

This dataset name is: **behavioral\_data.csv** (The screenshot is just a part of dataset)

event_id	customer_id	event_date	event_type	details
1	1	19-01-2022	cart_abandon	{'cart_value': 17.570562174026627, 'items_count': 4}
2	1	06-03-2022	site_visit	{'session_duration': 413.088698855629, 'pages_viewed': 2}
3	1	15-03-2022	site_visit	{'session_duration': 129.04851303496815, 'pages_viewed': 4}
4	1	24-03-2022	wishlist_add	{}
5	1	01-04-2022	site_visit	{'session_duration': 276.8703369064373, 'pages_viewed': 1}
6	1	20-04-2022	site_visit	{'session_duration': 6.145037571533635, 'pages_viewed': 4}
7	1	15-05-2022	cart_abandon	{'cart_value': 93.64107502147456, 'items_count': 2}
8	1	08-06-2022	site_visit	{'session_duration': 56.63756376680119, 'pages_viewed': 1}
9	1	16-06-2022	cart_abandon	{'cart_value': 90.95236664761788, 'items_count': 3}
10	1	09-08-2022	wishlist_add	{}
11	1	11-08-2022	cart_abandon	{'cart_value': 88.05397474824123, 'items_count': 1}
12	1	18-08-2022	site_visit	{'session_duration': 770.0155835819131, 'pages_viewed': 14}
13	1	28-08-2022	site_visit	{'session_duration': 3.2338641539158073, 'pages_viewed': 10}
14	1	04-09-2022	cart_abandon	{'cart_value': 12.752163326376234, 'items_count': 2}
15	1	24-10-2022	site_visit	{'session_duration': 63.02339334718069, 'pages_viewed': 5}
16	1	30-10-2022	customer_service_cor	{}
17	1	17-11-2022	site_visit	{'session_duration': 1006.5480052349485, 'pages_viewed': 2}
18	1	18-11-2022	cart_abandon	{'cart_value': 130.07867835715575, 'items_count': 1}
19	1	20-11-2022	site_visit	{'session_duration': 621.3302766855354, 'pages_viewed': 5}
20	1	05-12-2022	site_visit	{'session_duration': 256.0079044315629, 'pages_viewed': 8}
21	1	09-12-2022	site_visit	{'session_duration': 24.452304304689434, 'pages_viewed': 4}
22	1	23-12-2022	site_visit	{'session_duration': 437.5946716189578, 'pages_viewed': 1}

This dataset name is: **campaign\_data.csv** (The screenshot is just a part of dataset)

campaign_id	campaign_name	campaign_type	channel	discount_am	start_date	end_date	budget	target_segment	is_season
1	Campaign_1	Free Shipping	Email	20	21-10-2022	30-10-2022	35263.49	Inactive	FALSE
2	Campaign_2	Free Shipping	Push Notification	15	16-10-2022	06-11-2022	38106.02	New Customers	FALSE
3	Summer Kickoff	Free Shipping	Display Ads	10	04-06-2022	08-06-2022	12908.32	All	TRUE
4	Summer Kickoff	Bundle Deal	Display Ads	15	09-06-2022	16-06-2022	10662.53	All	TRUE
5	Black Friday	BOGO	SMS	25	23-11-2022	27-11-2022	49793.92	Inactive	TRUE
6	Campaign_6	Bundle Deal	Display Ads	25	25-11-2022	10-12-2022	39909.38	All	FALSE
7	Spring Fashion	Discount	SMS	20	14-03-2022	21-03-2022	9991.85	Inactive	TRUE
8	Campaign_8	Flash Sale	Display Ads	30	13-02-2022	05-03-2022	20264.25	High Value	FALSE
9	Mother's Day	BOGO	SMS	25	06-05-2022	17-05-2022	19022.31	Loyal Customers	TRUE
10	New Year Sale	Bundle Deal	SMS	20	06-01-2022	09-01-2022	15968.15	High Value	TRUE
11	New Year Sale	Bundle Deal	Email	10	03-01-2022	15-01-2022	13381.76	All	TRUE
12	Campaign_12	BOGO	Social Media	25	30-11-2022	22-12-2022	16804.86	Loyal Customers	FALSE
13	Summer Kickoff	Bundle Deal	Display Ads	20	24-06-2022	02-07-2022	39215.91	High Value	TRUE
14	Presidents Day	BOGO	Push Notification	25	13-02-2022	26-02-2022	47242.85	Inactive	TRUE
15	Independence Day	Bundle Deal	Display Ads	15	23-07-2022	01-08-2022	37895.58	New Customers	TRUE
16	Valentine's Day	Free Shipping	Display Ads	20	24-02-2022	01-03-2022	19984.26	High Value	TRUE
17	End of Summer	Free Shipping	Social Media	20	09-08-2022	22-08-2022	23119.4	Inactive	TRUE
18	Winter Clearance	Discount	Email	20	25-01-2022	06-02-2022	24653.22	New Customers	TRUE
19	Campaign_19	Free Shipping	Display Ads	10	13-06-2022	09-07-2022	24969.24	Inactive	FALSE
20	Campaign_20	BOGO	Push Notification	10	17-02-2023	07-03-2023	22457.57	High Value	FALSE
21	Spring Fashion	Discount	Push Notification	15	22-03-2022	29-03-2022	46230.88	Loyal Customers	TRUE
22	Holiday Sale	Free Shipping	Email	40	26-12-2022	01-01-2023	18596.86	New Customers	TRUE
23	Summer Sale	Free Shipping	SMS	30	27-07-2022	01-08-2022	19446.32	All	TRUE

