Class 10 (Case Study) Customer Targeting Using Supervised Learning for M&S

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Section 1

Business Objective

Background

Recently, M&S has launched its highly anticipated Beauty Advent Calendar for 2025, a curated selection of beauty and skincare products worth £330. This limited-edition calendar is available to customers for only **£60** when a customer purchases it alongside other products. With the holiday season approaching, M&S wants to maximize the reach and response of its marketing campaign by promoting the advent calendar offer to the right customers.

M&S decides to use a conventional direct mail marketing strategy, where customers receive colour-printed leaflets via Royal Mail to their doorsteps. Each mailer costs **£1.5 to produce** and another **£0.5 to mail** to the customers. M&S also plans to include a small sample of the beauty product, which costs M&S **£2 to produce**. If a customer responds to the offer, M&S expects them to spend **£35** on full-price clothing, homeware, or beauty, and purchase the advent calendar at **£60**. The COGS for clothing, homeware, and beauty products is **85%**. The COGS for the advent calendar is **90%**.

Cost-Benefit Analyses

- **Cost**: Each mailer costs **£1.5 to produce** and another **£0.5 to mail** to the customers. M&S also plans to include a small sample of the beauty product, which costs M&S **£2 to produce**.
- The cost is the expense of sending each marketing offer, `cost_per_offer`

Based on the information provided, calculate the following values:

1. `cost_per_offer`: the cost of sending a marketing offer

Cost-Benefit Analyses

- **Benefit**: If customer responds to the offer, the management expects customers to buy our products and generate profits for M&S.
- The benefit is the profit margin if a customer responds, `profit_per_customer`

2. `profit_per_customer`: the profit from a customer if a customer responds to the marketing offer

ROI for Blanket Marketing

- **Blanket marketing**: Send marketing offers to all 2000 customers. Compute the ROI for blanket marketing.
- We already know the cost of sending an offer is `cost_per_offer`. We can calculate the total marketing costs by multiplying the cost per offer by the number of customers in the dataset.
- Based on the `Response` variable in the dataset, calculate the total number of customers who responded to the marketing offer. Then calculate the total profit from the marketing campaign.
  - Tip: you can use `data_full$Response` to extract the `Response` variable as a vector in the dataset. Based on this vector, you can calculate the total number of responding customers and the total profit from the marketing campaign.

Section 2

Targeting Using Supervised Learning

Break-Even Analysis: Break-Even Response Rate

- In order to break even, we can calculate the break-even response rate, which is the **minimum response rate** we need from a customer in order to avoid losing money from sending the marketing offer[1]
- Only if a customer's expected response probability is at least the break-even response rate can we recover the costs of sending a marketing offer.
- If we send offers to customers whose expected response rate is lower than the break-even response rate, we will lose money on average.

[1]The idea of break-even is similar to the break-even quantity we learnt in Week 1, the minimum incremental quantity we need to sell in order not to lose any money.

Workflow Using Supervised Learning

- **Data collection and cleaning**
  - Send marketing offers to a random sample of customers and collect their responses (done by M&S)
  - Split the data into a training set and a test set
- **Data analytics**
  - Train predictive models on the training set
  - Predict customer response probability on the test set
- **Business recommendations**
  - Target customers based on predicted response probability
  - Compute and compare ROIs for each targeting method: (1) blanket marketing, (2) decision tree, (3) random forest

Let's work on the Quarto document together!

Section 3

Improve Marketing Efficiency Using Supervised Learning

Customer Life Cycle

- Acquisition
  - Use predictive analytics to target responsive customers to reduce marketing costs
- Development
  - Use predictive analytics to recommend products to customers (personalised recommendation system); for each customer, promote the item with the highest purchase probability
- Retention
  - Use predictive analytics to find valuable customers who are likely to churn and conduct targeted churn management