

**Group Name: BRAVO**

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## **Problem description**

In today's competitive banking scheme, organizations are constantly looking for innovative ways to improve their marketing strategies. ABC Bank competes in the banking sector, where growth and financial stability depend on having a steady and varied funding source. A crucial financial instrument like term deposits offers a steady stream of income to support bank's lending activities as well as general operations. This provides secure and predictable ways to earn higher interest rates on their savings over a fixed period to their customers as well.

To promote their term deposit product to yield business benefits they could rely on traditional marketing techniques like telemarketing, and SMS/email marketing, however, often this generally leads to low conversion rates and ineffective resource utilization as this don't have the level of detail necessary to effectively reach and engage potential customers. Therefore, before launching its product, ABC Bank wants to use an advanced machine learning model to transform its term deposit marketing approach. Our goal is to build an appropriate ML model which helps them identify the customers who are most likely to subscribe to this product based on their previous interactions with the bank.

The model will take into attributes like age, job, marital status, education, credit default status housing and personal loan statuses, type of communication contact, and details about the timing and frequency of past contacts and economic indicators like employment variation rate, consumer price index, consumer confidence index, Euribor 3-month rate, and number of employees. Using this variable our machine learning model shall find within them patterns and correlations that help in predicting the propensity of a customer to subscribe to a term deposit. This enables the bank to streamline its marketing efforts by targeting predicted customer segments or demographics.

In the end, the ML model's insights will help ABC Bank deliver more persuasive and individualized marketing communications, which will increase customer happiness and engagement. This strategic move is anticipated to boost revenue for the bank, improve client connections, and demonstrate ABC Bank's dedication to using technology to achieve better business results.

## **Business Understanding**

ABC Bank is aiming to improve the marketing strategy for its term deposit product by predicting which customers are most likely to purchase it. The primary objective is to increase sales of the term deposit by focusing marketing efforts on those customers who are most likely to buy it, based on their past interactions with the bank and other financial institutions.

To achieve this, the bank plans to use historical data on customer demographics, financial behavior, and previous responses to marketing campaigns. By analyzing this data, the bank can

identify patterns and characteristics that indicate a higher likelihood of subscribing to the term deposit. This enables the bank to segment its customer base more effectively, tailoring marketing messages and offers to different groups to enhance engagement and conversion rates.

Another key aspect of the project is resource optimization. By targeting only those customers who are more likely to convert, the bank can allocate its marketing budget and resources more efficiently, reducing waste and increasing the overall return on investment for its marketing campaigns. This targeted approach not only saves costs but also increases the effectiveness of the marketing efforts.

Additionally, ABC Bank must ensure that all data collection and processing activities comply with relevant data privacy and protection regulations. Maintaining customer trust is crucial, so the bank must use the data responsibly and transparently.

In the competitive landscape of the banking sector, leveraging data analytics for more effective marketing strategies provides a significant advantage. By staying ahead of competitors in identifying and targeting potential customers, ABC Bank can increase its market share and strengthen its position in the market.

To implement this strategy, the bank will first gather and preprocess the necessary data. Then, it will develop and train a predictive model using machine learning techniques. After evaluating the model's performance to ensure its accuracy and robustness, the bank will deploy the model within its marketing system. Continuous monitoring and updates will be essential to maintain the model's performance over time.

In summary, by developing a predictive model to identify potential customers for its term deposit product, ABC Bank aims to enhance its marketing campaign's effectiveness, improve customer targeting, and ultimately increase the subscription rate of the term deposit.

## **Project Lifecycle**

### **(Pt. 1) Initiation:**

Define the project objectives and scope:

ABC Bank has a term deposit product that they want to sell. ABC Bank wants to sell their product to customers who have a higher chance of buying it so they can focus their marketing channel to save money and resources. For this purpose, they request a model that can predict whether a customer will buy their term deposit product. Our team is to develop and present this model.

(For more detail of intermittent objectives see the planning section)

Identify key stakeholders:

Theoretically, there are many stakeholders to the success of a bank's term deposit product, but we would define the main stakeholders to be certain people internal to the company including executive leadership, management, and business units, and our data science team working on this project. Externally, the customer base as a whole is a big stakeholder.