This dataset name is: **customer\_data.csv** (The screenshot is just a part of dataset)

customer_id	age	location	income	loyalty_status	email_subscribed	registration_date
1	40	Houston	85637	Silver	FALSE	26-08-2022
2	33	San Diego	57232	Silver	TRUE	11-07-2022
3	42	San Jose	61224	Silver	FALSE	13-06-2022
4	53	San Jose	43605	Gold	FALSE	20-10-2023
5	32	Chicago	63049	Bronze	TRUE	02-08-2022
6	32	Chicago	49386	Silver	TRUE	03-05-2023
7	53	New York	49253	Bronze	TRUE	24-02-2023
8	44	Dallas	79624	Gold	TRUE	23-01-2022
9	29	Los Angeles	121092	Silver	TRUE	03-07-2022
10	41	Houston	36148	Bronze	TRUE	27-08-2022
11	29	Philadelphia	50846	Bronze	FALSE	12-07-2023
12	29	San Jose	248877	Bronze	TRUE	22-04-2022
13	37	New York	36817	Gold	FALSE	20-12-2023
14	18	Phoenix	53714	Bronze	FALSE	20-05-2022
15	18	San Diego	134829	Gold	TRUE	27-10-2023
16	28	San Jose	74411	Gold	TRUE	08-12-2022
17	22	Los Angeles	115802	Bronze	FALSE	03-07-2022
18	38	Los Angeles	116844	Bronze	FALSE	02-03-2023
19	24	Dallas	56331	Bronze	TRUE	22-10-2023
20	18	San Diego	33893	Silver	FALSE	12-02-2023

This dataset name is: **product\_data.csv** (The screenshot is just a part of dataset)

product_id	category	subcategory	base_price	avg_rating	stock_level	seasonal	peak_season
1	Home & Garden	Decor	10.13	3.7	575	seasonal	Summer
2	Beauty	General	22.47	4.3	594	year_round	
3	Books	Comics	50.66	3.7	668	year_round	
4	Electronics	Audio	7.27	4.5	588	seasonal	
5	Electronics	Gaming	4.8	3.6	224	year_round	
6	Electronics	Accessories	46.91	3.3	859	year_round	
7	Beauty	General	30.49	4.8	22	year_round	
8	Books	Fiction	149.76	3.7	742	year_round	
9	Books	Comics	5.16	3.5	443	year_round	
10	Sports	Team Sports	12.8	4.3	251	seasonal	Winter
11	Electronics	Accessories	77.19	3.7	552	year_round	
12	Food & Beverage	General	38.79	4.4	338	seasonal	
13	Electronics	Accessories	18.89	4.2	975	seasonal	
14	Jewelry	General	28.43	4.7	648	year_round	
15	Food & Beverage	General	4.95	3.7	897	year_round	
16	Electronics	Accessories	33.63	4.4	10	year_round	
17	Jewelry	General	84.94	4.8	129	seasonal	
18	Sports	Exercise	19.66	3	953	year_round	
19	Automotive	General	24.84	4.1	818	year_round	
20	Food & Beverage	General	41.62	5	834	seasonal	

This dataset name is: **transaction\_data.csv** (The screenshot is just a part of dataset)

transaction_id	customer_id	transaction_date	num_items	total_amount	final_amount	campaign_id	payment_method	device_type
1	166658	01-01-2022	1	22.35	22.35		Credit Card	Mobile
2	95735	01-01-2022	1	30.95	30.95		PayPal	Desktop
3	90037	01-01-2022	3	133.61	133.61		Apple Pay	Desktop
4	98194	01-01-2022	5	243.93	243.93		PayPal	Mobile
5	162408	01-01-2022	1	19.35	19.35		Apple Pay	Mobile
6	121386	01-01-2022	3	50.16	50.16		Credit Card	Mobile
7	143321	01-01-2022	1	4.5	4.5		PayPal	Mobile
8	45091	01-01-2022	4	70.45	70.45		Credit Card	Mobile
9	188751	01-01-2022	2	61.25	61.25		Apple Pay	Mobile
10	57392	01-01-2022	1	2.86	2.86		Apple Pay	Desktop
11	175975	01-01-2022	3	47.49	47.49		Credit Card	Desktop
12	186004	01-01-2022	1	21.43	21.43		Credit Card	Mobile
13	77480	01-01-2022	5	168.74	168.74		Credit Card	Tablet
14	130898	01-01-2022	2	27.5	27.5		Credit Card	Desktop
15	61981	01-01-2022	1	9.57	9.57		Apple Pay	Tablet
16	110472	01-01-2022	1	14.51	14.51		PayPal	Mobile
17	51208	01-01-2022	2	152.27	152.27		PayPal	Desktop
18	19015	01-01-2022	2	25.86	25.86		Credit Card	Mobile
19	152742	01-01-2022	1	27.31	27.31		Debit Card	Mobile
20	140247	01-01-2022	2	34.55	34.55		Credit Card	Mobile

I only provided very small part of each dataset. So, in coding, use real dataset columns.

Here is the project details:

**Project:** AI Optimized Promotional Campaign ROI Using Customer Segmentation and Behavioral Analysis

### Problem Statement:

Develop a data-driven framework to optimize promotional campaign effectiveness by targeting the most profitable customer segments. The goal is to identify patterns in customer behavior and purchase habits, enabling tailored campaigns that maximize ROI while minimizing costs.

### Dataset:

- **Size and Scope:** 5 million transactions over 2 years from an e-commerce platform.
- **Data Types:**
  - Customer demographics (age, location, income, loyalty status).
  - Transactional data (timestamps, products purchased, categories, spend amount).
  - Marketing campaign details (promotions, discounts, channels, reach).
  - Behavioral data (site visit frequency, abandoned carts, reviews, customer complaints).
- **Potential Insights:**
  - Patterns in customer response to discounts or free shipping.
  - High-value customer groups and their buying triggers.
  - Seasonal product trends and upsell opportunities.