TELCO CUSTOMER CHURN PREDICTION

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BACKGROUND

Churn quantifies the number of customers who have left a brand by cancelling their subscription or stopping paying for the services. This is bad news for any business as it costs five times as much to attract a new customer as it does to keep an existing one. A high customer churn rate will hit a company's finances hard.

https://www.invespcro.com/blog/customer-acquisition-retention/

OBJECTIVE

- Utilize machine learning for predicting customer churn
- Compare and choose the best machine learning model for this case
- Model Evaluation using ROC AUC

DATA INTRODUCTION

Source : https://www.kaggle.com/yeanzc/telco-customer-churn-ibm-dataset

Data related to a customer who left

churn_label, churn_scores, churn_value, churn reason

Data related to a customer subscribed service

phone_service, multiple line, internet_service, online_security, online_backup, device protection, tech_support, streaming_tv, streaming_movies

Data related to a customer demographic info

country, state, city, zip_code, lat_long, latitude, longitude, gender, senior_citizen, partner, dependents

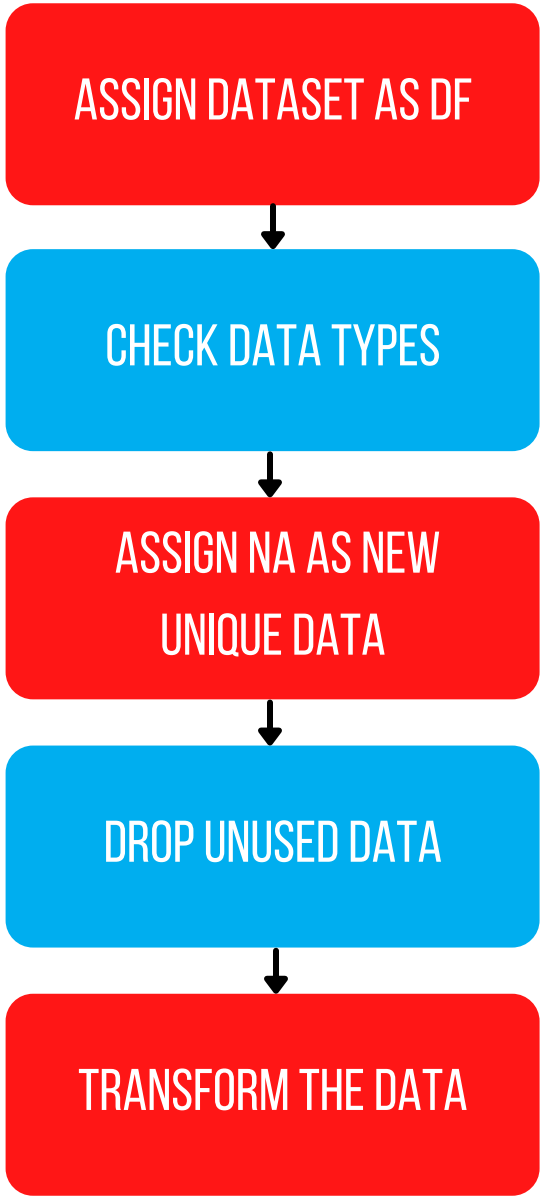
Data related to a customer account information

tenure_month, contract, paperless_billing, payment_method, monthly_charges, total_charges

