# DOM304: Contemporary Business Analytics

Group Project Presentation

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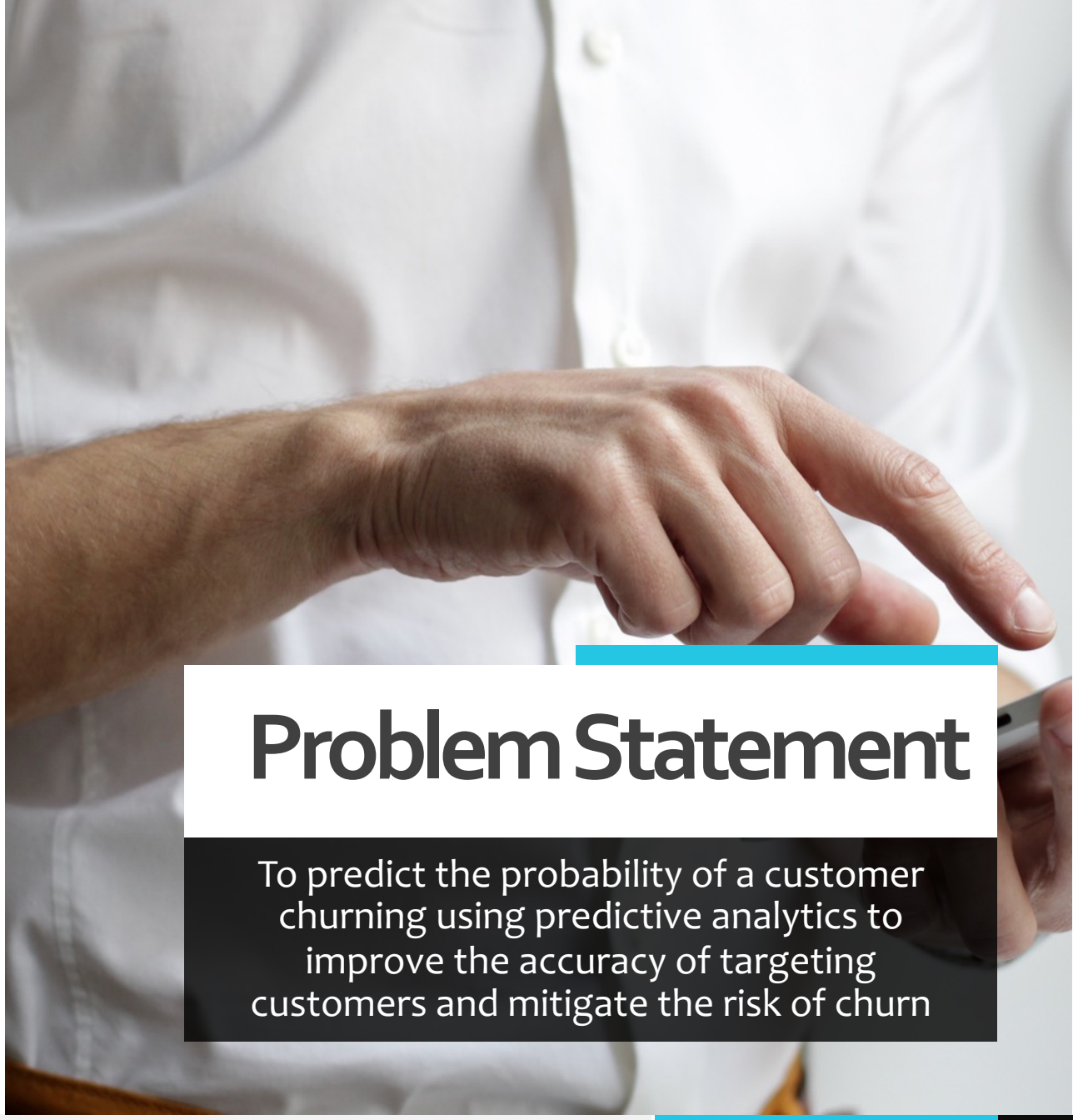
- Cell-Tel is a leading Mobile Telecom Operator (MTO) with a stellar track record and a strong customer base. It offers a multitude of services to its 125 Mn customers across regions.
- With the recent liberalization of telecom policies by the government, Cell-Tel is under threat from newer MTOs. These MTOs have had relatively short tenures but have been successful in taking away market share from Cell-Tel.
- This has prompted the board to take corrective measures and the first in a series of measures is reducing the customer churn rate.
- The telecom operator has conducted a customer survey on a sample of the population of a region under threat from the newer MTOs.
- This survey data is used by the marketing team and retention managers to target customers who are at a high risk of churn and offer them incentives



