K S RANGASAMY COLLEGE OF TECHNOLOGY

(Autonomous)
TIRUCHENGODE – 637215

A MINI PROJECT REPORT ON

EXPLORING CUSTOMER SATISFACTION AND PREFERENCES (E-COMMERCE) USING POWER BI

60 AM 601 – VISUAL ANALYTICS IN AI

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BONAFIDE CERTIFICATE

This is to be Certified that this *Report* titled **" EXPLORING CUSTOMER SATISFACTION AND PREFERENCES (E-COMMERCE) USING POWER BI "** is the bonafide work of **AAKASH.S (73772218102), DHARUN.S (73772218109), GOKULAN.S (73772218113)** and **GOVARTHAN.M (73772218115).**

MENTOR **HEAD OF THE DEPARTMENT**

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PROBLEM STATEMENT

In today's digital world, e-commerce platforms need to understand customer satisfaction and preferences to stay competitive. Businesses struggle to analyse vast amounts of customer feedback, reviews, and purchase patterns. Without proper insights, they may fail to meet customer expectations, leading to lower sales and brand loyalty. Using Power BI, we can visualize and analyse key factors like product ratings, delivery experience, and customer service feedback. This helps businesses identify trends, improve decision-making, and enhance customer satisfaction. The goal is to create a data-driven approach that ensures better product recommendations, optimized services, and an overall improved shopping experience.

One of the biggest challenges e-commerce companies faces are understanding what drives customer satisfaction. Customers have different expectations regarding product quality, delivery speed, customer support, and return policies. Negative experiences in any of these areas can result in bad reviews, loss of trust, and ultimately, reduced sales. Additionally, with the rise of multiple competitors in the online marketplace, businesses must leverage data-driven insights to stay ahead. However, manual data analysis is time-consuming and often lacks accuracy, making it difficult for decision-makers to respond quickly to customer demands.

Power BI, a powerful data visualization and business intelligence tool, provides a solution by transforming raw data into meaningful insights. By integrating customer feedback, sales performance, and service data into interactive dashboards, businesses can identify trends, monitor satisfaction levels, and make informed decisions. With real-time analytics, companies can detect emerging issues, predict customer behaviour, and personalize shopping experiences to improve retention.

By utilizing Power BI, e-commerce platforms can develop a customer-centric approach, enhancing overall satisfaction and loyalty. The ability to track key performance indicators (KPIs) such as customer ratings, average response time, and product return rates allows businesses to optimize their operations.

ABSTRACT

In today's fast-growing e-commerce industry, customer satisfaction plays a vital role in determining business success. With millions of online transactions occurring daily, businesses must analyse e-customer preferences, feedback, and behaviour to stay competitive. However, traditional data analysis methods are often slow and inefficient, making it difficult to extract meaningful insights. This study explores the use of Power BI, a powerful data visualization and business intelligence tool, to analyse and improve customer satisfaction in e-commerce. By leveraging interactive dashboards, real-time analytics, and predictive modelling, businesses can gain a deeper understanding of customer needs and enhance the overall shopping experience.

Customer satisfaction in e-commerce depends on various factors, including product quality, pricing, delivery speed, return policies, and customer service. Negative experiences in any of these areas can lead to poor ratings, loss of customer trust, and reduced sales. With the increasing competition in the online marketplace, businesses must adopt a data-driven approach to optimize operations, enhance customer engagement, and improve decision-making. Power BI provides an efficient and automated way to process large volumes of customer data, helping businesses identify trends, detect pain points, and take proactive measures to improve service quality.

This research focuses on utilizing Power BI for customer sentiment analysis, sales trend forecasting, and performance monitoring. By integrating customer feedback, purchase patterns, and support interactions into dynamic reports and visualizations, businesses can uncover hidden insights and drive strategic improvements. Key performance indicators (KPIs) such as average customer ratings, net promoter score (NPS), order fulfilment rates, and refund requests can be tracked efficiently. This allows businesses to refine their marketing strategies, optimize product recommendations, and personalize customer interactions, leading to higher satisfaction and loyalty.

