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# Business Understanding

***Overview***
We are looking into the Syria Telecommunications company dataset with a focus n the customer churn

***Problem Statement***
We want to know if a customer will soon stop doing business with Syria Telecommunications company or not and establish of there is a pattern. The goal here is make sure that our telcom business staff know how much money is lost through high churn rate and actually how to reduce this loss

***Stakeholder***
The telecommunication business

***Understanding***
**Churn** is measure of the rate at which customers stop busines, in our context, the rate at which customers stop doing business with Syria Telcom company

# Data Understanding

Data provided was for SyriaTel Companyto solve a binary classification problem and the target variable was customer churn rate.

Below is an explanation of the columns on our dataset

- `state` : The US state in which the customer resides.
- `account length` : The duration (in days) of the customer's account with the company
- `area code` : The area code of the customer's phone number.
- `phone number` : The customer's phone number.
- `international plan` : Whether the customer has an international calling plan (yes or no).
- `voice mail plan` : Whether the customer has a voice mail plan (yes or no).
- `number vmail messages` : The number of voice mail messages the customer has.
- `total day minutes` : The total number of minutes the customer has used during the day.
- `total day calls` : The total number of calls the customer has made during the day.
- `total day charge` : The total charges incurred by the customer for day usage.
- `total eve minutes` : The total number of minutes the customer has used during the evening.
- `total eve calls` : The total number of calls the customer has made during the evening.

- `total eve charge` : The total charges incurred by the customer for evening usage.
- `total night minutes` : The total number of minutes the customer has used during the night.
- `total night calls` : The total number of calls the customer has made during the night.
- `total night charge` : The total charges incurred by the customer for night usage.
- `total intl minutes` : The total number of minutes the customer has used for international calls.
- `total intl calls` : The total number of international calls the customer has made.
- `total intl charge` : The total charges incurred by the customer for international usage.
- `customer service calls` : The number of calls the customer has made to customer service.
- `churn` : Whether the customer has churned (True or False).

## Methodology

- Data preview/cleaning: Check for missing, null values and data summary
- EDA: Univariate and Bivariate Analysis
- Preprocessing: Correlation, OHE, Multicolleniarity, scaling, handling imbalance
- Classification models: Logistic regression, Decision Trees, Random Forests, Gradient Boosting, KNN, XGBoost and Cross Validation
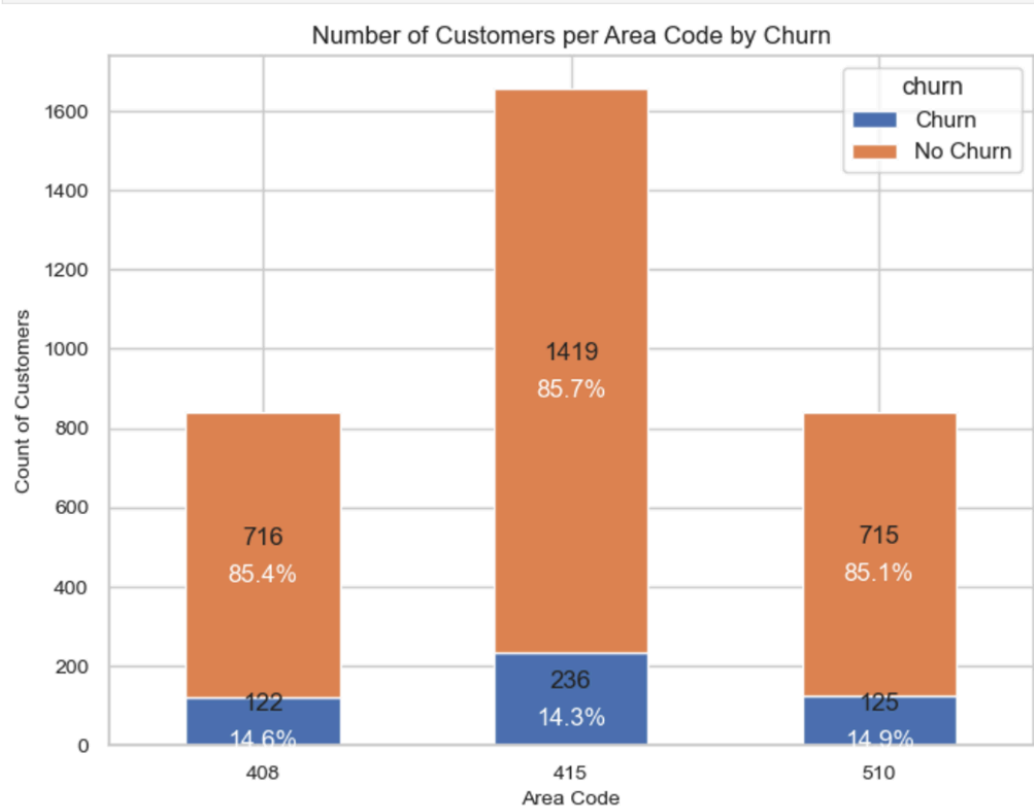
## Results