Data related to IBM company data

customer_id, count, cltv

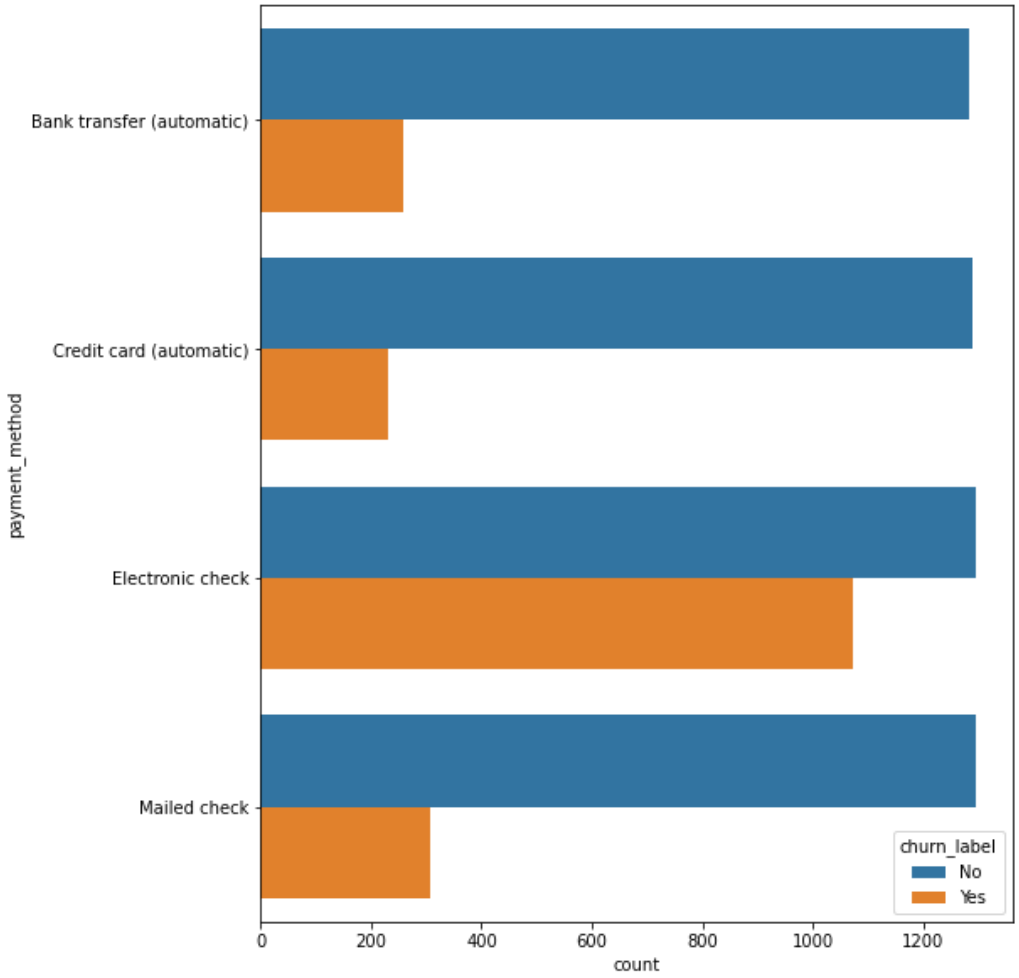
DATA CLEANSING



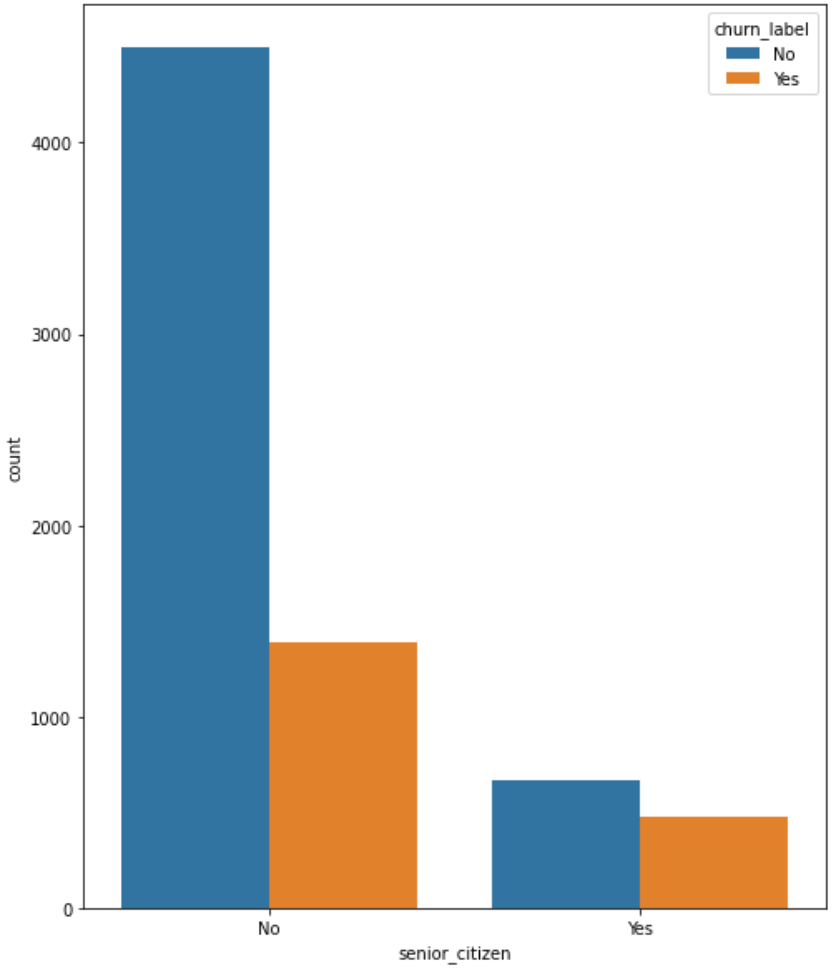
EXPLORATORY DATA ANALYSIS

CATEGORICAL VARIABLE