IMPLEMENTATION

Step 1: Data Collection and Cleaning

- Gather the e-commerce dataset, which includes customer information, purchase details, ratings, and sentiment.
- Clean the dataset in Excel or Power BI by handling missing values, correcting inconsistencies, and ensuring uniform formatting.
- The provided dataset contains key columns such as Customer Name, Age, Gender, Location, Category, Purchases, Order Value, Sentiment, and Rating.

Step 2: Import Data into Power BI

- Open Power BI and import the cleaned dataset.
- Load the dataset into the Power Query Editor to perform final data transformations if necessary.
- Ensure data types are correctly assigned (e.g., numerical for ratings, categorical for sentiment).

Step 3: Data Transformation

- Create calculated columns and measures as needed (e.g., average rating per category, total purchases per customer).
- Use DAX (Data Analysis Expressions) to compute meaningful insights.
- Handle relationships between tables if using multiple datasets.

Step 4: Data Visualization

1. Bar Chart - Sum of Ratings by Category and Sentiment
    - Displays ratings for different categories (Sports, Home & Kitchen, Books, Electronics, Clothing) categorized by sentiment (Negative, Neutral, Positive).
    - Helps analyse customer satisfaction trends per category.

2. Column Chart - Sum of Purchases Per Month and Sum of Order Value
    - Highlights purchasing trends over time.
    - Aids in understanding customer spending behaviour.

3. TreeMap - Age Distribution by Category
    - Provides a visual representation of the sum of age groups per product category.
    - Helps in targeting different age groups for marketing.

Step 5: Insights and Decision-Making

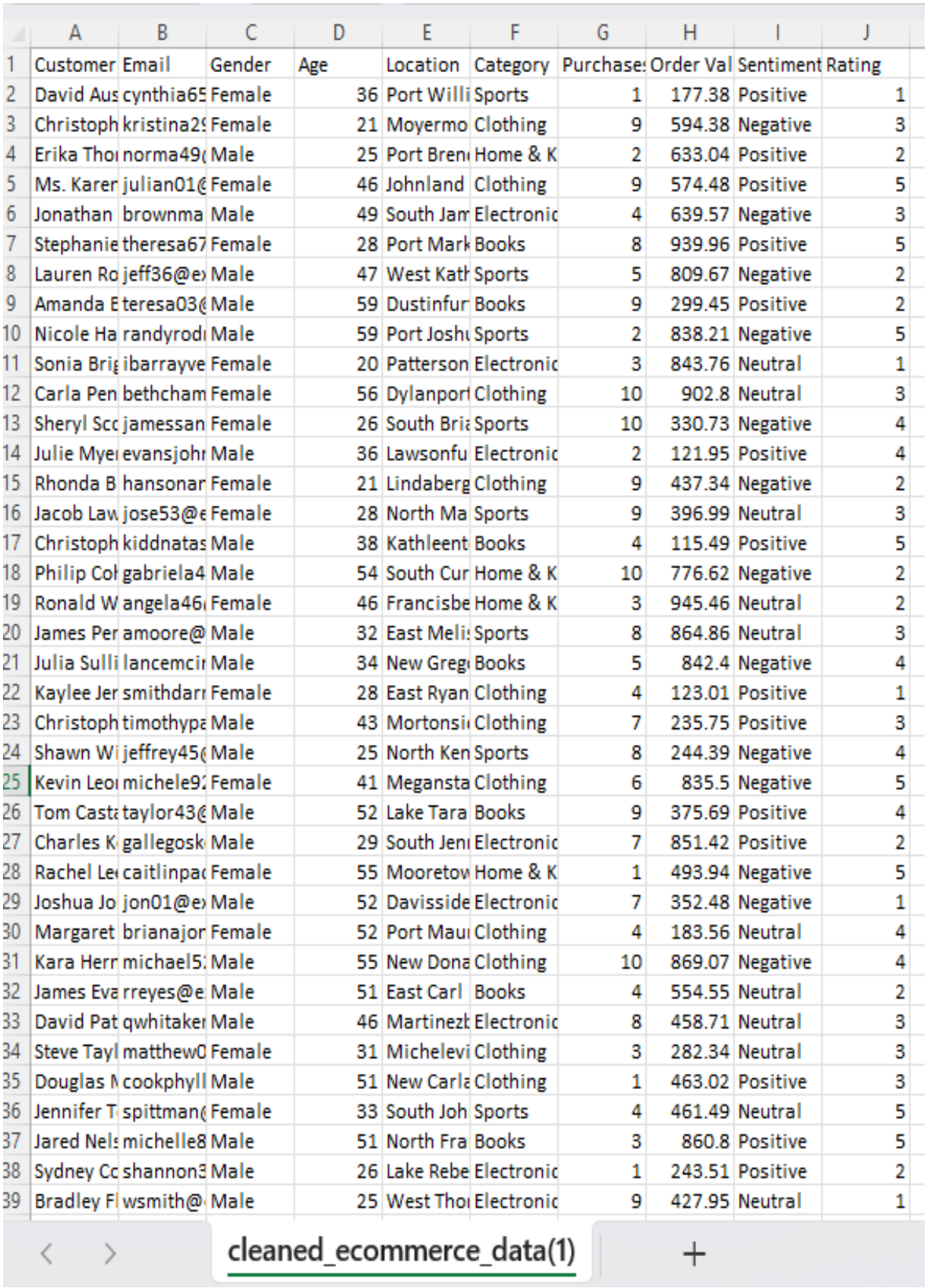
- Identify which categories receive the most positive/negative feedback.
- Analyse trends in customer purchases and spending behaviour.
- Understand the age groups contributing the most to different product categories.
- Use insights to improve product offerings and customer experience.

