**CUSTOMER SEGMENTATION USING DATA SCIENCE.**

**Problem statement:**

In the project's beginning, we gather knowledge and define its scope. We then select and acquire water level sensors and assess potential risks, planning for mitigation. Next, we design a sensor network for flood-prone areas and establish reliable data communication. Real-time data analysis and an early warning web platform are developed, with secure data storage and backups.

Testing, deployment, and continuous monitoring ensure system functionality. Regular data analysis and reporting are conducted, alongside emergency response coordination protocols and drills. Periodic evaluations assess the project's effectiveness and impact on flood preparedness.

**Introduction:**

Demographic customer segmentation is one of the most common and easy-to-apply segmentation techniques. Dividing up your customer base on the basis of traditional demographic attributes such as age, gender, income, education, occupation, marital status, ethnicity or religion is going to be a near choice for any consumer goods or services business. Here’s how you can perform customer segmentation using demographic data.

1. \*\*Collect Data\*\*: Acquire data about your customers' demographical information. This can be done through surveys with customers, registration information, purchase records or even and external data sources

2. \*Data Cleaning and Preprocessing\*: This processes entails the data to be cleaned and preprocessed, to ensure the data to be accurate and consistent. Also and if needed, the values are handled in case of missing values and data are standardized.

3. \*Selecting segmentation criterion\*: Decide and explore the demographic variables according to the nature of the business. For instance, it may target age, gender and residence of the individuals.

4. \*Extracting the text\*: A very simple method to start, is to make use the fact that the text region is always darker than the region outside the text. We can segment the text using simple thresholding-based segmentation.

- \*Demographic-based rules\*: Set rules to create groups of customers based on demographic criteria (for example, by age such as customers 18 to 34, customers 35 to 50, etc.)

- \*Cluster analysis\*: Cluster analysis groups customers with similar demographic profiles using clustering algorithms. For example, we might use the K-means clustering algorithm to group customers based on their demographics.

5. \*Segment Visualization\*: Visual representation of segments to better understand the characteristics of the segments. You may use bar charts, pie charts, heatmaps, etc to represent the segments.

6. Customer profile creation: Develop a customer profile for each of the segments so that you know and understand the attributes and characteristics of customers in each group.

7. \*Marketing Strategy\*: Develop marketing strategies and campaigns for each targeted segment based on demographic factors. For example, customize advertising for gender- and location-based promotions.

8. \*Testing and Optimization\*: Continuously test and improve your marketing strategy and messages for each segment. Use A/B testing and measurement of campaign performance to continue learning and refining your approach.

9. \*Assess\*: Determine how demographic-based segmentation has impacted your business objectives, such as conversion rates, customer retention, or revenue.

One thing to note is that demographic segmentation is just one type, or approach, a business could take. A business may also look at behavioral or psychographic segmentation as another option or in addition to demographic segmentation. Combining different types of segmentation can help increase your understanding of your customer base and help you tailor your marketing to different group

**Customer segmentation using demography involves categorizing customers into distinct groups based on demographic attributes such as age, gender, income, education, marital status, and location. This approach helps businesses better understand their customer base and tailor marketing strategies and product offerings to different demographic segments. Here are the steps involved in customer**

**Data Collection: Gather customer data from various sources, including transaction history, demographic information, website interactions, and more.**

**Data Preprocessing: Clean and prepare the data by handling missing values, outliers, and normalizing or scaling features.**

**Target: Need to perform clustering to summarize customer segments.**

**Program:**

**import pandas as pd**

**# Load your customer data into a DataFrame (replace 'customer\_data.csv' with your data file)**

**customer\_df = pd.read\_csv('customer\_data.csv')**

**# Define the demographic variables for segmentation**

**demographic\_features = ['Age', 'Gender', 'Education', 'Salary']**

**# You can define criteria for segmentation based on these features.**

**# For example, segmenting by education level and salary range:**

**segment1 = customer\_df[(customer\_df['Education'] == 'Bachelor') & (customer\_df['Salary'] < 50000)]**

**segment2 = customer\_df[(customer\_df['Education'] == 'Master') & (customer\_df['Salary'] >= 50000)]**

**# Add more segments as needed.**

**# You can also analyze and visualize these segments for insights.**

**# For example, to get statistics for each segment:**

**print("Segment 1 Statistics:")**

**print(segment1.describe())**

**print("Segment 2 Statistics:")**

**print(segment2.describe())**

**# To visualize the segments, you can use libraries like matplotlib or seaborn.**

**# For instance, to create a histogram of ages for each segment:**

**import matplotlib.pyplot as plt**

**plt.hist(segment1['Age'], bins=10, alpha=0.5, label='Segment 1')**

**plt.hist(segment2['Age'], bins=10, alpha=0.5, label='Segment 2')**

**plt.legend(loc='upper right')**

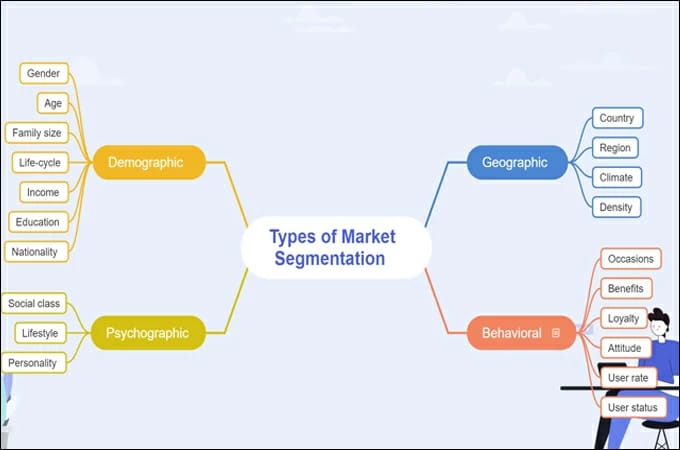
**plt.xlabel('Age')**

**plt.ylabel('Count')**

**plt.title('Age Distribution by Segment')**

**plt.show()**

**FLOWCHART:**

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