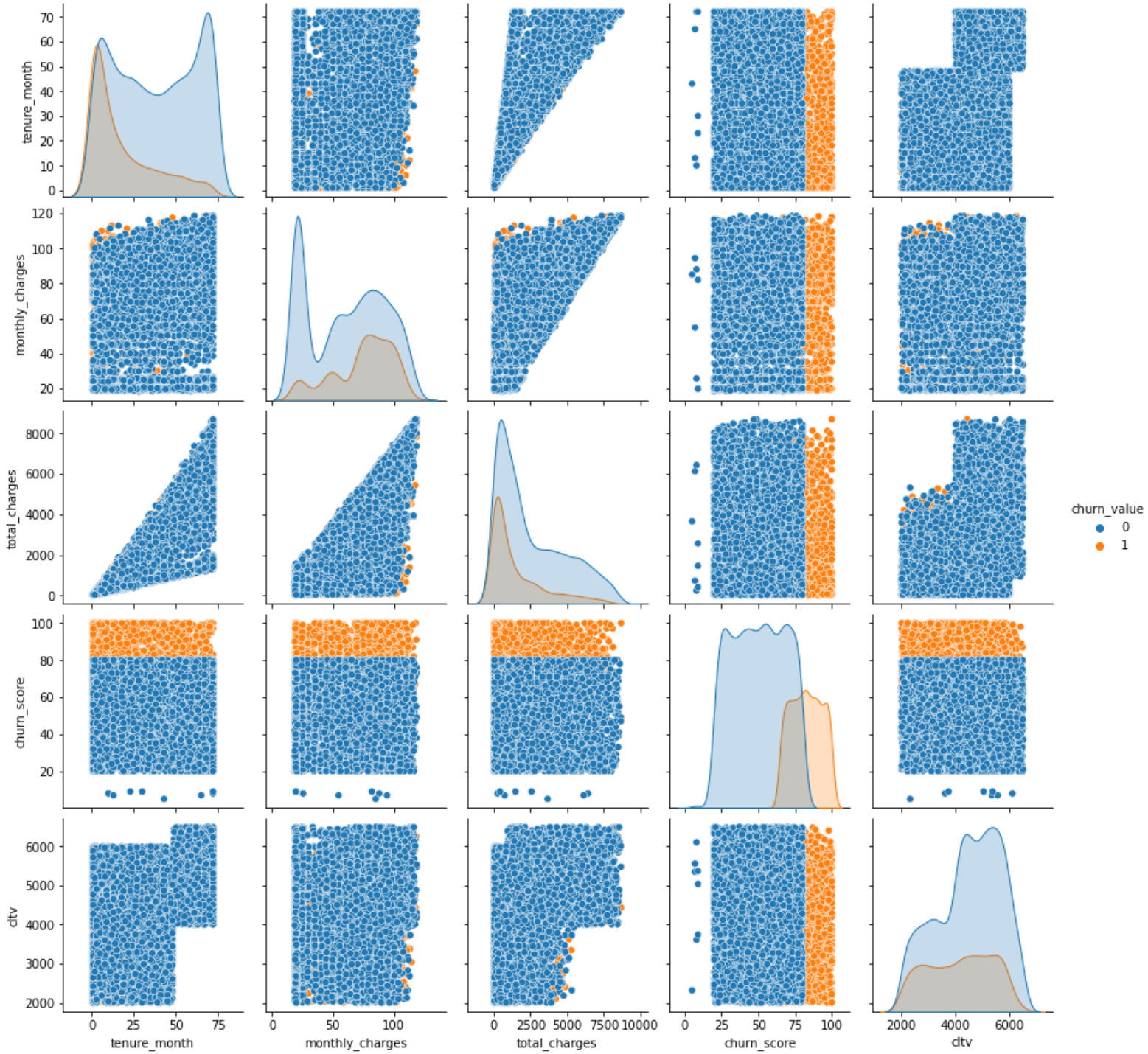
PAYMENT METHOD



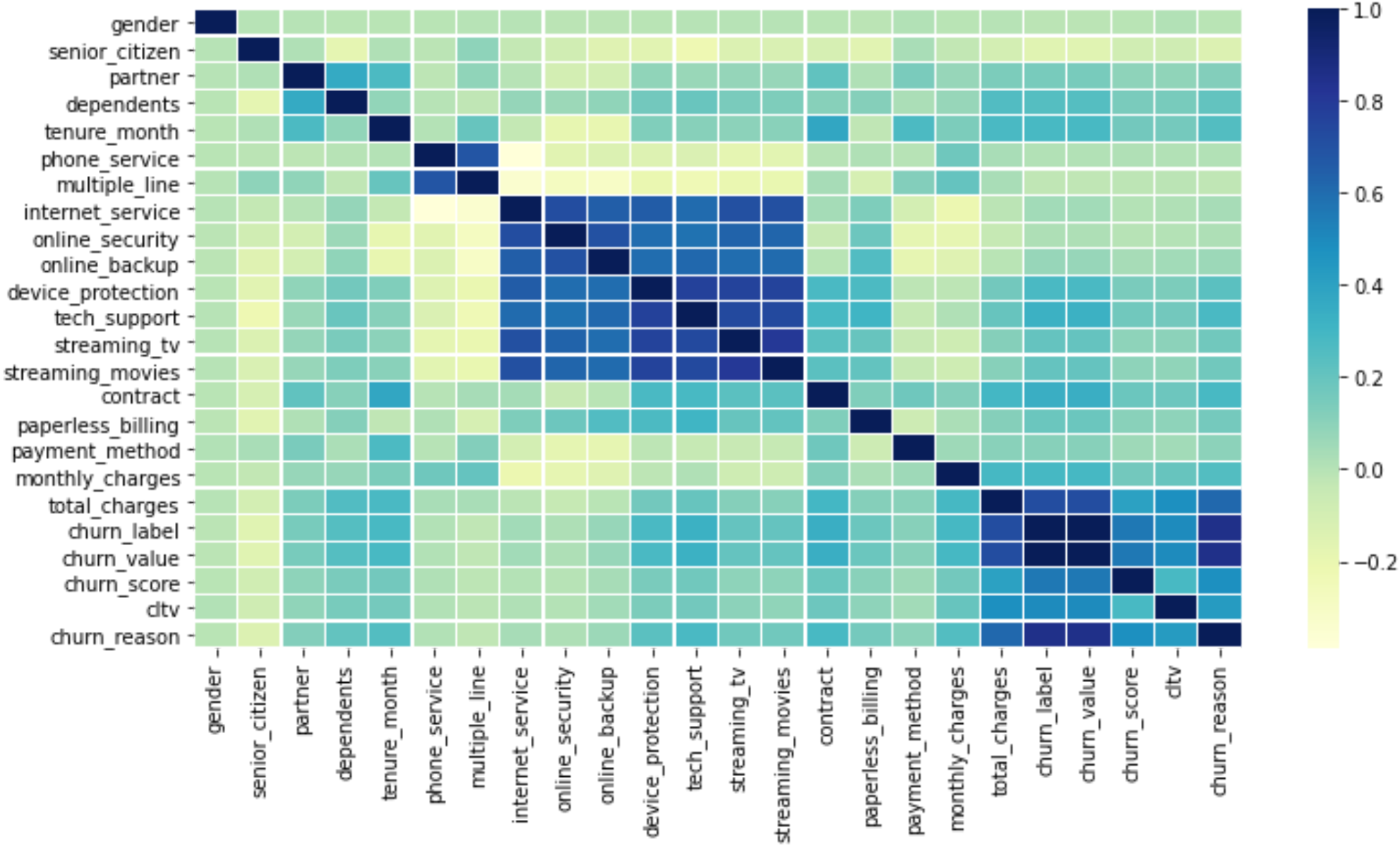
SENIOR CITIZEN



NUMERIC COLUMN



CORRELATION HEATMAP

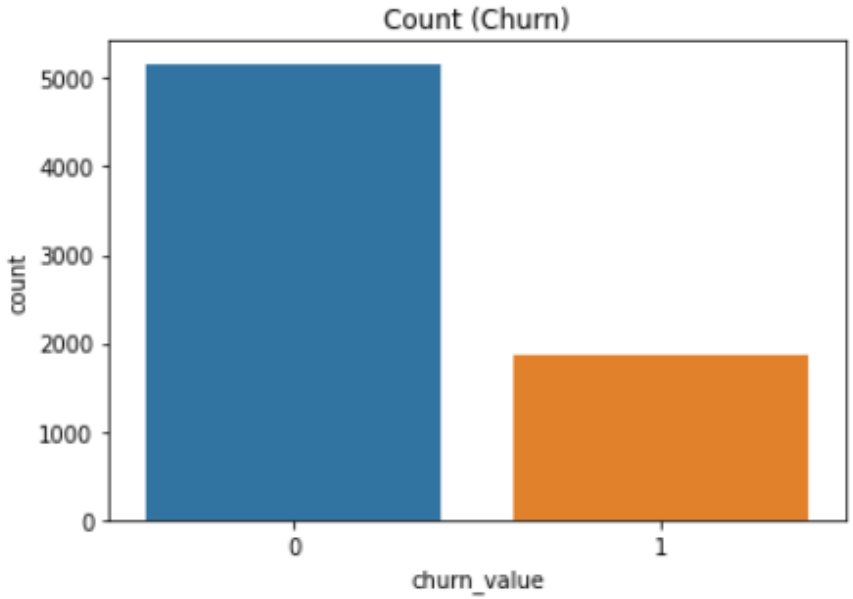