Step 6: Report Publishing and Dashboard Sharing

- Finalize the Power BI dashboard with interactive filters.
- Publish the report to Power BI Service for stakeholders to access.
- Enable scheduled data refresh for real-time analytics.

DATASET - CUSTOMER PREFERENCES DATASET

Customer Name	Email	Gender	Age	Location	Category	Purchases Per Month	Order Value ($)	Sentiment	Rating
David Austin	cynthia65@example.com	Female	36	Port Williamton	Sports	1	177.38	Positive	1
Kevin Byrd	michaelmorgan@example.net	Female	21	Nicoleshire	Sports	6	915.24	Positive	1
Jennifer Martin	jonathanbaker@example.net	Female	24	Sloanberg	Sports	6	853.14	Positive	2
Jonathan Carlson	geraldcampbell@example.com	Male	22	Karlaton	Sports	9	244.73	Positive	5
Bryan English	hensleypaige@example.net	Female	56	Danielleview	Sports	2	429.88	Positive	1
Rebecca Allen	fordjoshua@example.org	Female	31	Port Alexanderbury	Sports	2	982.99	Positive	4
Lisa Jones	soliver@example.org	Male	60	Petersontown	Sports	5	393.52	Positive	3
Keith Simpson	bfrench@example.net	Female	50	South Joel	Sports	5	106.22	Positive	1
Jeremy Aguilar DVM	christian03@example.org	Male	57	Justinport	Sports	6	322.04	Positive	2
Martha Ramirez	randykent@example.com	Male	52	Thomastown	Sports	5	222.62	Positive	1
Bradley Conway	nwhitaker@example.com	Female	60	North Chelseaside	Sports	5	812.92	Positive	3
Evelyn Thomas	saraduarte@example.net	Male	18	Brianborough	Sports	6	310.35	Positive	3
Michael Livingston	bakerjeffery@example.org	Male	25	Craneberg	Sports	4	188.12	Positive	5
Greg Peters	tanyakelley@example.com	Female	39	Patriciaport	Sports	4	282.95	Positive	1
Craig Short	jjohnson@example.org	Female	27	East Ryanland	Sports	2	921.92	Positive	3
Joseph Phillips	rachel80@example.net	Female	42	West Shannonton	Sports	9	714.76	Positive	4
Sandra Pearson	kellylittle@example.com	Male	33	Brennanshire	Sports	1	736.95	Positive	5
Paul Gay	nmartin@example.net	Male	40	Andrewbury	Sports	8	364.21	Positive	4
Kaitlin Wilson	james45@example.org	Male	51	Michaelshire	Sports	10	572.03	Positive	4
Brett Howard	garciaaaron@example.net	Male	33	South Michelle	Sports	8	561.92	Positive	1
Dana Webb MD	christinejohnson@example.org	Male	20	East Richardland	Sports	5	684.03	Positive	1
Michelle Rubio	scott19@example.com	Male	45	Port Lauren	Sports	9	162.87	Positive	3
Lorraine Gibson	linda43@example.org	Female	21	Mendozaview	Sports	2	183.36	Positive	2
Brendan Dunn	wrighttaylor@example.org	Male	45	Simmonstown	Sports	2	112.75	Positive	2
Gregory Barnes	dherman@example.org	Female	53	Thomastown	Sports	10	986.22	Positive	5
