Predicting Bank Customers Attrition

Data Science Bootcamp Final Project

25 February 2021

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Project Motivation

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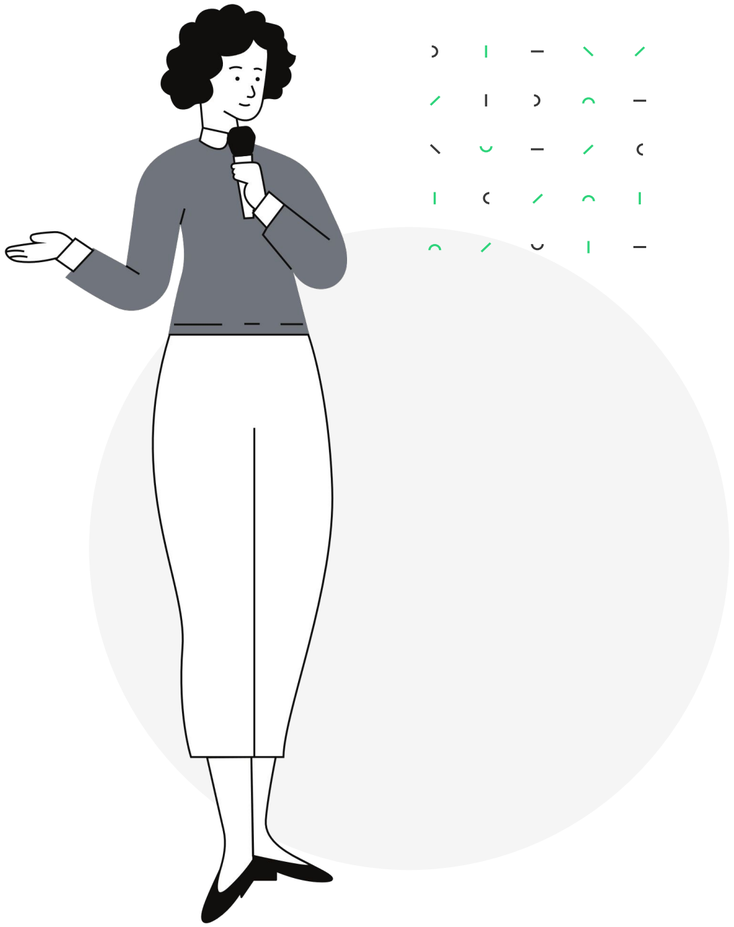


Customer attrition which is also known as customer churn, customer turnover is defined as the loss of customers in a business, it is one of the biggest concerns especially in banking since customers are considered as the most valuable part of it.

We are using the bank customer’s data to predict possible attrited customers using Machine Learning to help prevent any possible attrition that may happen in the future.