RANDOM UNDERSAMPLING

Random Undersampling involves randomly selecting examples from the majority class to delete from the training dataset.

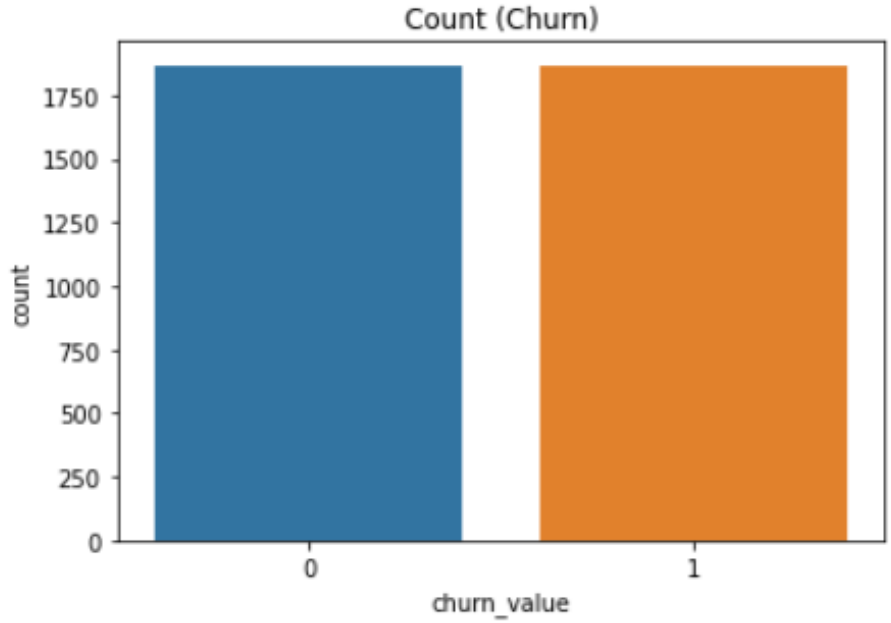
BEFORE

```
Class 0: 5163
Class 1: 1869
Proportion: 2.76 : 1
Text(0.5, 1.0, 'Count (Churn)')
```



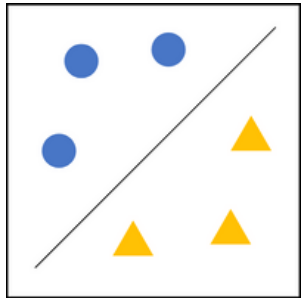
AFTER

```
1    1869
0    1869
Name: churn_value, dtype: int64
Text(0.5, 1.0, 'Count (Churn)')
```

