





Assignment: **Supervised ML to identify a business/workplace-related decision problem**

**Allocate marketing resources to different channels**

One business or workplace-related decision problem is how to allocate marketing resources to different channels, such as email, social media, web, etc. This decision problem can be mapped to a prediction problem that is suitable for a supervised learning model. The outcome variable being predicted is the return on investment (ROI) of each marketing channel, which is the ratio of the revenue generated by the channel to the cost spent on the channel.

The training data for this prediction problem would consist of historical data on the marketing campaigns conducted by the business, such as the channel, the cost, the target audience, the content, the timing, and the revenue. Some of the features or input variables of this training data that can be helpful with the prediction problem are:

-  The channel: This is a categorical variable that indicates which marketing channel was used for the campaign.
-  The cost: This is a numerical variable that indicates how much money was spent on the campaign.
-  The target audience: This is a categorical or numerical variable that indicates the characteristics of the potential customers who received the campaign, such as age, gender, location, income, etc.
-  The content: This is a textual or image variable that indicates the message or offer that was delivered by the campaign.

- ✚ The timing: This is a temporal variable that indicates when the campaign was launched and how long it lasted.
- ✚ The revenue: This is a numerical variable that indicates how much money was generated by the campaign.

ML algorithms can be a good alternative or supplement to human decision-makers for several reasons. First, ML algorithms can handle large and complex data sets that may be difficult or time-consuming for humans to analyze. Second, ML algorithms can learn from data and improve their performance over time, whereas humans may have biases or limitations in their learning abilities. Third, ML algorithms can provide consistent and objective predictions that are not influenced by emotions or preferences, whereas humans may have inconsistent or subjective judgments.

For the specific prediction problem of marketing ROI, these benefits of ML algorithms would be particularly important because:

- ✚ Marketing data can be very large and complex, especially with the proliferation of digital channels and platforms that generate massive amounts of data.
- ✚ Marketing performance can vary depending on many factors, such as customer behavior, market trends, competitor actions, etc., which require constant learning and adaptation from the decision-makers.
- ✚ Marketing decisions can have significant impacts on the business outcomes, such as sales, profits, customer satisfaction, etc., which require reliable and accurate predictions from the decision-makers.