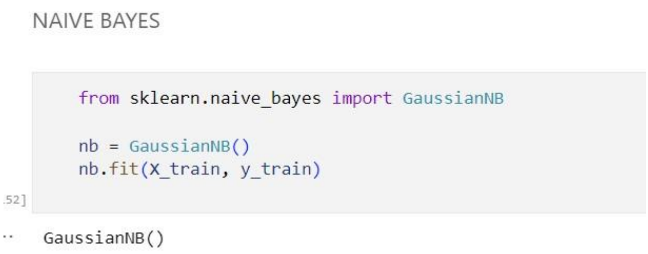
Model Development Phase

Date	31st January 2025
Team ID	LTVIP2025TMID43915
Project Title	Revolutionizing Liver Care: Predicting Liver Cirrhosis Using Advanced Machine Learning Techniques.
Maximum 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.



NAIVE BAYES

```
from sklearn.naive_bayes import GaussianNB

nb = GaussianNB()
nb.fit(X_train, y_train)
```

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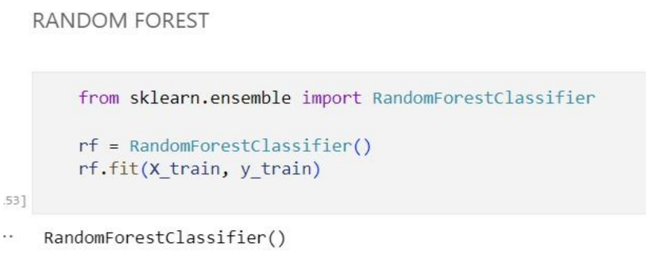
```
GaussianNB()
```



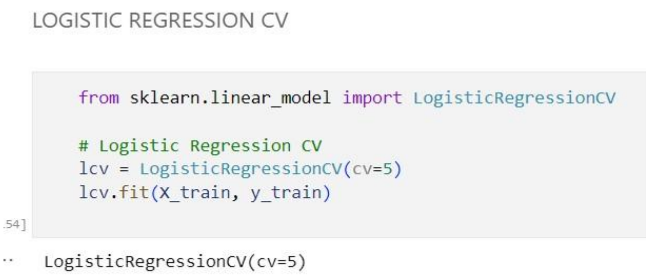
RANDOM FOREST

```
from sklearn.ensemble import RandomForestClassifier

rf = RandomForestClassifier()
rf.fit(X_train, y_train)
```

53]

```
RandomForestClassifier()
```



LOGISTIC REGRESSION CV

```
from sklearn.linear_model import LogisticRegressionCV

# Logistic Regression CV
lcv = LogisticRegressionCV(cv=5)
lcv.fit(X_train, y_train)
```

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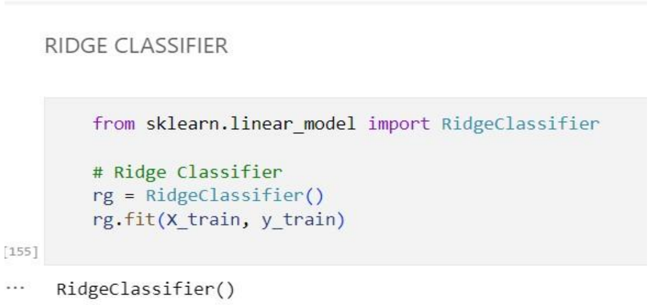
```
LogisticRegressionCV(cv=5)
```



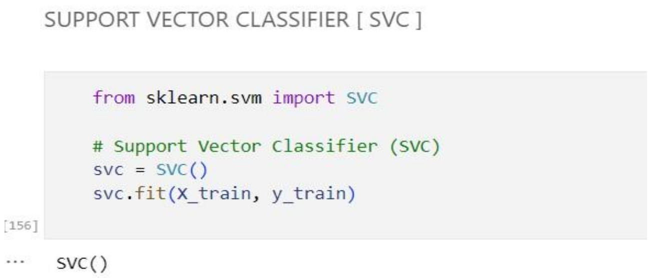
RIDGE CLASSIFIER

```
from sklearn.linear_model import RidgeClassifier

# Ridge Classifier
rg = RidgeClassifier()
rg.fit(X_train, y_train)
```

[155]

```
RidgeClassifier()
```



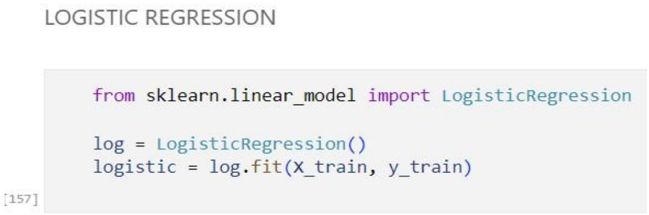
SUPPORT VECTOR CLASSIFIER [SVC]

```
from sklearn.svm import SVC

# Support Vector Classifier (SVC)
svc = SVC()
svc.fit(X_train, y_train)
```