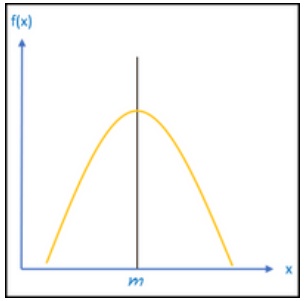


MODELLING

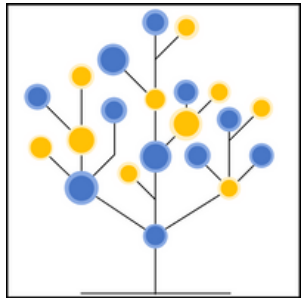
Support Vector Machine



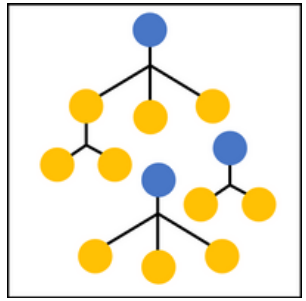
Gaussian Naive Bayes



Decision Tree Classifier



Random Forest Classifier



Train Set

80 % Total Data

X = 2990, 19

y = 2990, 1

Test Set

20 % Total Data

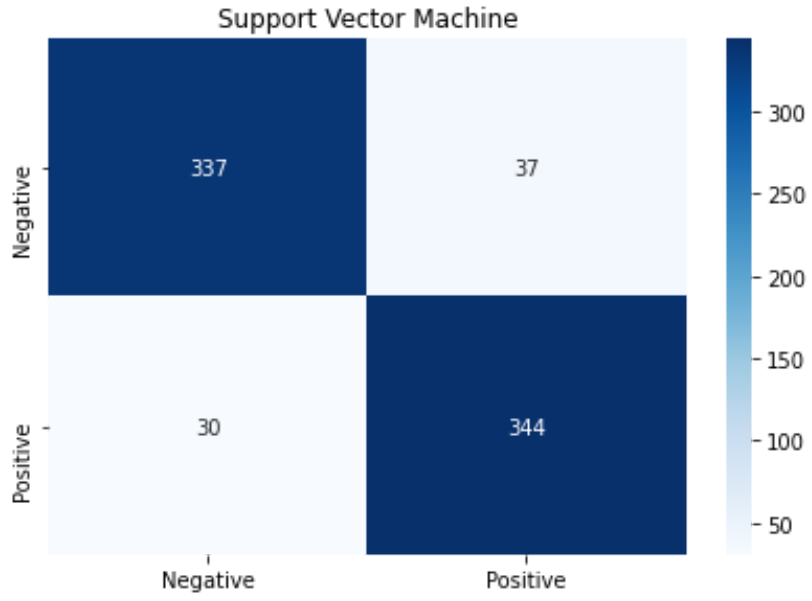
X = 748, 19