Exploratory Data Analysis

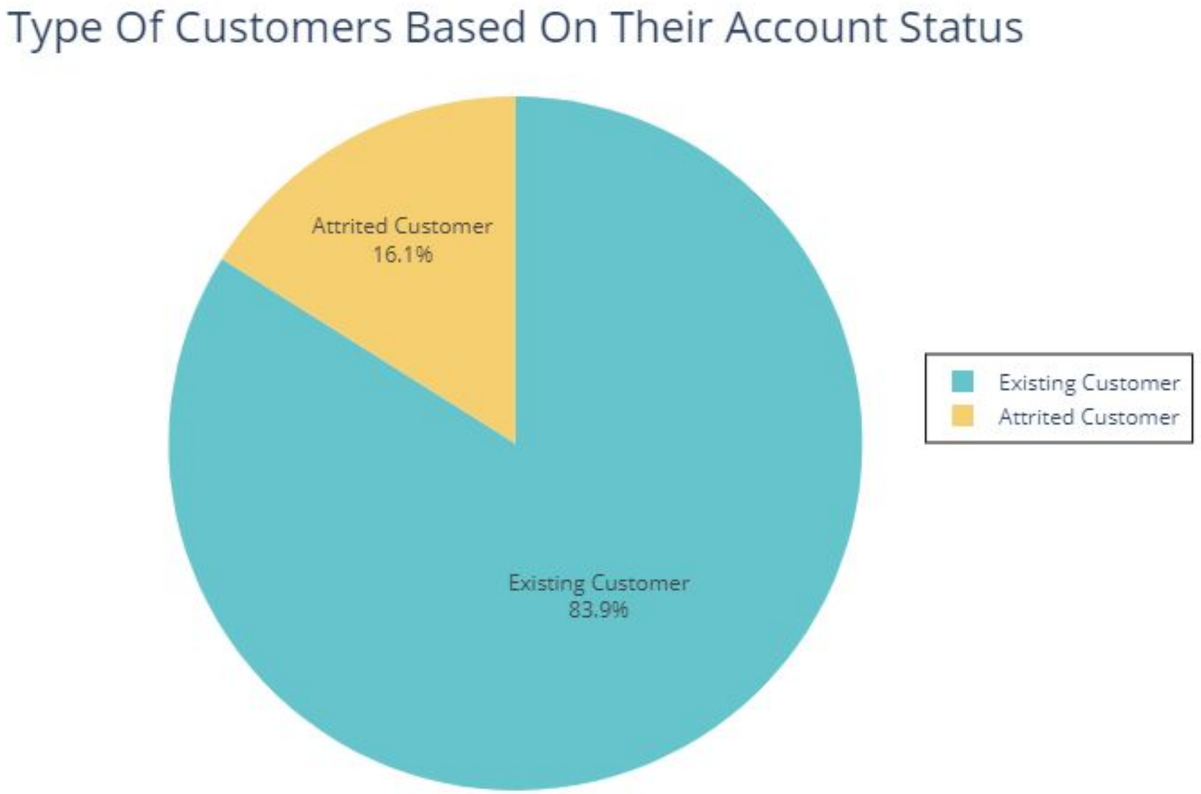
02

plotly

Data Information

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10127 entries, 0 to 10126
Data columns (total 20 columns):
 #   Column                    Non-Null Count  Dtype
---  ------                    --------------  -----
 0   Attrition_Flag            10127 non-null  object
 1   Customer_Age              10127 non-null  int64
 2   Gender                    10127 non-null  object
 3   Dependent_count           10127 non-null  int64
 4   Education_Level           10127 non-null  object
 5   Marital_Status            10127 non-null  object
 6   Income_Category           10127 non-null  object