[156]

```
SVC()
```



LOGISTIC REGRESSION

```
from sklearn.linear_model import LogisticRegression

log = LogisticRegression()
logistic = log.fit(X_train, y_train)
```

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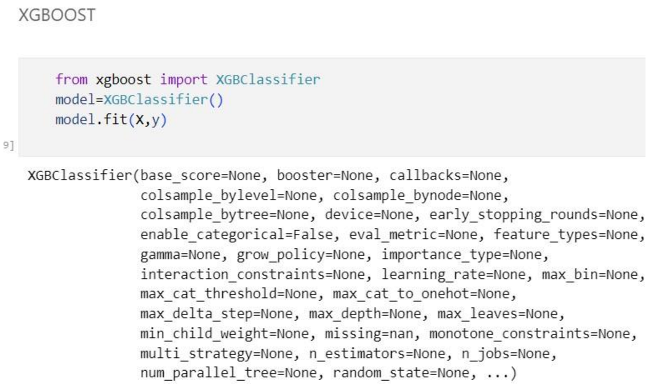
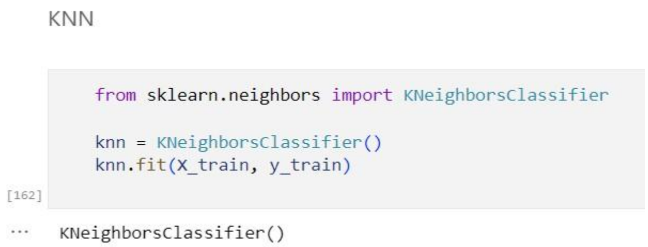
Initial Model Training Code:



XGBOOST

```
from xgboost import XGBClassifier
model=XGBClassifier()
model.fit(X,y)
```

```
XGBClassifier(base_score=None, booster=None, callbacks=None,
              colsample_bylevel=None, colsample_bynode=None,
              colsample_bytree=None, device=None, early_stopping_rounds=None,
              enable_categorical=False, eval_metric=None, feature_types=None,
              gamma=None, grow_policy=None, importance_type=None,
              interaction_constraints=None, learning_rate=None, max_bin=None,
              max_cat_threshold=None, max_cat_to_onehot=None,
              max_delta_step=None, max_depth=None, max_leaves=None,
              min_child_weight=None, missing=nan, monotone_constraints=None,
              multi_strategy=None, n_estimators=None, n_jobs=None,
              num_parallel_tree=None, random_state=None, ...)
```

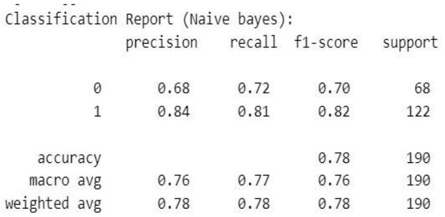


KNN

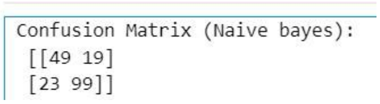
```
from sklearn.neighbors import KNeighborsClassifier

knn = KNeighborsClassifier()
knn.fit(X_train, y_train)
```

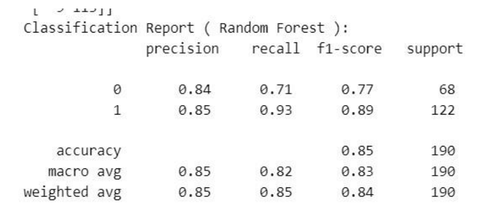
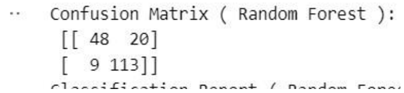
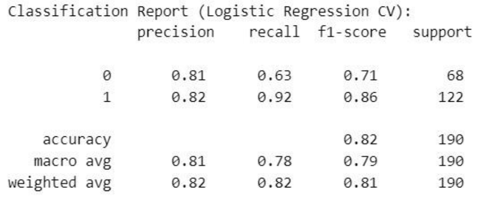
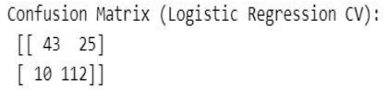
```
KNeighborsClassifier()
```

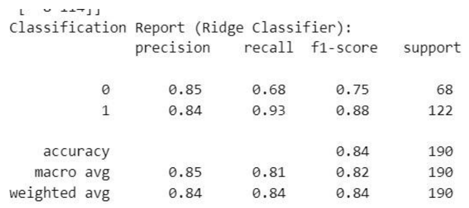
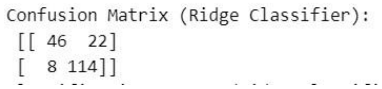
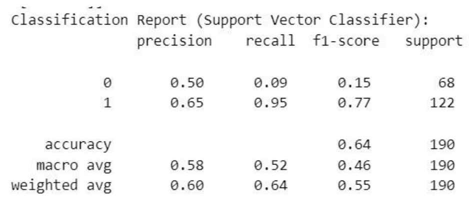
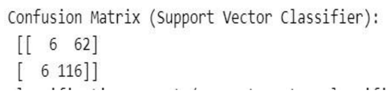
Model Validation and Evaluation Report:

