X\_train and y\_train data that is the training features and training target variables. This model is then given to the model\_evaluation function to check its performance. | **-** | Training accuracy:98  Testing accuracy:94 |
| **Random Forest Model** | Random Forest Classifier is a Bagging model which utilises multiple decision trees and takes their aggregate to give a prediction. A variable is created with name rf which has RandomForestClassifier() algorithm initialised in it with a parameter max\_depth set to 11. The rf model is trained using the .fit() function. The model is trained on the X\_train and y\_train data that is the training features and training target variables. This model is then given to the model\_evaluation function to check its performance. | **-** | Training accuracy:98  Testing accuracy:95 |
| **Gradient Boosting Model** | Random Forest Classifier is a Bagging model which utilises multiple decision trees and takes their aggregate to give a prediction. A variable is created with name rf which has RandomForestClassifier() algorithm initialised in it with a parameter max\_depth set to 11. The rf model is trained using the .fit() function. The model is trained on the X\_train and y\_train data that is the training features and training target variables. This model is then given to the model\_evaluation function to check its performance. | **-** | Training accuracy:95  Testing accuracy:94 |