Project Charter:

Project title: Data Science:: Bank Marketing (Campaign)

Project Purpose and Justification: ABC Bank seeks success for their new term deposit product. Their strategy for its success involves focusing their marketing channel on customers more likely to buy it. This is a very common marketing tactic used industry wide. To accomplish this, they seek the expertise of a data science team to build a model that can segment their customers.

Project objective: (Stated in initiation)

Project scope: (Stated in initiation)

Project deliverables: (Refer planning section)

Project stakeholders: (Stated in initiation)

Project timeline: (Refer planning section)

Project budget: (NA)

## **(Pt. 2) Planning:**

Risk management and Communication plan: For each weekly assignment there will be an initial team meeting to discuss plans. Team members are expected to attend meetings as this is when roles are initially established. If a team member misses a team meeting it is their responsibility to request meeting details including their workload. If a team member is uncertain about their workload for a week, inquiries to the other team members should be made as soon as possible. Team members will be required to commit to a fair workload so that all requirements can be fulfilled. If a team member needs assistance with their work, they may request it and ideally a team member will be fairly chosen to fulfill the requirement with the help of the team member originally assigned that task. Collaboration of ideas may be discussed in the initial weekly team meeting or upon request. However, it is best to discuss these details as early as possible for

effective planning. Individuals' progress should at least be saved locally, ideally with a version control system to avoid the loss of work.

### **Week 8 – The initial exploration and correction of the data**

Due: 06/26/2024

Summary requirements: (Data understanding, Data types, NA values, outliers, etc.)

Roles and responsibilities: Members will be assigned to certain data understanding and data issue tasks based on their preferences and skills discussed in the meeting. Team members will be required to collaborate their ideas by adding them in the document for submission.

### **Week 9 – Data cleansing and Transformation**

Due: 07/02/2024

Summary requirements: (NA values, outliers, featurization, regex, python, etc.)

Roles and responsibilities: Members will be assigned to code certain Data cleansing and Transformation tasks based on their preferences and skills discussed in the meeting. Each member should have unique methods and review all the other member's code. Team members will be required to combine their ideas by adding their code to a single repository.

### **Week 10 – EDA and recommendation**

Due: 07/09/2024

Summary requirements: (EDA .ipynb file and corresponding recommendation)

Roles and responsibilities: In the meeting, team members will be describing the direction they will be taking for their data analysis. Members will be expected to produce similar levels of work in their analysis. Members will be staying in contact so that they can keep other team members updated on their data analysis completions and pursuits so that ideally the same work is not done more than once. The final recommendation should be collaborated on by all team members.

performance metrics and baselines: When conducting data analysis, it is critical to observe interesting and useful statistics and metrics that may support arguments in the presentation.

### **Week 11 – EDA presentation and proposed modeling**

Due: 07/16/2024

Summary requirements: (EDA for business users, recommended models for technical users.)

Roles and responsibilities: Each member should integrate their own analysis into the presentation. If the work of the analysis is similar for each member from Week 10, then the work presenting it should be roughly similar. Team members should state their unique ideas for the recommended model's section. However, in case the analysis work was imbalanced from Week 10, members may contribute more or less to the recommended models in the technical section.

performance metrics and baselines: Statistics and metrics that fit analytical arguments may be presented here. There may be the need for model evaluation to come up with the list of recommended models for the technical section at the end of the presentation.

## **Week 12 – Model selection and building**

Due: 07/23/2024

Summary requirements: (Explore one model for each family of models e.g. (linear, ensemble, and boosting etc.))

Roles and responsibilities: Generally, our base model is classification (subscribed to term deposit or not). This means we will ideally test 4 models (one per group member) each of a different family of classification models. Team members will be required to combine their ideas by adding their code to a single repository.

performance metrics and baselines: To focus on the models that work well from the different model families, model evaluation will take place.

## **Week 13 – Final Project Report and Code**

Due: 07/30/2024

Summary requirements: (Combine ideas to come up with one solution to the problem statement. This solution requires code and a final PowerPoint presentation.)

Roles and responsibilities: Team members should spend a relatively equal time working on the final presentation and they should spend a relatively equal time collaborating on the final solution. Each team member has an opportunity and duty to present their model and collaborate ideas for the final model.

performance metrics and baselines: Model evaluation should be used here to select the best model or models as a solution to the business problem. The presentation should present appropriate statistics and metrics in a way that answers the problem thoroughly.