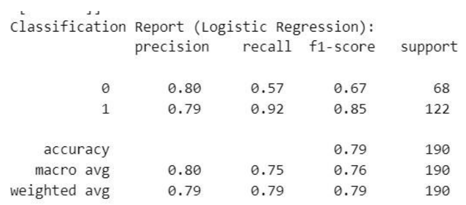
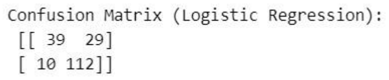
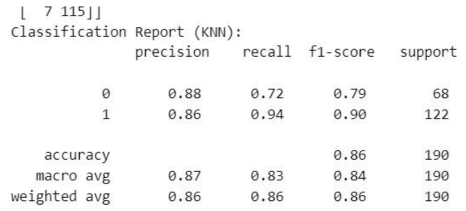
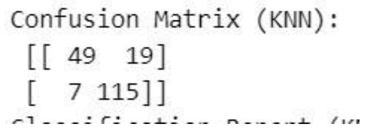
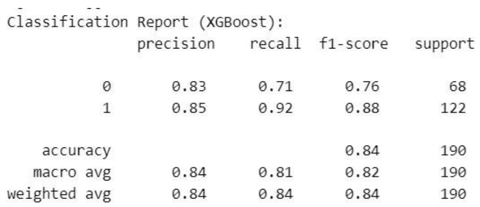
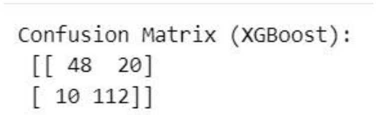
<table>
<tr><th>Model</th><th>Classification Report</th><th>Accuracy</th><th>Confusion Matrix</th></tr>
<tr><td>Naive Bayes</td><td>
<pre>
Classification Report (Naive bayes):
              precision   recall f1-score   support

           0   0.68   0.72   0.70   68
           1   0.84   0.81   0.82   122

    accuracy   0.78   190
   macro avg   0.76   0.77   0.76   190
weighted avg   0.78   0.78   0.78   190
</pre></td><td>35.79 %</td><td>
<pre>
Confusion Matrix (Naive bayes):
 [[49 19]
 [23 99]]
</pre></td></tr>
</table>

Random Forest	 [9 113]] Classification Report (Random Forest): precision recall f1-score support 0 0.84 0.71 0.77 68 1 0.85 0.93 0.89 122 accuracy 0.85 190 macro avg 0.85 0.82 0.83 190 weighted avg 0.85 0.85 0.84 190	73.16 %	 Confusion Matrix (Random Forest): [[48 20] [9 113]] Classification Report (Random Fores
Logistic Regression CV	 Classification Report (Logistic Regression CV): precision recall f1-score support 0 0.81 0.63 0.71 68 1 0.82 0.92 0.86 122 accuracy 0.82 190 macro avg 0.81 0.78 0.79 190 weighted avg 0.82 0.82 0.81 190	73.16 %	 Confusion Matrix (Logistic Regression CV): [[43 25] [10 112]]

Ridge Classifier	 [8 114]] Classification Report (Ridge Classifier): precision recall f1-score support 0 0.85 0.68 0.75 68 1 0.84 0.93 0.88 122 accuracy 0.84 190 macro avg 0.85 0.81 0.82 190 weighted avg 0.84 0.84 0.84 190	35.79 %	 Confusion Matrix (Ridge Classifier): [[46 22] [8 114]]
Support Vector Classifier	 Classification Report (Support Vector Classifier): precision recall f1-score support 0 0.50 0.09 0.15 68 1 0.65 0.95 0.77 122 accuracy 0.64 190 macro avg 0.58 0.52 0.46 190 weighted avg 0.60 0.64 0.55 190	35.79 %	 Confusion Matrix (Support Vector Classifier): [[6 62] [6 116]]

Logistic Regression	 Classification Report (Logistic Regression): precision recall f1-score support 0 0.80 0.57 0.67 68 1 0.79 0.92 0.85 122 accuracy 0.79 190 macro avg 0.80 0.75 0.76 190 weighted avg 0.79 0.79 0.79 190	74.21 %	 Confusion Matrix (Logistic Regression): [[39 29] [10 112]]
KNN	 [7 115]] Classification Report (KNN): precision recall f1-score support 0 0.88 0.72 0.79 68 1 0.86 0.94 0.90 122 accuracy 0.86 190 macro avg 0.87 0.83 0.84 190 weighted avg 0.86 0.86 0.86 190	86.32 %	 Confusion Matrix (KNN): [[49 19] [7 115]]
XG Boost	 Classification Report (XGBoost): precision recall f1-score support 0 0.83 0.71 0.76 68 1 0.85 0.92 0.88 122 accuracy 0.84 190 macro avg 0.84 0.81 0.82 190 weighted avg 0.84 0.84 0.84 190	64.21 %	 Confusion Matrix (XGBoost): [[48 20] [10 112]]