# Problem Statement

To predict the probability of a customer churning using predictive analytics to improve the accuracy of targeting customers and mitigate the risk of churn

# Data Understanding

An overview of the attributes of the dataset and results of basic data exploration

# Data

## Features in the data set

- Generic features like gender, details of dependents, senior citizenship status, relationship status (partner yes or no)
- Add-ons include subscription to multiple lines, availing of internet services, subscription to streaming services both movies and TV
- Customer support level data points include availing of online backup service, seeking help from tech support, anti-virus subscription
- Revenue related features like contract type, billing mode, payment method, monthly charges and total charges

## Data Quality

- Data quality was high with very little ambiguous values and outliers
- Mean imputation was employed to make up for missing values (<0.15% of the total data)

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# Overview

Brief insights into the data

**7K**

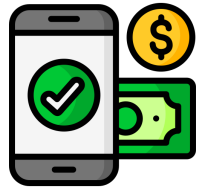
**Customers surveyed**

**$16.06M**

**Total Revenue**

**32 weeks**

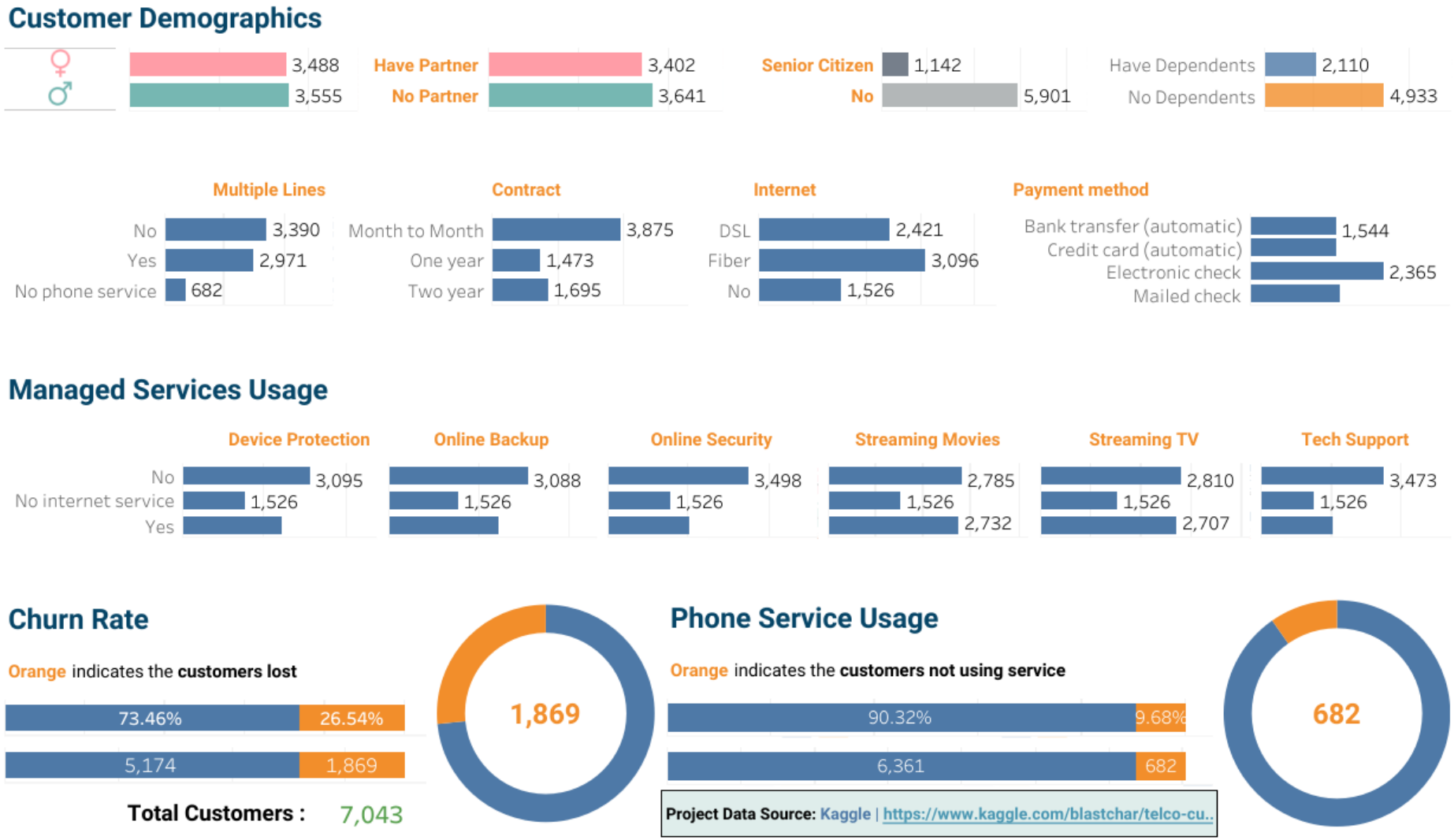
**Average tenure of customers**



**$64.76**

**Average monthly charges of customers**

# Pictorial Representation of the data



# Modelling

A total of 4 models were tested

- Logistic Regression
- K Nearest Neighbours Classifier
- Naives Bayes Classifier
- Decision Tree Classifier