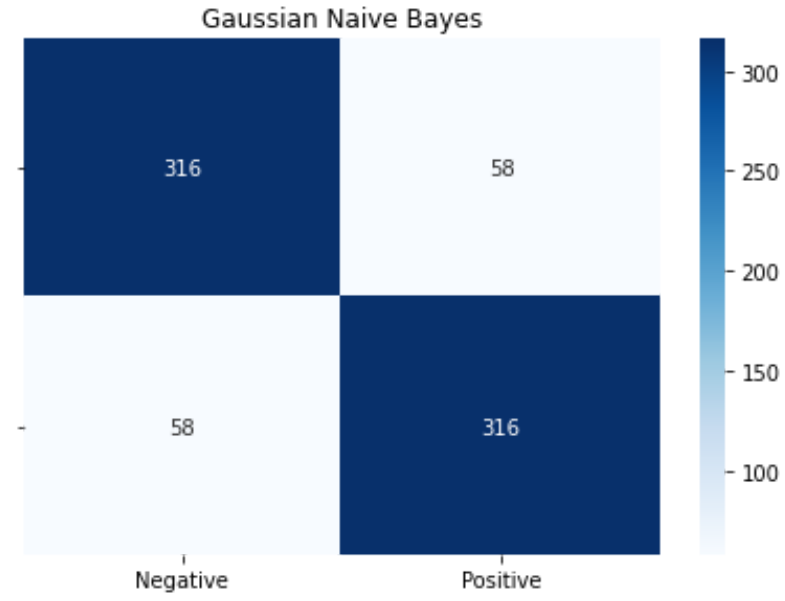
y = 748, 1

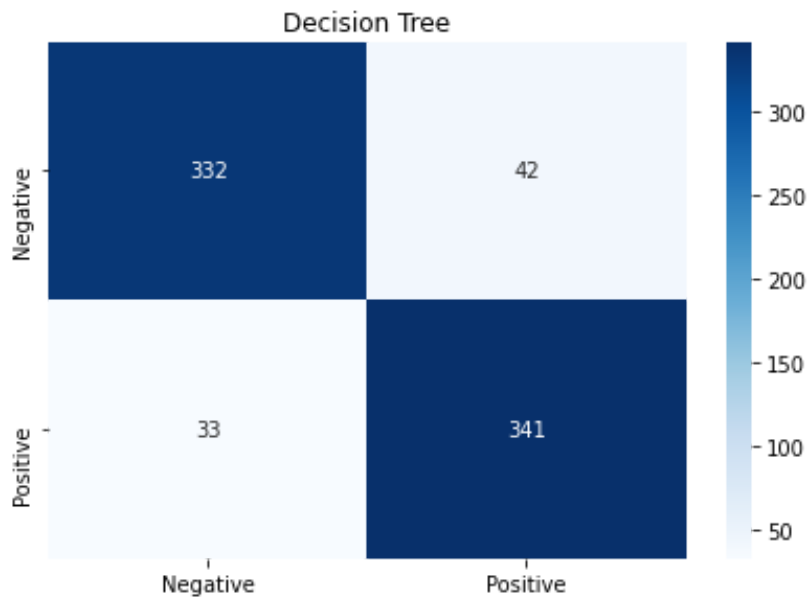
MODEL COMPARISON

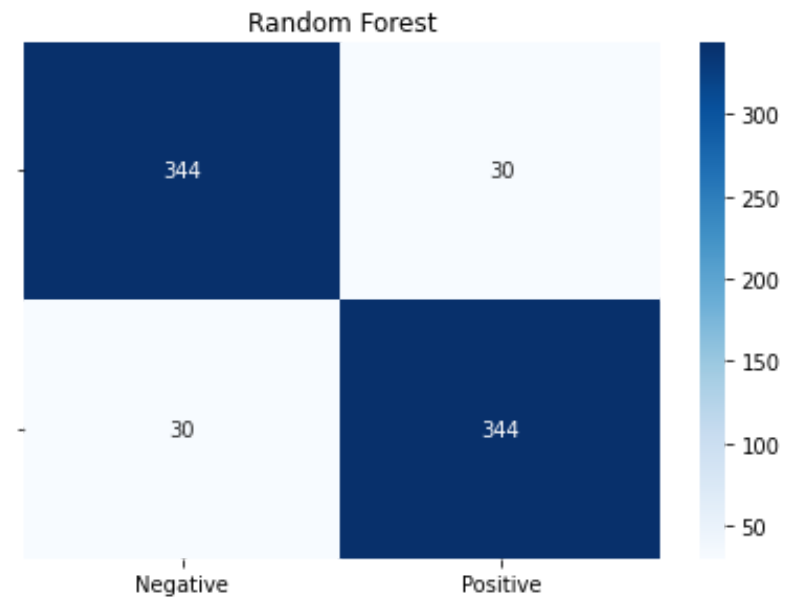
MODEL	ACCURACY	RECALL	PRECISION	F1 SCORE
Support Vector Machine	0.910	0.919	0.902	0.911
Gaussian Naive Bayes	0.844	0.844	0.844	0.844
Decision Tree Classifier	0.899	0.911	0.890	0.900
Random Forest Classifier	0.919	0.919	0.919	0.919