 7   Card_Category             10127 non-null  object
 8   Months_on_book            10127 non-null  int64
 9   Total_Relationship_Count  10127 non-null  int64
 10  Months_Inactive_12_mon    10127 non-null  int64
 11  Contacts_Count_12_mon     10127 non-null  int64
 12  Credit_Limit              10127 non-null  float64
 13  Total_Revolving_Bal       10127 non-null  int64
 14  Avg_Open_To_Buy           10127 non-null  float64
 15  Total_Amt_Chng_Q4_Q1      10127 non-null  float64
 16  Total_Trans_Amt           10127 non-null  int64
 17  Total_Trans_Ct            10127 non-null  int64
 18  Total_Ct_Chng_Q4_Q1       10127 non-null  float64
 19  Avg_Utilization_Ratio     10127 non-null  float64
dtypes: float64(5), int64(9), object(6)
memory usage: 1.5+ MB
```

Class Distribution



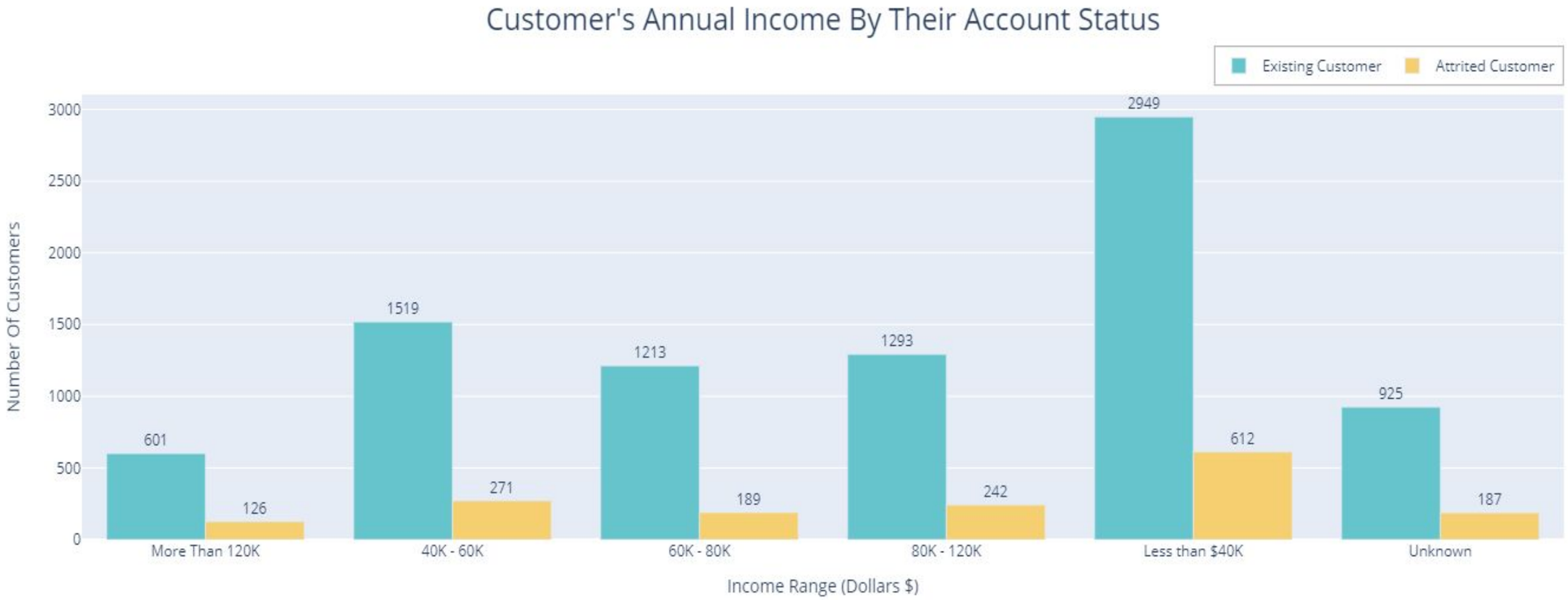
04

Age Range


Customer's Age Range By Their Account Status
Existing Customer
Attrited Customer
Number Of Customers
2500
2000
1500
1000
500
0
30
40
50
60
70
Age Range

05

Annual Income



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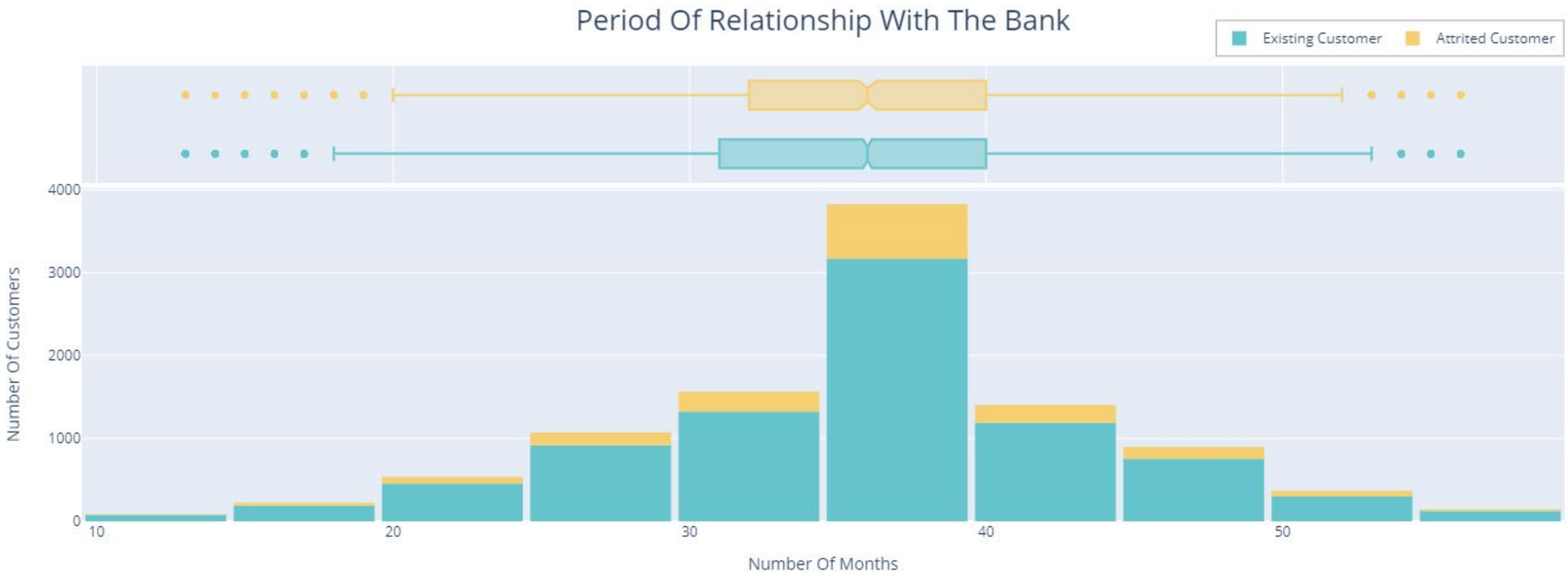
Credit Card Type

07

Period Of Relationship With The Bank



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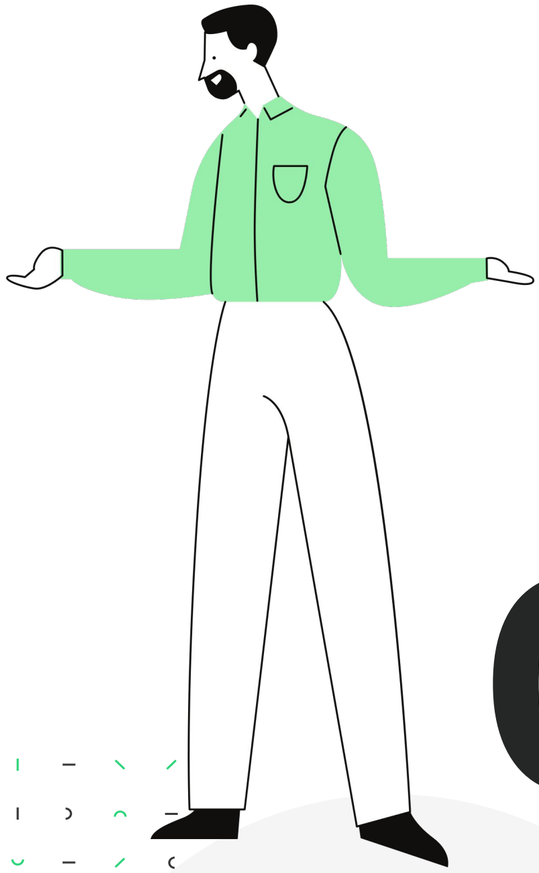
Preprocessing

- **Encoding Categorical Features**
  Using Label Encoder.

