

Week 9 Deliverables

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Problem description

The objective of this project is to develop a predictive model for ABC Bank to determine the likelihood of customers subscribing to their term deposit product. By analyzing customer interactions with the bank and other financial institutions, the machine learning model will identify potential clients who are more likely to purchase the product. This will enable the bank to optimize their marketing efforts by focusing resources on customers with a higher probability of conversion, thus enhancing campaign efficiency and reducing costs. The project will assess model performance with and without using the "duration" feature while also addressing any data imbalance through suitable techniques.

Github Repo link

https://github.com/yuh39/Bank_Marketing_Group_Project/tree/main/docs

Link to EDA files

Rishi Aluri:

https://github.com/yuh39/Bank_Marketing_Group_Project/blob/main/notebooks/week_10/EDA_RishiAluri.ipynb

Final Recommendation

1. **Bank-addtional.csv:** Based on the EDA performed on this file, below are the recommendations:
 - a. Target the age group of 30 to 40 years old. This group has the highest percentage of people who have purchased the term deposit product.
 - b. Market the product more to retired people. Although the percentage of retired people who have purchased the product is lower than the percentage of people in the 30 to 40 age group, it is still significant.
 - c. Target single people. Single people are more likely to purchase the term deposit product than married or divorced people.
 - d. Target people with professional or university degrees. These people are more likely to have the financial means to purchase the term deposit product.
 - e. Focus on customers who have been contacted recently. The duration of the last contact and the number of previous contacts have a positive correlation with the likelihood of a customer purchasing the term deposit product.

- f. Avoid contacting customers who have been contacted recently from a previous campaign. The number of days that have passed since the customer was last contacted from a previous campaign has a negative correlation with the likelihood of a customer purchasing the term deposit product.

2. Bank-additional-full.csv:

The bank can focus their effort in customers with the following attribute:

- a. greater than 60 years-old: probability of purchase for customer under 60 is 10%, while it is 39% for customers 60 or older)
- b. retired or student: customers who are retired (25% probability of purchase) or students (31% probability of purchase) have the highest chance of purchase all job categories
- c. single: customers who are single have higher chance of purchasing the product than married or divorced customers
- d. university degree: customers with a university degree in their education have a 14% probability of purchase. It is the highest among all education categories excluding illiterate (which doesn't have enough samples)
- e. has cellular as contact method: customers that have cellular as contact method have a 15% chance of purchase, which is significantly higher than the 5% purchase chance of customers who have telephone as their contact method.

other attributes:

- a. High number of contacts performed before this campaign(previous): the probability of purchase increases as the number of contacts performed increases in general
- b. positive experience with the previous campaign(poutcome): customers labeled 'success' in 'poutcome' column has a higher chance of purchasing the product
- c. contacted at least once since their last contact from a previous campaign(pdays): customers who have never been contacted have significantly lower chances of purchasing the product.

social and economic context attributes:

- a. Number of employees: negative correlation with the probability of purchase for this product
- b. Employment variation rate: negative correlation with the probability of purchase for this product

- c. Consumer price index: The CPI has negative but weak correlation with the possibility of purchase (pearson correlation: -0.14)
- d. Euribor-3-month-rate (interest rate at which a selection of European banks lend one another funds denominated in euros): negative correlation with the possibility of purchase (pearson correlation:-0.31)

3. Bank-full.csv:

Here are my recommendations for the bank:

- a. The bank can focus on the customers with secondary education.
- b. The bank can focus on the customers without housing or personal loans.
- c. The customers with age between 30-40 are more likely to subscribe.
- d. December, March, September and January are not ideal times to attract customers.
- e. The bank can focus on the customers who are using cellular contact.
- f. The bank can focus on the customers who are contacted in a few days.

We will use predictive models later to provide more in-depth analysis.

4. Bank.csv:

This is a subset of bank-full.csv and similar recommendations would apply here including focusing on customers with secondary education, those without loans, and the age range of 30-40 being a target demographic