# Bank Customers Churn

Raden Ameer, Ain Salwa, Ainul Fatihah

# Table of Content

# Introduction

Customer Churn is well known as customer leaves a company over a given time. Retaining existing customer has always been priority for the bank as bringing new customer might cost more money.

## Project Objective

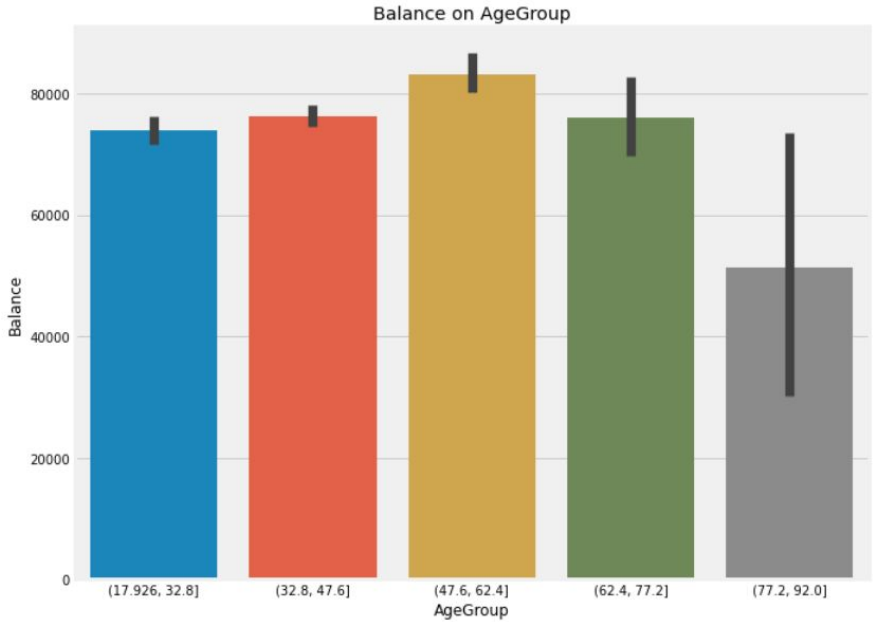
To predict customers churn in order to prevent possible profit loss for the bank.

# Analysis

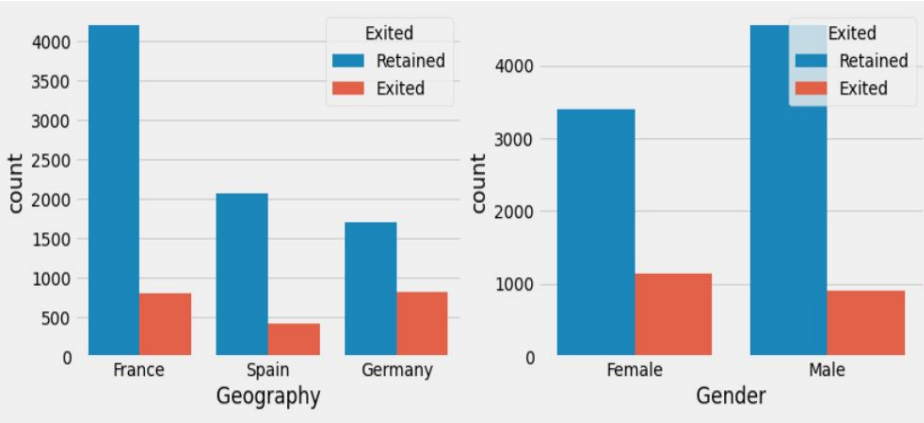
Further analysis on the dataset to identify and visualize customer churn.