- **Split Data 80% Train, 20% Test**



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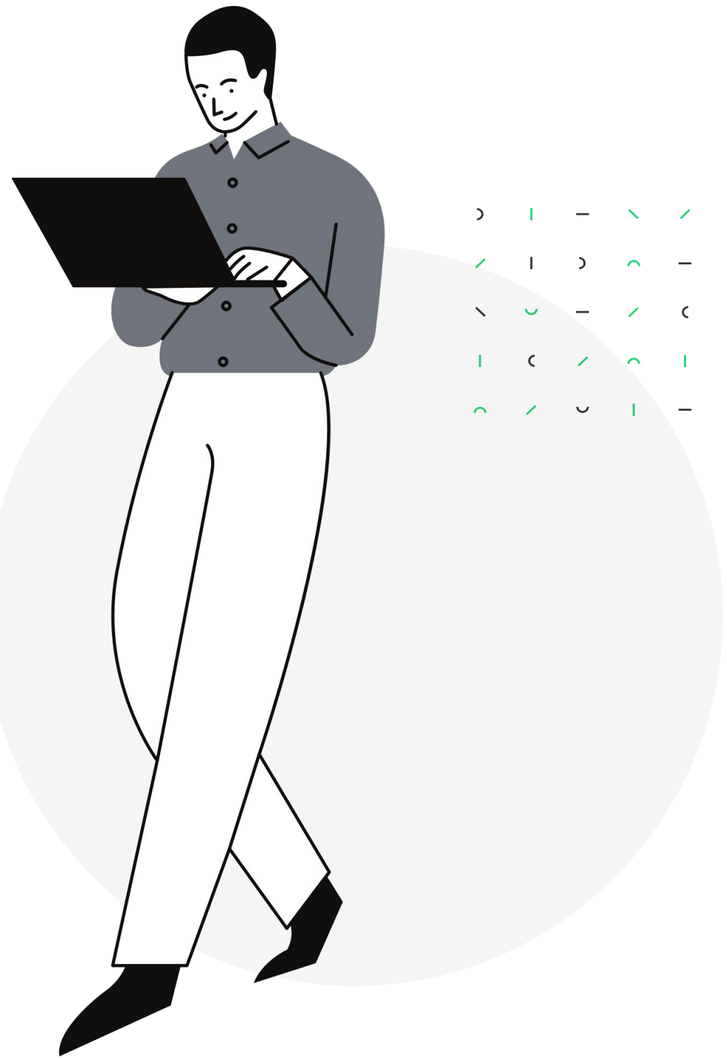
Modeling

- **Baseline Model.**
- **Ensemble learning Method.**
- **Tuning Highest Scoring Model With GridSearchCV.**