CONFUSION MATRIX









ROC AUC

Area Under Curve

AUC Train & Test : 99.9% & 96.57%

Confusion Matrix Evaluation

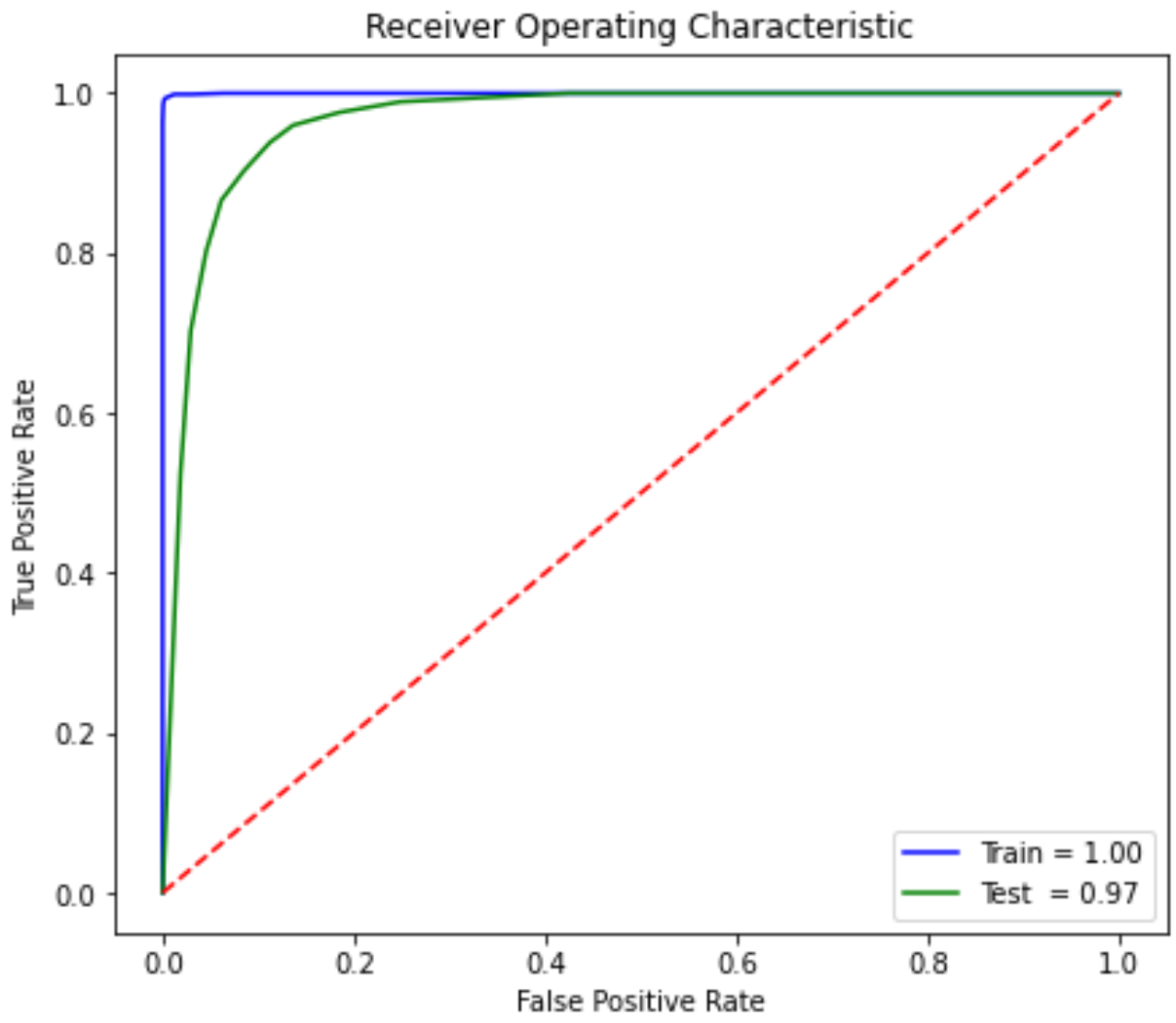
Accuracy Train & Test : 99.36% & 91.98%

Recall Train & Test: 99.13% & 91.98%

Precision Train & Test: 99.60% & 91.98%

F1 Score Train & Test: 99.36% & 91.98%

Log Loss Train & Test: 0.1502 & 3.1399



SUMMARY

- Some column was dropped because they can cause the model to overfit.
- Random Undersampling was chosen to handle the imbalance data.
- Random Forest Classifier was chosen as it is the best model compared to the other model in this case.
- Model were validated using ROC AUC.

THANK YOU

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https://github.com/raka-raprast