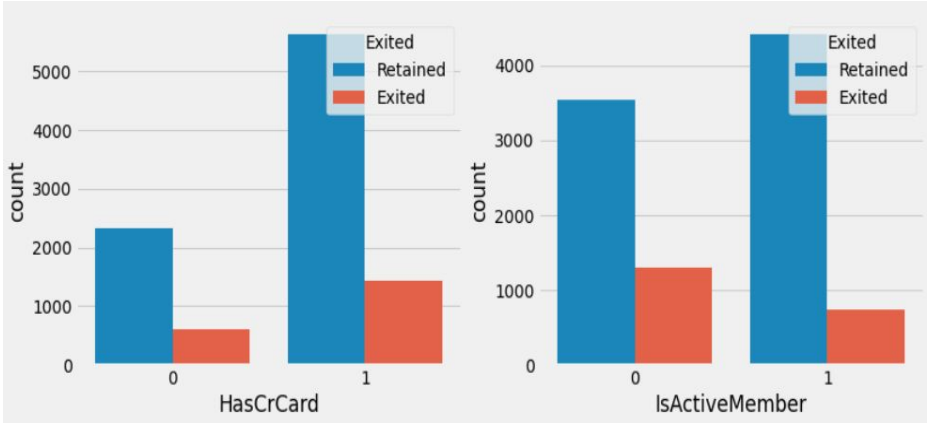
# Customers' Information

| Gender / Geography | Female | Male | |
|---|---|---|---|
| France | 2,261 | 2,753 | **5,014** |
| Germany | 1,193 | 1,316 | **2,509** |
| Spain | 1,089 | 1,388 | **2,477** |
| | **4543** | **5457** | |