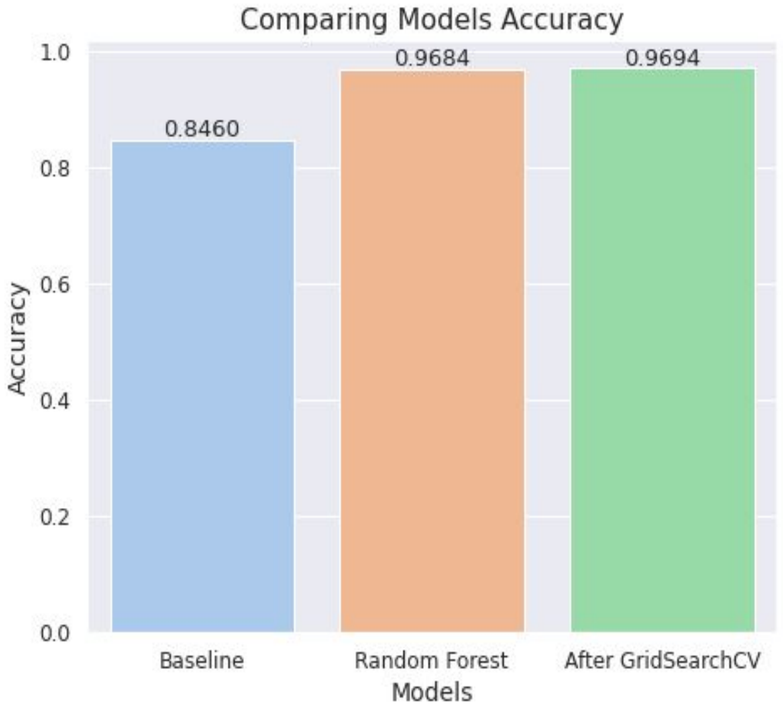
Ensemble Results

```
Model: Logistic Regression, Score: 0.8810108832096327
Model: knn, Score: 0.8914288569583075
Model: Decision Tree, Score: 0.9388765797716111
Model: Random Forest, Score: 0.963020023643255
```

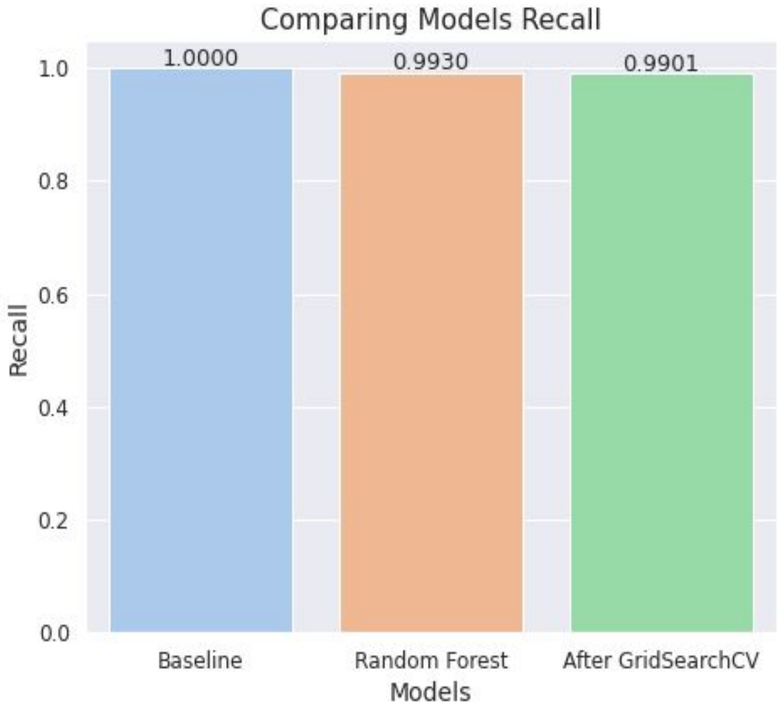