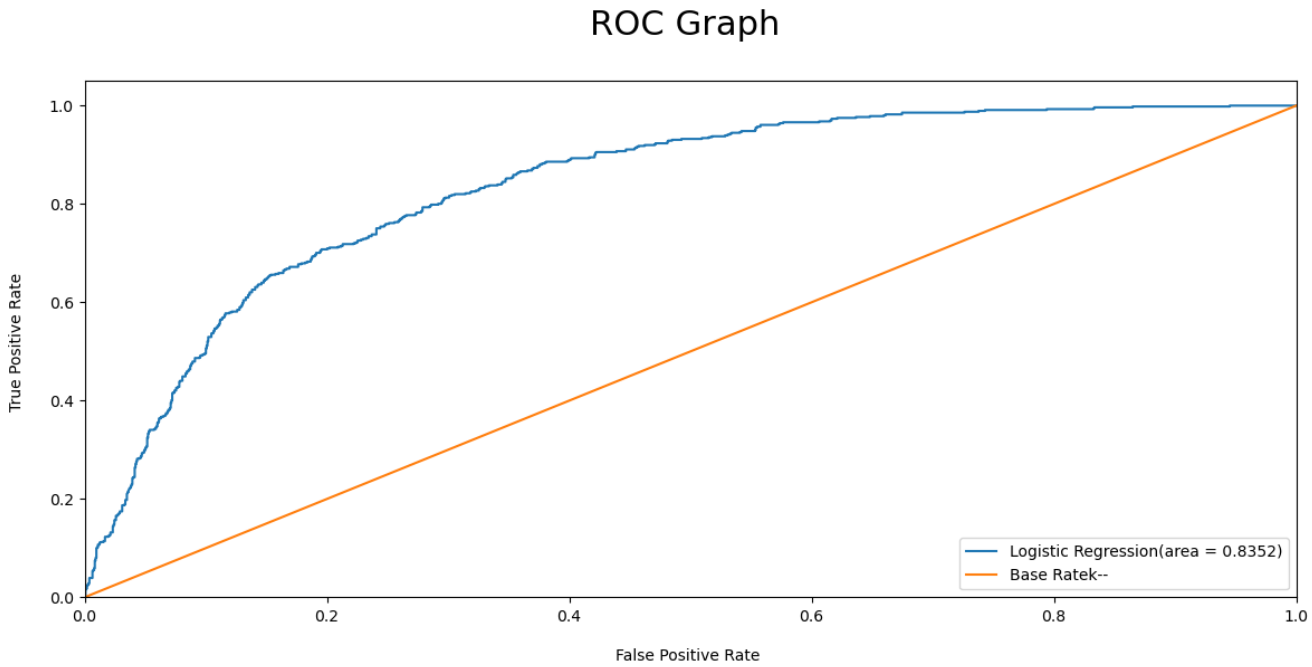
# Model Metrics

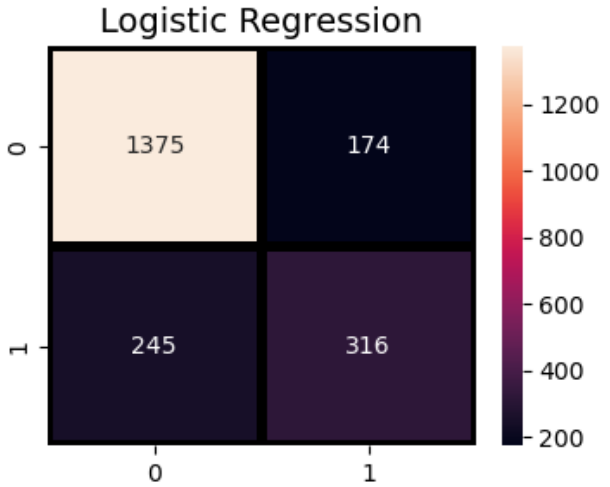
| | Precision | Recall | F1 Score | Accuracy |
|---|---|---|---|---|
| **Logistic Regression** | 0.644898 | 0.563280 | 0.601332 | 0.801422 |
| **K-Nearest Neighbours** | 0.579060 | 0.483066 | 0.526725 | 0.769194 |
| **Naive Bayes** | 0.508075 | 0.729055 | 0.598829 | 0.740284 |
| **Decision Tree** | 0.498239 | 0.504456 | 0.501329 | 0.733175 |

# Logistic Regression

LR is chosen and is recommended for deployment due to it appropriateness to the use case

- Logistic Regression is relatively easy to implement and explain
- The algorithm works very well on unseen data – an important parameter for Cell-Tel which operates in a sector where customer preferences change quite frequently
- The algorithm is less prone to over-fitting, thereby aiding the use case of the dynamic customer behaviour
- Since this is a sample of the population, Cell-Tel can very well scale this model to its large customer base of 125 Mn without compromising on computational efficiency




Accuracy
80.142%

F Score
0.6013

# Conclusion and Recommendations

- Comments on business implication
- Comments on shelf-life on model
- Guidance to reduce churn rates

# Business implication and model shelf life

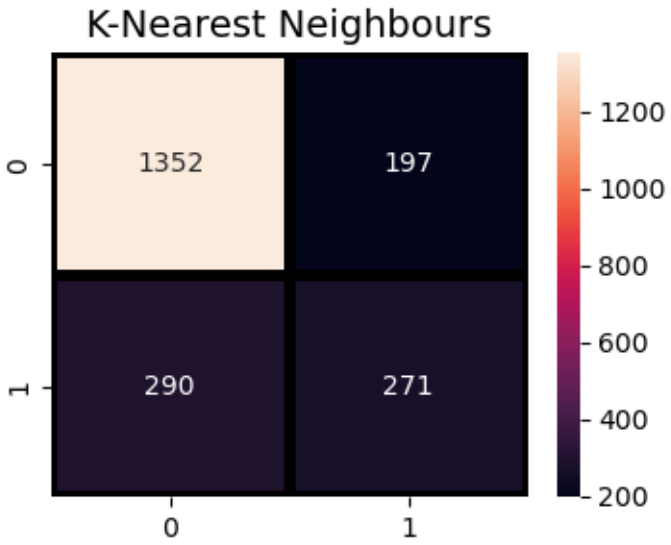
- Month-to-month contract type users are at the highest risk of churn
  - Converting current month-to-month users to long term contract subscribers has statistically shown to reduce the customer churn rate. Recommend amplifying the conversion rate by providing content about the key functional benefits of applying for a subscription model
- More than half of the churned customers have not subscribed to additional internet services and/or streaming services
  - Recommend attractively introducing additional internet and streaming services to these users. There is a higher chance that they will retain and become high value customers after purchasing these add-on offers.
- Fiber optic internet service is popular among both (churned and retained) customer groups
  - Cell-Tel can develop a better pricing plan since majority customers prefer unlimited data and revenue from fiber optic internet service could be used to offset any loss incurred due to customer churns.
- The model is expected to perform well unless there is a tectonic shift in consumer behaviour or there are newer government regulations.
- Cell-Tel is recommended to conduct periodic customer surveys to not only improve the current model, but also to leverage data to improve:
  - Ticket classification
  - Anomaly detection
  - Predictive maintenance
  - Dynamic Optimization