The was an imbalance in the customer churn and this had to be fixed using SMOTE technique
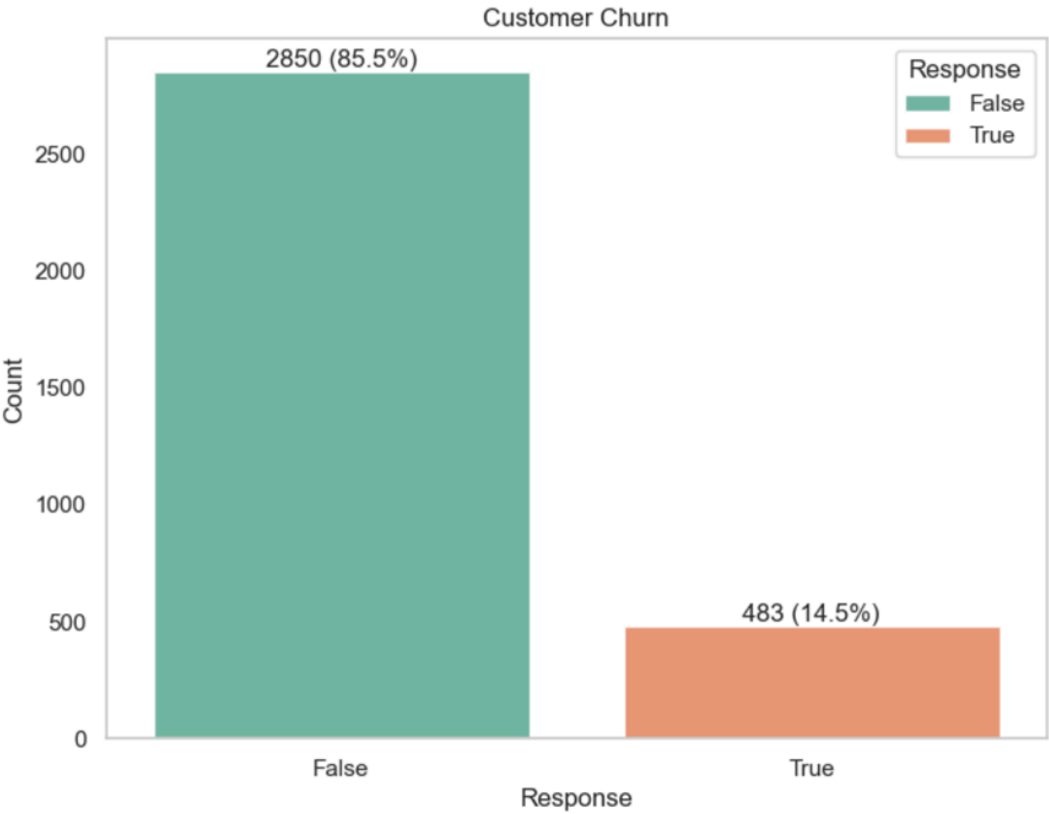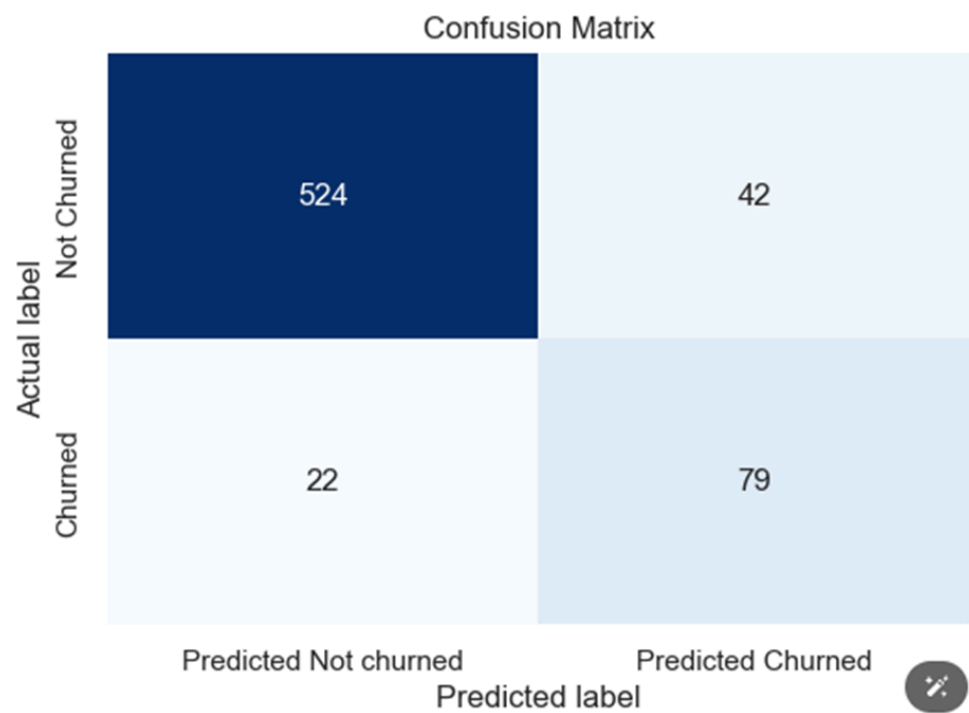
Customer Churn