- Since **Random Forest Classifier** Scored the highest among other model i will use it and tune it to achive the best results

Results

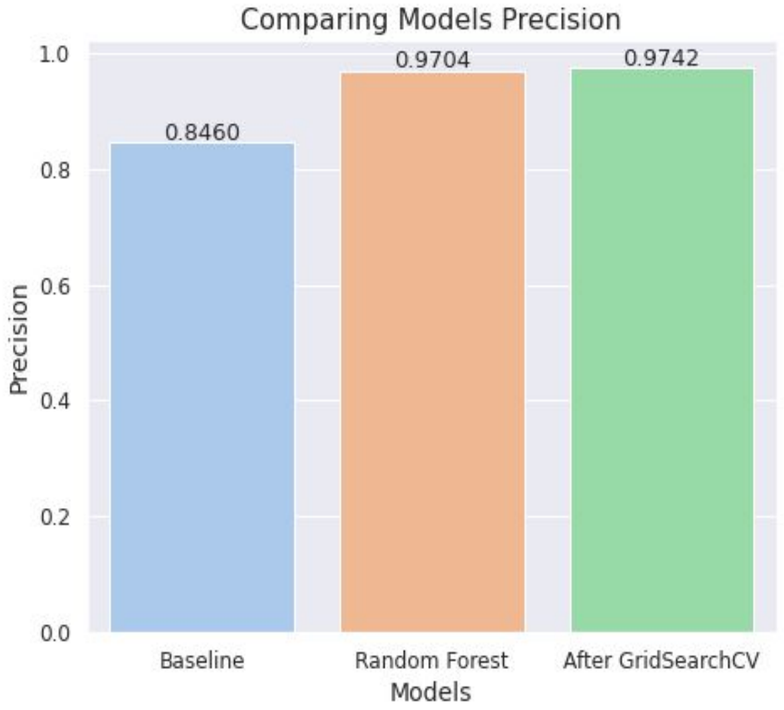
Accuracy



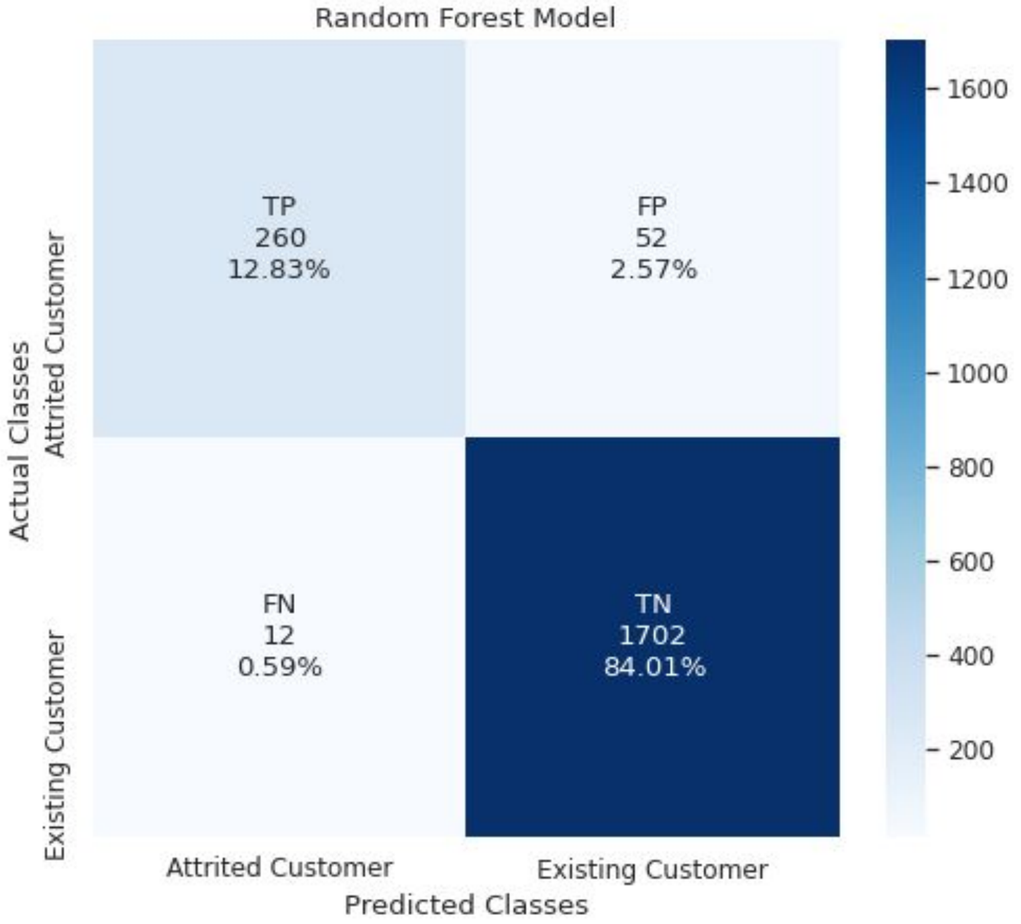
Recall

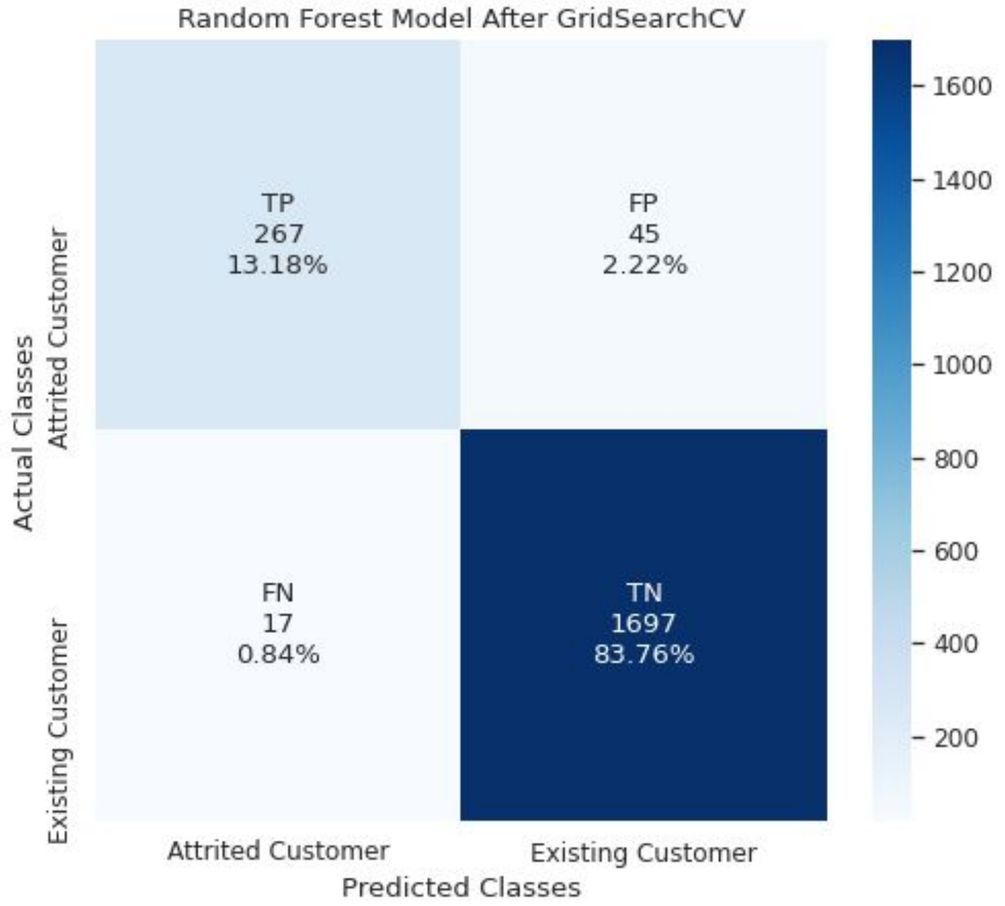


