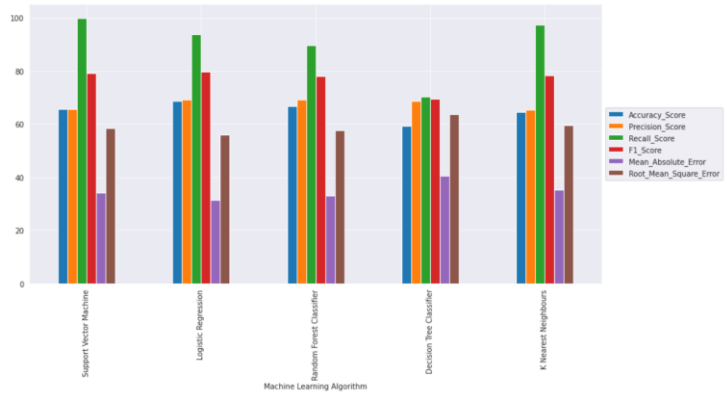
Project Development Phase
Model Performance Test

Date	17 November 2022
Team ID	PNT2022TMID53565
Project Name	Project – Statistical machine learning approaches to liver disease prediction
Maximum Marks	10 Marks

Model Performance Testing:

S.No.	Parameter	Values	Screenshot

1.	Metrics	**Regression Model:** MAE - , MSE - , RMSE - , R2 score -
		
		 Classification Model: Confusion Matrix - , Accuracy Score- & Classification Report
			Support Vector Machine
			Confusion matrix
			`[[115  0]`
			`[ 60  0]]`
			Accuracy
			Machine Learning Algorithm Accuracy_Score
			0 Support Vector Machine 65.714286
			Classification report
			precision recall f1-score support
			1 0.66 1.00 0.79 115
			2 0.00 0.00 0.00 60
			accuracy 0.66 175
			macro avg 0.33 0.50 0.40 175
			weighted avg 0.43 0.66 0.52 175
			
			Comparison with other models
			Machine Learning Algorithm | Accuracy_Score | Precision_Score | Recall_Score | F1_Score | Mean_Absolute_Error | Root_Mean_Square_Error
			0 Support Vector Machine 65.714286 65.714286 100.000000 79.310345 34.285714 58.554004
			1 Logistic Regression 68.571429 69.230769 93.913043 79.704797 31.428571 56.061191
			2 Random Forest Classifier 66.857143 69.127517 89.565217 78.030303 33.142857 57.569833
			3 Decision Tree Classifier 59.428571 68.644068 70.434783 69.527897 40.571429 63.695705
			4 K Nearest Neighbours 64.571429 65.497076 97.391304 78.321678 35.428571 59.521905

2.	Tune the Model	Hyperparameter Tuning - Validation Method -	`from sklearn.svm import SVC`
			
			`model=SVC()`
			
			`param_grid = {'C': [0.1,1, 10,50,100,200,1000], 'gamma': [1,0.1,0.01,0.001,0.0001], 'kernel': ['rbf']}`
			`from sklearn.model_selection import GridSearchCV`
			`grid = GridSearchCV(SVC(),param_grid,refit=True,verbose=3)`
			`grid.fit(X_train,y_train)`
			
			`Fitting 5 folds for each of 35 candidates, totalling 175 fits`
			`[CV 1/5] END .....C=0.1, gamma=1, kernel=rbf;, score=0.707 total time= 0.0s`
			`[CV 2/5] END .....C=0.1, gamma=1, kernel=rbf;, score=0.707 total time= 0.0s`
			`[CV 3/5] END .....C=0.1, gamma=1, kernel=rbf;, score=0.707 total time= 0.0s`
			`[CV 4/5] END .....C=0.1, gamma=1, kernel=rbf;, score=0.716 total time= 0.0s`
			`[CV 5/5] END .....C=0.1, gamma=1, kernel=rbf;, score=0.716 total time= 0.0s`
			`[CV 1/5] END .....C=0.1, gamma=0.1, kernel=rbf;, score=0.707 total time= 0.0s`

```
GridSearchCV(estimator=SVC(),
             param_grid={'C': [0.1, 1, 10, 50, 100, 200, 1000],
                         'gamma': [1, 0.1, 0.01, 0.001, 0.0001],
                         'kernel': ['rbf']},
             verbose=3)
```

```
svm_predictions=grid.predict(X_test)
```

	precision	recall	f1-score	support
0	0.00	0.00	0.00	43
1	0.75	1.00	0.86	132
accuracy			0.75	175
macro avg	0.38	0.50	0.43	175
weighted avg	0.57	0.75	0.65	175

Project team shall fill the following information in model performance testing template.