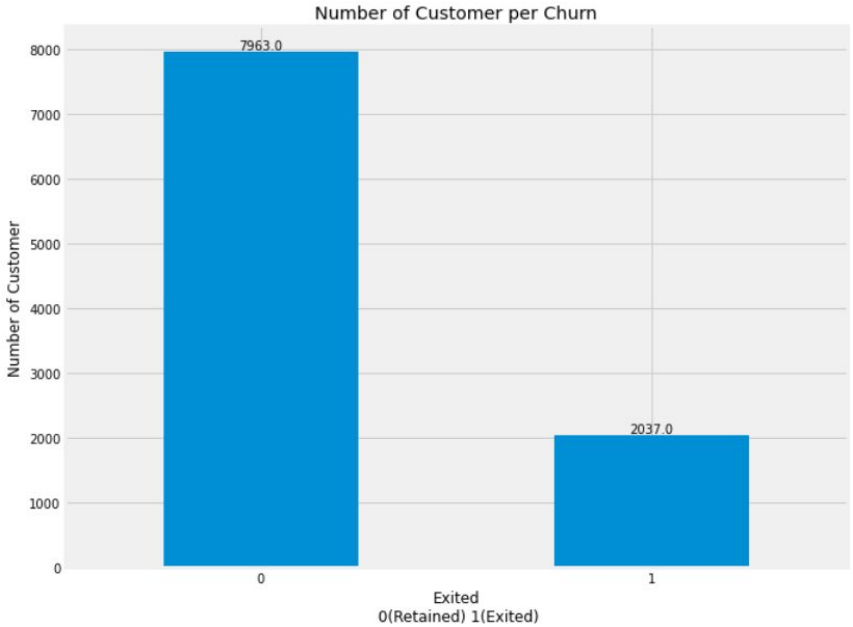


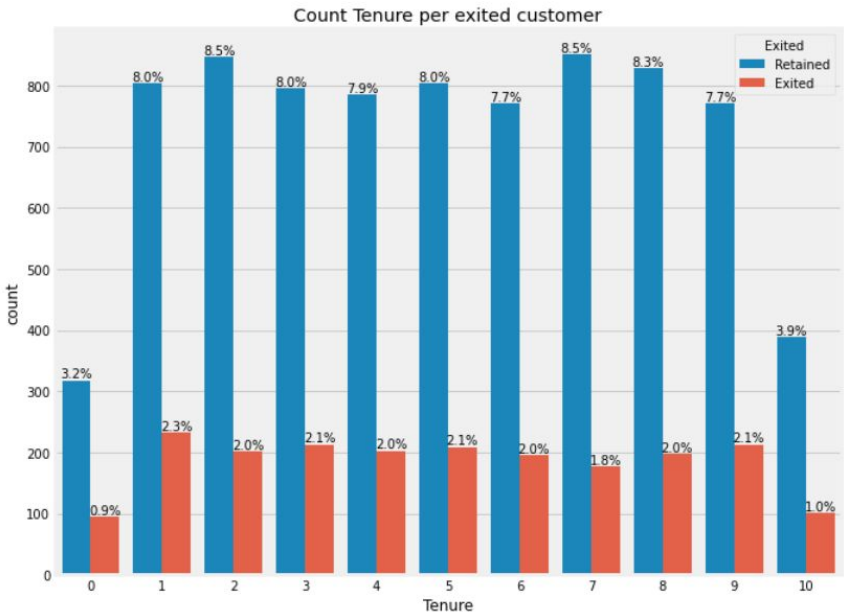
# Customers' Exit Identification



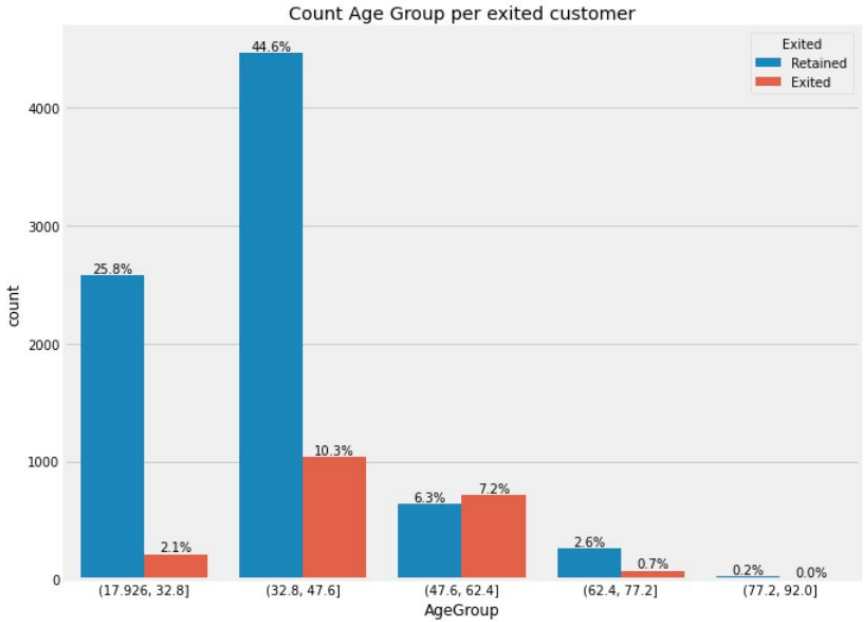



# Exit customer



# Exit customer



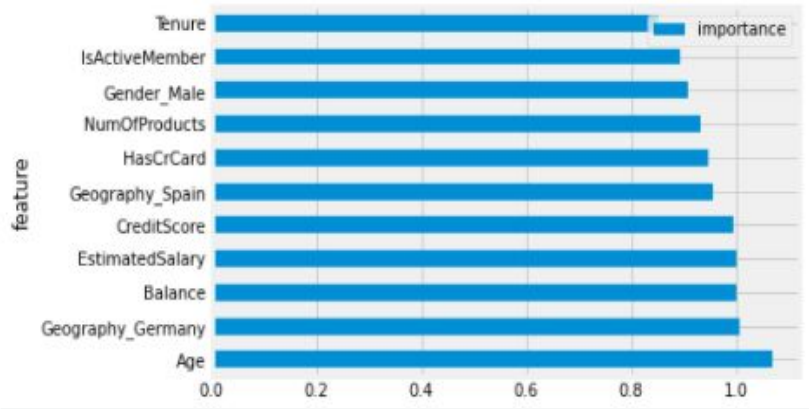
# Modeling

As the problem is classification problem, three algorithm based on classification had been choose as follows:

