

# Programming with Python

## Graded Project-2

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### Marketing Data Analysis

#### Domain:

Marketing, Retail

#### Learning Outcome:

- Exploratory Data Analysis & Data Visualization

#### Background:

Marketing analytics is the study of data gathered through marketing campaigns in order to analyse patterns between such things as how a campaign contributed to conversions, consumer behavior, regional preferences, creative preferences and much more. The goal of marketing analytics as a practice is to use these patterns and findings to optimize future campaigns based on what was successful.

Marketing analytics benefits both marketers and consumers. This analysis allows marketers to achieve higher return of investment on marketing investments by understanding what is successful in driving conversions, brand awareness and improvement related to sales, inventory, targeting customers, and other important crucial aspects.

#### Data Description:

SL.No	Column Name	Description
1	ID	Customer's unique identifier
2	Year_Birth	Customer's birth year
3	Education	Customer's education level
4	Marital_Status	Customer's marital status
5	Income	Customer's yearly household income
6	Kidhome	Number of children in customer's household

7	Teenhome	Number of teenagers in customer's household
8	Dt_customer	Date of customer's enrollment with the company
9	Recency	Number of days since customer's last purchase
10	MntWines	Amount spent on wine in the last 2 years
11	MntFruits	Amount spent on fruits in the last 2 years
12	MntMeatProducts	Amount spent on meat in the last 2 years
13	MntFish Products	Amount spent on fish in the last 2 years
14	MntSweetProducts	Amount spent on sweets in the last 2 years
15	MntGoldProds	Amount spent on gold in the last 2 years
16	NumDealsPurchases	Number of purchases made with a discount
17	NumWebPurchases	Number of purchases made through the company's web site
18	NumCatalogPurchases	Number of purchases made using a catalogue
19	NumStorePurchases	Number of purchases made directly in stores
20	NumWebVisitsMonth	Number of visits to company's web site in the last month
21	AcceptedCmp3	1 if customer accepted the offer in the 3rd campaign, 0 otherwise
22	AcceptedCmp4	1 if customer accepted the offer in the 4th campaign, 0 otherwise
23	AcceptedCmp5	1 if customer accepted the offer in the 5th campaign, 0 otherwise
24	AcceptedCmp1	1 if customer accepted the offer in the 1st campaign, 0 otherwise
25	AcceptedCmp2	1 if customer accepted the offer in the 2nd campaign, 0 otherwise
26	Response	1 if customer accepted the offer in the last campaign, 0 otherwise
27	Complain	1 if customer complained in the last 2 years, 0 otherwise
28	Country	Customer's location

## Problem Statement:

You're a marketing analyst and you've been told by the Senior Marketing Manager that recent marketing campaigns have not been as effective as they were expected to be. You need to analyze the data set in order to understand this problem and propose data-driven solutions. You are required to solve the following questions to generate a report for your management.

## Questions:-

1. Import necessary libraries and load the dataset and display random 5 samples. Check the info of the data and write your findings. (1 point)
2. Check the following using an appropriate method and write your findings (1 point)
  - i) Check how spread out or varied your data set is.
  - ii) Check where the middle 50% of your data lies.
  - iii) Check boundaries for the lower, middle and upper quarters of data.
3. Check for any missing values in the dataset and handle them using an appropriate method. (1 point)
4. Check for any presence of special characters in any variables. If present, clean/replace and change the datatype of the variable if required. (1 point)
5. The Marketing Manager wants to know the 'Age' of the customers. Extract the feature age from the given dataset and display the statistical summary of the age? (2 points)
6. The Marketing manager wants to understand the total amount spent on various products so that we can find what percentage of the amount is spent on which product. (2 points)
  - a. Find out the total amount spent by a customer.
  - b. Display the Percentage of the amount spent on Wines and other products.
7. Being an Analyst understands the total number of purchases made through different channels which can help find the percentage these channels contribute. (2 points)
  - a. Find out the total purchases done by a customer through different channels.
  - b. Display the percentage of the store and other channels' contribution to the total purchases.
8. The marketing manager wants to understand the performance of different marketing campaigns. Find out which marketing campaign is most successful? Use suitable graphs for visualization. (Hint:- use features like AcceptedCmp for campaign information) (1 point )

9. The marketing manager wants to understand which products are performing the best and which are performing the least in terms of revenue. Being an analyst, analyse the data and plot a suitable graph to display a report on revenue generated by different products. (2 points)
10. The team wants to understand if there's any pattern between the age of customers and the last campaign acceptance rate. Plot a suitable graph to visualize the distribution of the age with respect to customers who accepted the last campaign. (1 point)
11. The Chief Marketing specialist wants to visually see which Country has the most number of customers who accepted the last campaign. What is your approach? (1 point)
12. Analyse visually and write your inferences about the relationship between the following:- (1 point )
  - i) Total amount spent Vs Dependents. (Dependents=['Kidhome']+['Teenhome'])
  - ii) Total Purchases Vs Dependents.
13. Perform Correlation Analysis and write your key inferences. (Hint:- visualise using an appropriate plot) (1 point)
14. Understand the Education background of the customers who complained in the last 2 years. State the Education background of the customers who have registered the most number of complaints. (Hint:- you can use appropriate) (1 point)
15. Use features 'Total\_amount\_spent', 'MntFruits', 'MntMeatProducts', 'MntFishProducts', 'MntSweetProducts' and, 'MntGoldProds' in x-axis and y-axis and plot the following plots. (2 points)
  - i) Plot a pairplot with hue as Response.
  - ii) Plot a pairplot with hue as Education.
  - iii) Plot a pairplot with hue as Marital Status and write your key observations.

## FAQs:-

1. For question no. 5, 6, 7, create a new feature for age, total\_amount, total\_purchase respectively.
2. For question no. 8 to 14 use appropriate plots based on the type of feature and the outcome required to answer the question asked.
3. Add your findings inferences wherever asked.