Most of the customers were not under the international plan despite it being a key predictor



International Plan
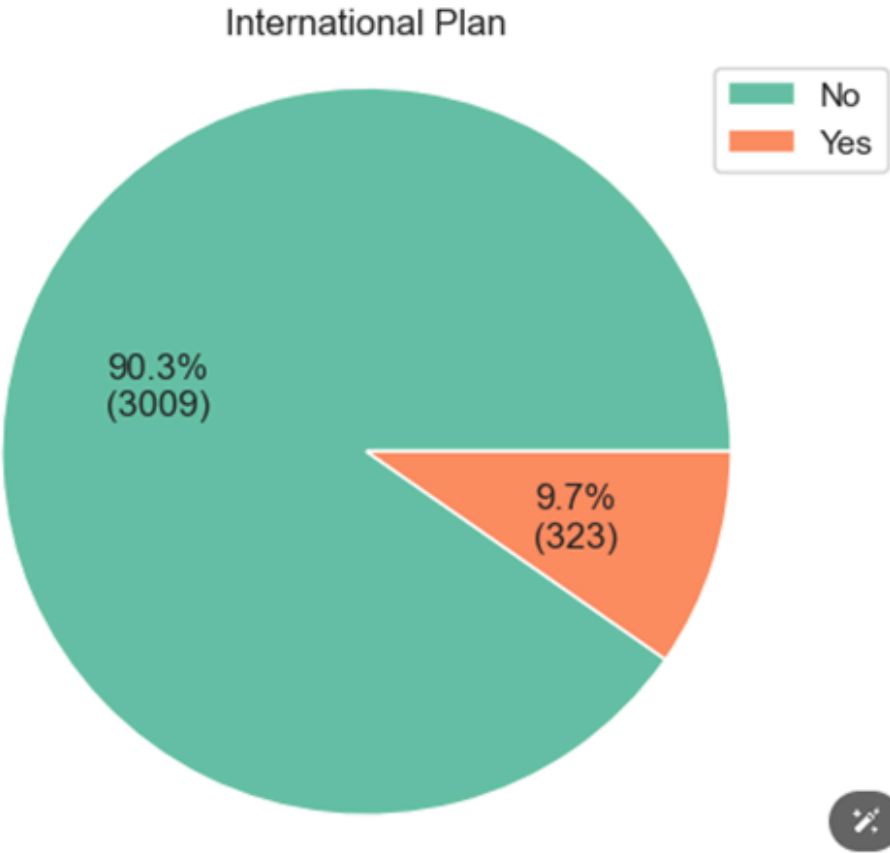
The customer churn across all the 3 area codes is relatively the same, i.e., approximately 14%

