# Model Development Phase Template

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| Date | 15 March 2024 |
| Team ID | SWTID1720161281 |
| Project Title | Ecommerce Shipping Prediction Using Machine Learning |
| Maximum Marks | 4 Marks |

**Initial Model Training Code, Model Validation and Evaluation Report**

**Initial Model Training Code:**

```
from sklearn.linear_model import LogisticRegression
lr=LogisticRegression()
lr.fit(x_train,y_train)
```

```
LogisticRegression
LogisticRegression()
```

```
from sklearn.svm import SVC
svc=SVC()
svc.fit(x_train,y_train)
```

```
SVC
SVC()
```

```
from sklearn.tree import DecisionTreeClassifier
df=DecisionTreeClassifier(criterion='entropy',random_state=0)
df.fit(x_train,y_train)
```

```
DecisionTreeClassifier
DecisionTreeClassifier(criterion='entropy', random_state=0)
```

```
from sklearn.ensemble import RandomForestClassifier
rf=RandomForestClassifier(n_estimators=10,criterion='entropy',random_state=0)
rf.fit(x_train,y_train)
```

```
RandomForestClassifier
RandomForestClassifier(criterion='entropy', n_estimators=10, random_state=0)
```

```
import xgboost as xgb
xg=xgb.XGBClassifier()
xg.fit(x_train,y_train)
```

```
from sklearn.ensemble import AdaBoostClassifier, GradientBoostingClassifier
ad=AdaBoostClassifier()
gb=GradientBoostingClassifier()
ad.fit(x_train,y_train)
```

```
C:\Users\ASUS\AppData\Local\Programs\Python\Python312\Lib\site-packages\skle
ent this warning.
  warnings.warn(
```

AdaBoostClassifier

```
AdaBoostClassifier()
```

```
gb.fit(x_train,y_train)
```

GradientBoostingClassifier

```
GradientBoostingClassifier()
```

```
from sklearn.naive_bayes import GaussianNB
nb=GaussianNB()
nb.fit(x_train,y_train)
```

GaussianNB

```
GaussianNB()
```

```
from sklearn.neighbors import KNeighborsClassifier
knn=KNeighborsClassifier()
knn.fit(x_train,y_train)
```

KNeighborsClassifier

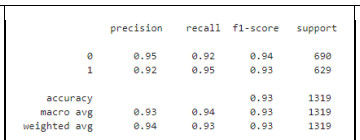
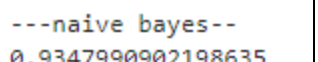
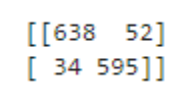
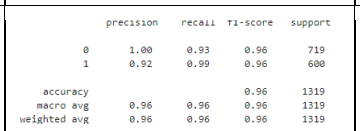
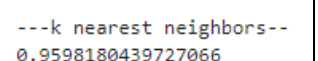
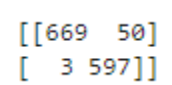
```
KNeighborsClassifier()
```

```
from sklearn.metrics import accuracy_score,confusion_matrix,classification_report
```

```
def evalu(model):
    pred=model.predict(x_test)
    acc=accuracy_score(pred,y_test)
    print(acc,'\n',classification_report(pred,y_test),'\n',confusion_matrix(pred,y_test))
```

**Model Validation and Evaluation Report:**

| Model | Classification Report | Accuracy | Confusion Matrix |
|---|---|---|---|
| Logistic Regression | precision recall f1-score support<br>0 0.97 0.92 0.94 704<br>1 0.92 0.96 0.94 615<br>accuracy 0.94 1319<br>macro avg 0.94 0.94 0.94 1319<br>weighted avg 0.94 0.94 0.94 1319 | ---logistic regression---<br>0.9423805913570887 | [[650 54]<br>[ 22 593]] |
| SVC | precision recall f1-score support<br>0 1.00 0.95 0.97 703<br>1 0.95 1.00 0.97 616<br>accuracy 0.97 1319<br>macro avg 0.97 0.97 0.97 1319<br>weighted avg 0.97 0.97 0.97 1319 | ---SVC---<br>0.9719484457922669 | [[669 34]<br>[ 3 613]] |
| Decision Tree Classifier | precision recall f1-score support<br>0 0.98 0.97 0.97 682<br>1 0.96 0.98 0.97 637<br>accuracy 0.97 1319<br>macro avg 0.97 0.97 0.97 1319<br>weighted avg 0.97 0.97 0.97 1319 | ---DecisionTreeClassifier--<br>0.9727065959059894 | [[659 23]<br>[ 13 624]] |
| Random Forest Classifier | precision recall f1-score support<br>0 1.00 0.96 0.98 698<br>1 0.96 1.00 0.98 621<br>accuracy 0.98 1319<br>macro avg 0.98 0.98 0.98 1319<br>weighted avg 0.98 0.98 0.98 1319 | ---RandomForestClassifier--<br>0.9787717968157695 | [[671 27]<br>[ 1 620]] |
| XGBoost | precision recall f1-score support<br>0 1.00 0.97 0.98 693<br>1 0.96 1.00 0.98 626<br>accuracy 0.98 1319<br>macro avg 0.98 0.98 0.98 1319<br>weighted avg 0.98 0.98 0.98 1319 | ---xgboost---<br>0.979529946929492 | [[669 24]<br>[ 3 623]] |
| AdaBoost | precision recall f1-score support<br>0 0.98 0.96 0.97 689<br>1 0.96 0.98 0.97 630<br>accuracy 0.97 1319<br>macro avg 0.97 0.97 0.97 1319<br>weighted avg 0.97 0.97 0.97 1319 | ---AdaBoost---<br>0.9704321455648218 | [[661 28]<br>[ 11 619]] |
| Gradient Boost | precision recall f1-score support<br>0 1.00 0.96 0.98 695<br>1 0.96 1.00 0.98 624<br>accuracy 0.98 1319<br>macro avg 0.98 0.98 0.98 1319<br>weighted avg 0.98 0.98 0.98 1319 | ---gradient Boosting---<br>0.978013646702047 | [[669 26]<br>[ 3 621]] |

| | | | |
|---|---|---|---|
| Naïve Bayes |  |  |  |
| K Nearest Neighbors |  |  |  |