Precision

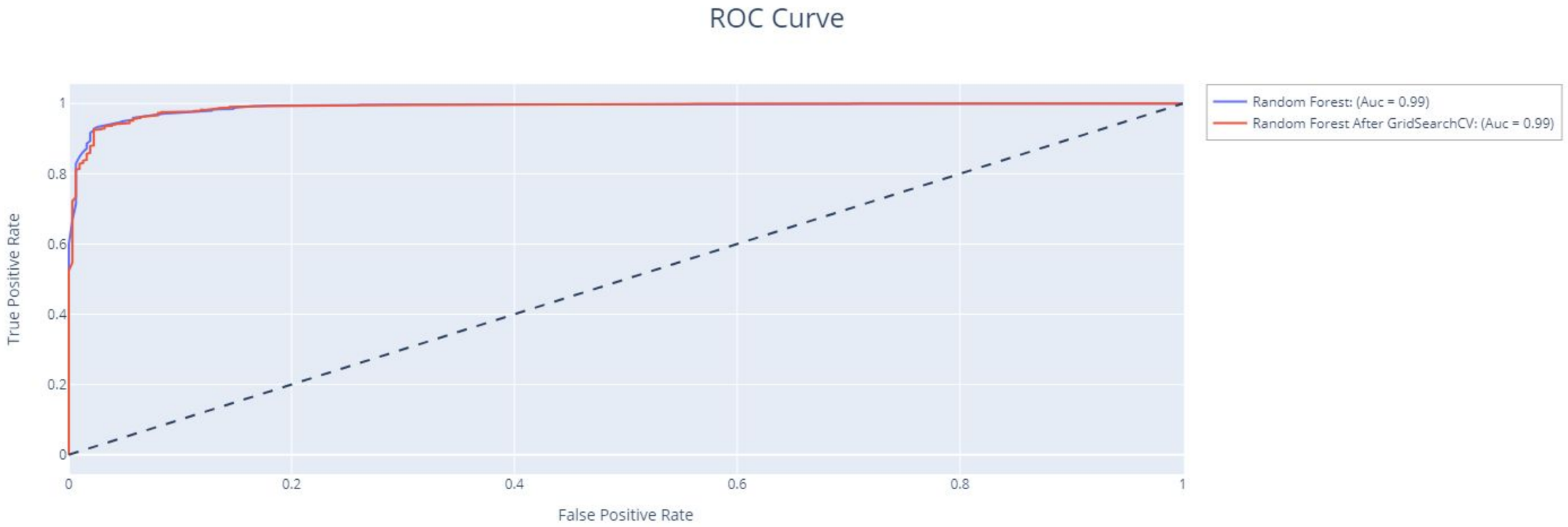


Confusion Matrix





Roc Curve


ROC Curve
True Positive Rate
False Positive Rate
0
0.2
0.4
0.6
0.8
1
Random Forest: (Auc = 0.99)
Random Forest After GridSearchCV: (Auc = 0.99)

Thank you

Any Questions?