Number of Customers per Area Code by Churn

Random Forest Model had the best performance with 524 customers correctly predicted as not churned



Confusion Matrix

The best performing model by checking the Area Under the ROC Curve (AUC) was the Random Forest
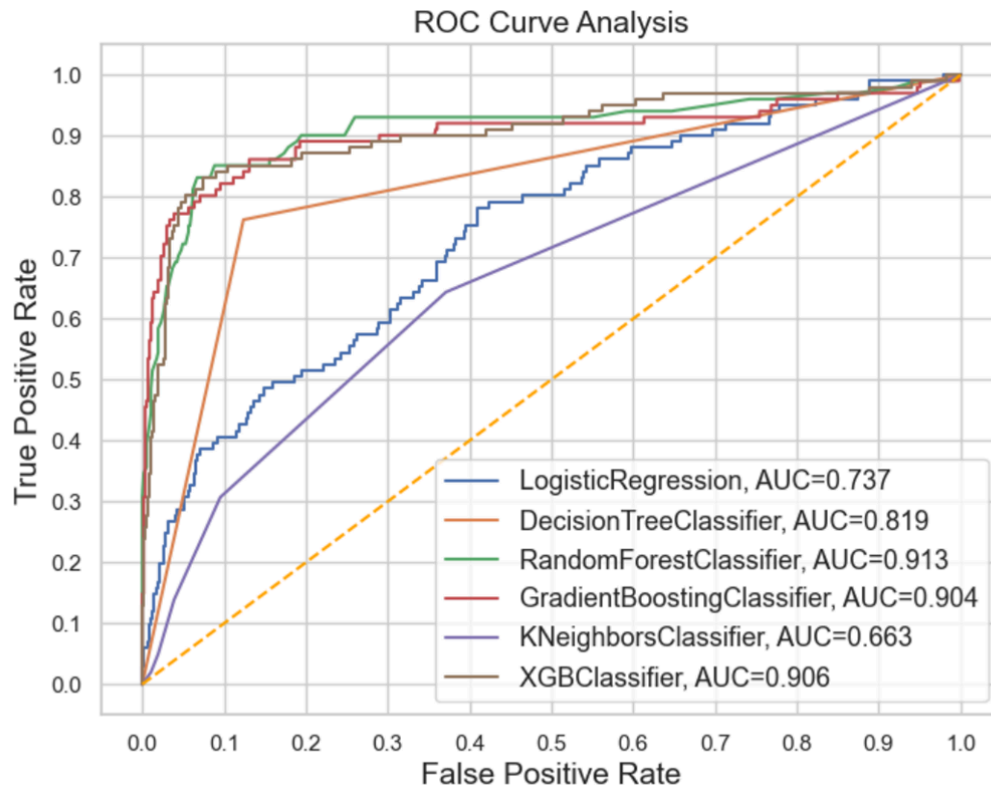
## Conclusion

The key items that determine a customer's churn are:-

- Internationa plan
- Total day charge and minutes
- Customer service calls

Handling these top 3 major factors will definitely reduce the customer churn.

## Recommendation

Below are the major recommendations for SyriaTel company to consider:

- Better their customer service techniques so as to reduce this churn rate
- Provide credit offers and minute offers to customers on their communication during daytime
- Increase their international coverage/provide better options for their customers to make international calls

## Recommendation

The SyriaTel company should do the following:

- Do more research on the which other Telecommunication company are shifting to and why so as to better their services.

- After every specified duration, they should run an analysis to monitor customer churn rate so to mitigate losses do to high