**Project Development Phase**
**Model Performance Test**

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| Date | 22 November 2023 |
| Team ID | Team - 592124 |
| Project Name | Project – Online Shoppers Intentions using Ml |
| Maximum Marks | 10 Marks |

**Model Performance Testing:**

| S.No. | Parameter | Values | Screenshot |
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| 1. | Metrics | **Random Forest Classifier Classification Model:** Confusion Matrix - [[3005 110] [257 327]] , Accuray Score- 0.90 & Classification Report | RandomForestClassifier :<br>Confusion matrix<br>[[3005 110]<br>[ 257 327]]<br>Classification report<br>precision recall f1-score support<br>0 0.92 0.96 0.94 3115<br>1 0.75 0.56 0.64 584<br>accuracy 0.90 3699<br>macro avg 0.83 0.76 0.79 3699<br>weighted avg 0.89 0.90 0.89 3699 |
| 2. | Tune the Model | Hyperparameter Tuning<br>Validation Method – K-fold cross validation | **Hyperparameter Tuning**<br>`from sklearn.model_selection import GridSearchCV`<br>`param_grid = { 'n_estimators': [50, 100, 150], 'max_depth': [None, 10, 20, 30], 'min_samples_split': [2, 5, 10], 'min_samples_leaf': [1, 2, 4] }`<br>`grid_search = GridSearchCV(estimator=rf, param_grid=param_grid, cv=5, scoring='accuracy')`<br>`grid_search.fit(x_train, y_train)`<br>GridSearchCV<br>estimator: RandomForestClassifier<br>RandomForestClassifier<br>`best_params = grid_search.best_params_`<br>`print("Best Hyperparameters:", best_params)`<br>Best Hyperparameters: {'max_depth': 20, 'min_samples_leaf': 4, 'min_samples_split': 10, 'n_estimators': 150} |

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| | | | **Cross Validation**<br>`from sklearn.model_selection import cross_val_score`<br>`cv_scores = cross_val_score(rf, x_train, y_train, cv=5, scoring='accuracy')`<br>`print("Cross-Validation Scores:", cv_scores)`<br>`Cross-Validation Scores: [0.91372322 0.90614137 0.900927 0.9032445 0.89687138]` |