

# SmartCart Clustering System

## Problem Statement

SmartCart is a growing e-commerce platform serving customers across multiple countries. The company collected extensive customer data consisting of 2240 customer records and 22 attributes including demographics, purchase behaviour, website activity, and response.

Currently, SmartCart uses **generic marketing and engagement strategies** for all customers, without clearly understanding different customer behaviour patterns. This results in **inefficient marketing**, missed opportunities to retain high-value customers, and delayed identification of churn-prone users.

To solve this, SmartCart aims to build an **intelligent customer segmentation system** using **unsupervised machine learning**. The system will analyse historical customer transaction data and **group customers into meaningful clusters** based on purchasing behaviour, engagement levels, and loyalty indicators.

You are hired as an **AI/ML Engineer** to develop this system using **clustering algorithms** to discover hidden patterns in customer behaviour and support **data-driven decision-making** for personalised marketing and customer retention.

## Dataset Description

Each row in the dataset represents a **customer** and contains multiple attributes describing their spending and activity on platform.

### 1. Customer Demographics

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Feature	Description
<b>ID</b>	Unique customer identifier
<b>Year_Birth</b>	Year of birth of the customer
<b>Education</b>	Highest education level achieved
<b>Marital_Status</b>	Marital status of the customer
<b>Income</b>	Yearly household income
<b>Kidhome</b>	Number of small children in household
<b>Teenhome</b>	Number of teenagers in household
<b>Dt_Customer</b>	Date when customer enrolled with SmartCart

## 2. Purchase Behaviour (Amount Spent)

Feature	Description
<b>MntWines</b>	Amount spent on wine products
<b>MntFruits</b>	Amount spent on fruits
<b>MntMeatProducts</b>	Amount spent on meat products
<b>MntFishProducts</b>	Amount spent on fish products
<b>MntSweetProducts</b>	Amount spent on sweet products
<b>MntGoldProds</b>	Amount spent on gold products

## 3. Purchase Behaviour (Frequency)

Feature	Description
<b>NumDealsPurchases</b>	Purchases made using discounts
<b>NumWebPurchases</b>	Purchases made through website
<b>NumCatalogPurchases</b>	Purchases made through catalog
<b>NumStorePurchases</b>	Purchases made in physical stores
<b>NumWebVisitsMonth</b>	Number of visits to website per month

## 4. Customer Feedback & Constants

Feature	Description
Recency	Number of days since last purchase
Complain	Customer complained in last 2 years (1 = Yes, 0 = No)

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