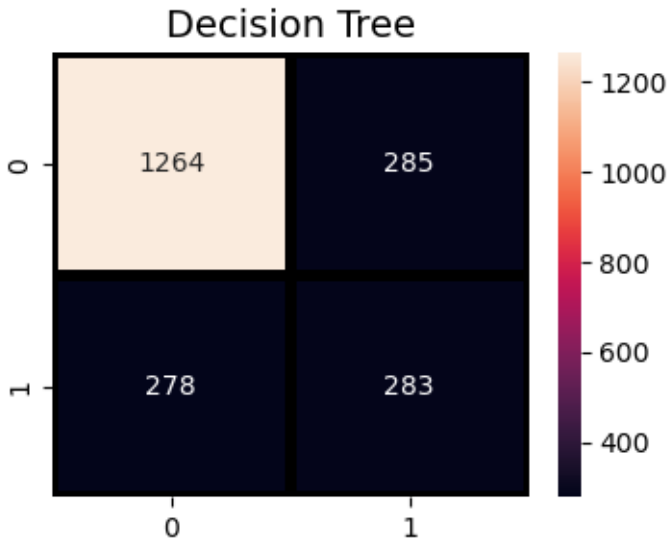
# ThankYou

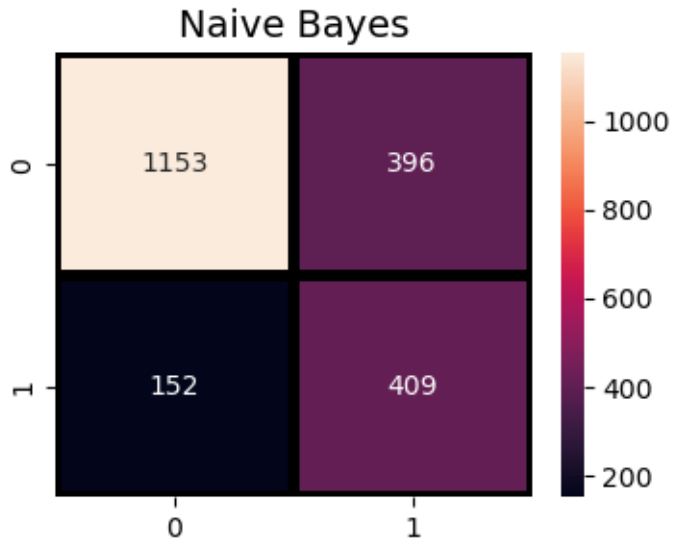
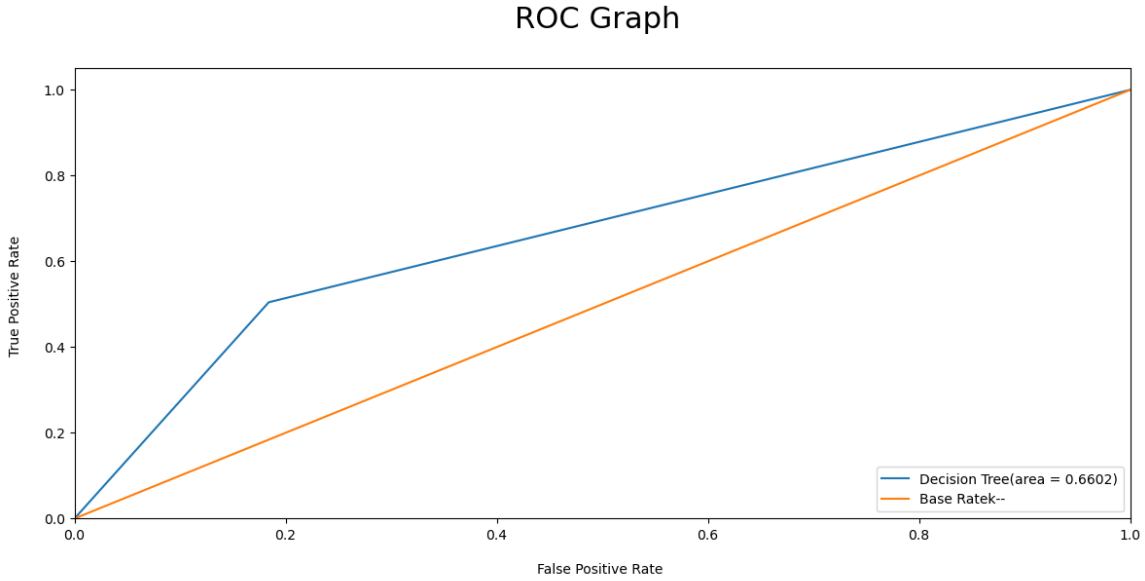
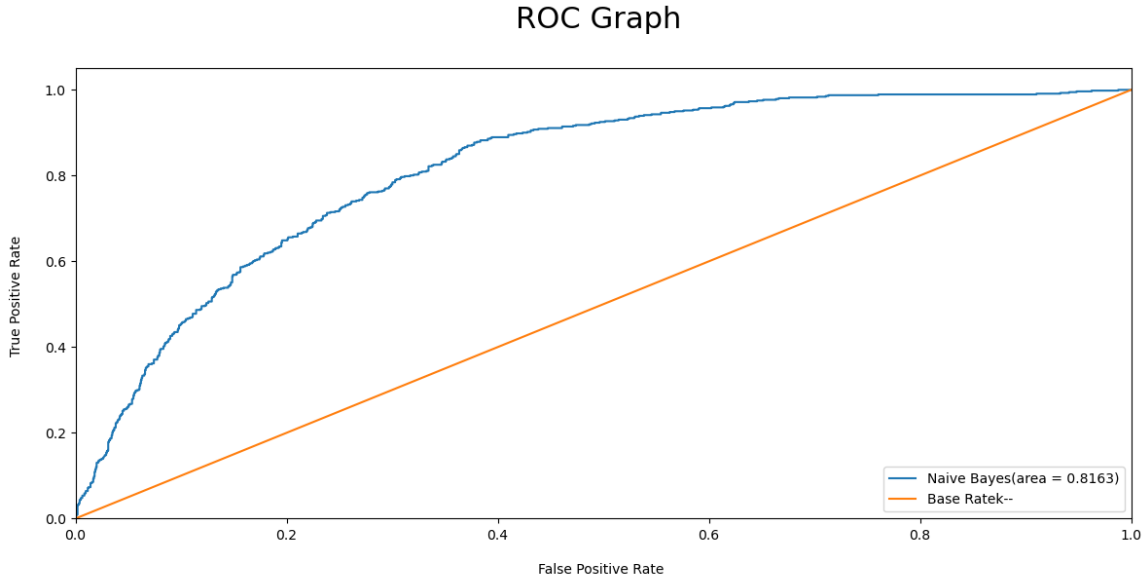