Marcus Fisher	stephanieklein@example.com	Male	36	Amyland	Sports	5	749.99	Positive	5
Michael Fisher	jonathan18@example.com	Female	32	West Olivia	Sports	4	320.01	Positive	3
Kerry Howard	nancybrown@example.net	Female	42	South Ericatown	Sports	6	617.94	Positive	3
Juan Fleming	canthony@example.com	Male	37	East Hannahton	Sports	3	505.92	Positive	3
Lisa Collins	sanchezedward@example.com	Female	35	North Dianeton	Sports	4	250.86	Positive	5
Brittany Brooks	scott15@example.net	Male	57	Port Matthew	Sports	7	232.1	Positive	1
Matthew Hall	danielwheeler@example.com	Male	27	Port Richardstad	Sports	1	551.98	Positive	4
Tina Bowman	robin26@example.org	Female	57	South David	Sports	4	252.96	Positive	2
Janet Alexander	kristen74@example.net	Female	37	Port Morgan	Sports	2	746.36	Positive	2
Ronnie Frazier	timothy23@example.org	Female	24	Hooversbire	Sports	9	388.32	Positive	1
Lori Gill	courtneylopez@example.net	Male	39	Stanleyshire	Sports	9	620.24	Positive	5
Katherine Watkins	theresaherrera@example.com	Female	46	West Ericburgh	Sports	7	352.97	Positive	4
Tracey Gray	joshuajones@example.com	Female	24	South Melissa	Sports	6	762.45	Positive	2
Jose Mathis	jjimenez@example.net	Male	50	Portertown	Sports	7	826.44	Positive	4
Edwin Holland MD	miguel62@example.org	Male	58	Rogerstown	Sports	6	289.83	Positive	5
Elizabeth Douglas	hesscrystal@example.com	Female	25	Perezfort	Sports	8	394.45	Positive	4
Brian Sullivan	piercephilip@example.org	Female	51	Nguyenburgh	Sports	9	962.57	Positive	5
Michael Wallace	shawnriley@example.com	Female	53	West Scott	Sports	4	625.36	Positive	1
Beth Campos	kathybryant@example.com	Male	37	Jacobville	Sports	5	231.24	Positive	5
Katrina Sparks	david82@example.org	Female	58	Port Matthewfort	Sports	7	359.46	Positive	5
Tina White	annettestewart@example.net	Female	23	South Robertside	Sports	2	491.56	Positive	2
Larry Chen	emmanewman@example.net	Female	54	Quinnberg	Sports	9	454.12	Positive	3
Michael Hernandez	katherine40@example.com	Female	42	Terrystad	Sports	5	621.1	Positive	5
Daniel Peterson	creeves@example.org	Female	22	East James	Sports	5	988.23	Positive	4
Michelle Tyler	hgreer@example.org	Male	20	Port Michael	Sports	1	537.57	Positive	3
Benjamin Nichols	cherylgarcia@example.net	Male	47	Lake Raymondborough	Sports	10	978.21	Positive	2
Julia Gray	crystal05@example.com	Female	19	Rosestad	Sports	8	259.9	Positive	5
David Valentine	catherine82@example.org	Male	46	Sandovalview	Sports	9	429.05	Positive	4
Michael Edwards	bsummers@example.com	Female	22	Caseyberg	Sports	9	812.68	Positive	1
Lori Banks	erika22@example.net	Male	36	Rosefurt	Sports	5	195.25	Positive	5



