Project Title: *Marketing Campaign Performance Insights*

Problem Statement:

In the highly competitive landscape of digital marketing, effectively evaluating the success of various marketing campaigns is essential for optimizing return on investment (ROI) and improving overall performance. Despite having extensive data on multiple campaigns, there is a need for a thorough analysis to assess and compare key metrics such as conversion rates, acquisition costs, and ROI across different campaign types, channels, and audience segments. This project aims to uncover actionable insights by examining temporal trends, geographical influences, and audience responses to identify factors driving campaign success and provide recommendations for enhancing future marketing strategies.

Dataset Link:

https://raw.githubusercontent.com/ArchanaInsights/Datasets/main/marketing_campaign.csv

Data Dictionary:

Column	Description
Campaign_ID	Unique identifier for each campaign.
Company	The organization running the campaign, represented by various fictional brands.
Campaign_Type	The type of marketing effort used, such as email, social media, influencer, display, or search.
Target_Audience	The specific demographic or audience segment targeted by the campaign (e.g., women aged 25-34).
Duration	The duration of the campaign, expressed in days.
Channels_Used	The platforms or mediums used to promote the campaign, including email, social media, YouTube, websites, or Google Ads.
Conversion_Rate	The percentage of impressions or leads that resulted in desired actions, reflecting campaign effectiveness.
Acquisition_Cost	The monetary expense incurred to acquire each customer through the campaign.
ROI	Return on Investment, indicating the profitability and success of the campaign.
Location	The geographical area where the campaign was executed (e.g., New York, Los Angeles).
Language	The language in which the campaign's content was delivered (e.g., English, Spanish).
Clicks	The total number of clicks generated by the campaign, showing user interaction.
Impressions	The total number of times the campaign was displayed or viewed by the audience.

Engagement_Score	A score from 1 to 10 representing the level of engagement and interaction generated by the campaign.
Customer_Segment	The specific group or category of customers targeted by the campaign (e.g., tech enthusiasts, fashionistas).
Date	The date on which the campaign occurred.

Project Steps and Objectives:

1) Load the Dataset

- ➢ Read the marketing campaign data from the CSV file into a pandas DataFrame.

2) Descriptive Analysis *(7 marks)*

Basic Structure:

- ➢ Print the first few rows of the dataset to get an overview of the data.
- ➢ Obtain the number of rows and columns in the dataset.
- ➢ Get a concise summary of the dataset, including the data types and non-null values.
- ➢ Generate descriptive statistics for numerical columns.

Data Exploration:

- ➢ Print the number of unique `Campaign_ID` values in the dataset.
- ➢ List the unique values of the `Location` and `Customer_Segment` columns.
- ➢ Count the occurrences of each category in the `Campaign_Type` and `Channel_Used` and columns.

3) Exploratory Data Analysis (EDA) and Visualization *(18 marks)*

Campaign Performance:

- ➢ Plot a scatter plot to visualize the relationship between `Acquisition_Cost` and `ROI`.
- ➢ Create a bar chart to visualize the average `Conversion_Rate` for different `Channel_Used`, categorized by `Campaign_Type`.
- ➢ Visualize the distribution of `Engagement_Score` across different `Campaign_Type` using a box plot.

- Analyze the average `ROI` by `Company` using a bar chart to compare the profitability of campaigns conducted by different companies.
- Examine the correlation between `Engagement_Score` and `Conversion_Rate` using a heatmap.

Customer Segmentation:

- Create a count plot to visualize the distribution of `Target_Audience`.
- Identify which `Customer_Segment` has the highest `Conversion_Rate` for each `Language` using a bar chart.
- Visualize the distribution of `Acquisition_Cost` across each `Customer_Segment`, categorized by `Channel_Used`, using a box plot.
- Analyze average `Conversion_Rate` by `Language` using a bar chart to compare the effectiveness of campaigns conducted in different languages.

Channel Effectiveness:

- Compare the `Engagement_Score` for different `Channels_Used`, segmented by `Campaign_Type`, using a bar chart.
- Show the distribution of total `ROI` across different `Channels_Used` using a pie chart.
- Plot a scatter plot to show the relationship between `Clicks` and `Impressions` for each `Channel_Used`.

Time-Based Analysis:

- Plot the distribution of `Duration` using a histogram.
- Analyze how the overall `Conversion_Rate` has changed over `Date` for each `Company` using a line chart.
- Examine the trend of `Engagement_Score` over `Date` with a line chart.

Geographic Analysis:

- Determine which location has the highest `Acquisition_Cost` using a bar chart.
- Visualize the `Conversion_Rate` by different `Location`, categorized by `Target_Audience`, using a bar chart.
- Illustrate the proportion of `ROI` by `Location` using a pie chart.