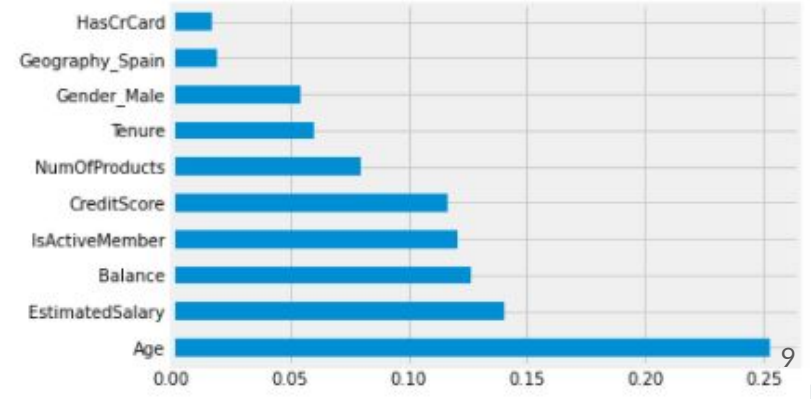
- Logistic Regression
- Decision Tree
- k-Nearest Neighbor

Logistic Regression and Decision Tree choose Age as the most importance variable in predicting either the customers will retained or exited from bank

Logistic Regression




Decision Tree



# Key Insights from Model

| Variables | Odds Ratio | Explanation |
|---|---|---|
| Age | 1.02 | For every one unit increases with age, the odd to be exited increases by 2% |
| Credit Score | 0.99 | For every one unit increases with credit score, the odd to be exited decreases by 1% |
| Gender | 0.79 | Female customer more likely to be exited than male |
| Geography_Germany | 1.02 | Customer from Germany more likely to be exited than customer from France |
| Geography_Spain | 0.85 | Customer from France more likely to be exited than customer from Spain |
| Has Credit Card | 0.90 | Customer without credit card more likely to be exited than customer with credit card |
| Is Active Member | 0.74 | Non-active customer more likely to be exited than active customer |
| Number of Products | 0.92 | For every one unit increases with number of products, the odd to be exited decreases by 8% |
| Tenure | 0.99 | For every one unit increases with tenure, the odd to be exited decreases by 1% |

# Performance Evaluation

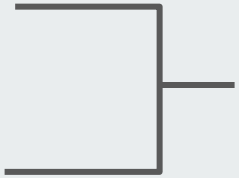
| Matrices / Model | Logistic Regression | Decision Tree | kNN |
|---|---|---|---|
| **Accuracy** | 69% | 79% | 69% |
| **Precision** | 70% | 79% | 67% |
| **Recall** | 68% | 80% | 78% |
| **F1-Score** | 69% | 79% | 72% |

Suggest to use Decision Tree model as it gives the highest accuracy and performance in predicting either customers will retained or exited from bank

# Key Findings for Business

1. **20.4%** (2,037 out of 10,000) customers from Spain, France and Germany had **terminated** their services with the bank after 6 months.

2. Most of the proportions of customers that Exited are in **Germany**.
   a. Age group of 30 - 40.
   b. Female customers
   c. Has credit card
   d. Non-active customers

   **More likely to churn**

3. This model uses customer's data to identify and predict the possibility of customers churn after 6 months with **79% accuracy**.

# Business Recommendation

1. **Engage** with customers who have high possibility of terminating their service with the bank.

2. **Improve** the **credit card system and the reward-based system** to its customers, especially to the loyal and high-spending customers.

3. To provide **push promotion** via direct selling, newsletter, message and advertisement to targeted customers .

# Limitations & Future Works

1. Data limitation is too biased toward customer retention. Need to increase sample size to further accurately improve the model.
2. Need to conduct more research on customers in Germany and France to further analyse their financial behaviour.
3. Suggest to add a few other variables, such as customer satisfaction survey, to the data.

References:


1. https://www.superoffice.com/blog/reduce-customer-churn/
2. https://hbswk.hbs.edu/archive/the-economics-of-e-loyalty
3. https://www.kaggle.com/artemsolomko/customer-churn-prediction