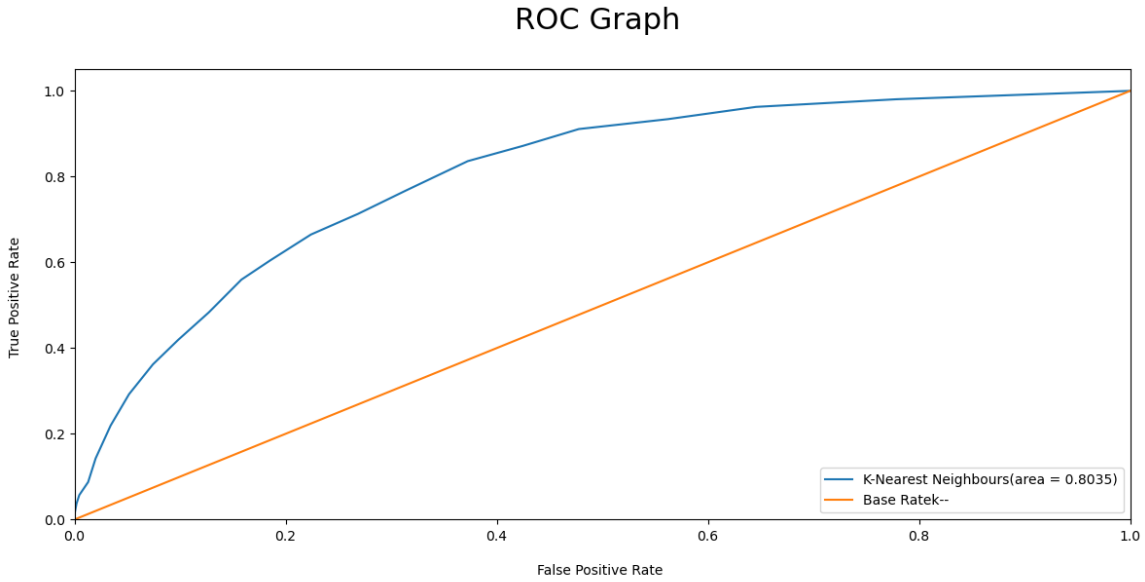
# Appendix

# Other Model Performances

Confusion Matrices






# Receiver Operating Characteristic (ROC) Curve