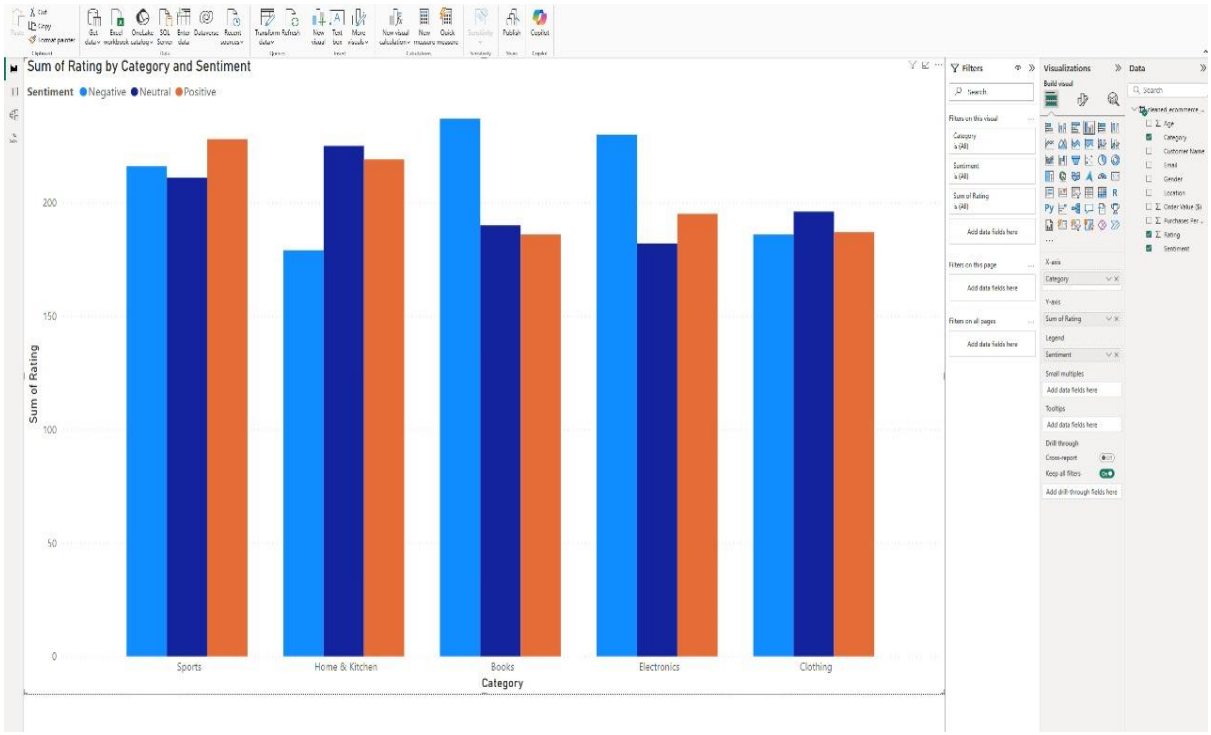
	A	B	C	D	E	F	G	H	I	J
1	Customer	Email	Gender	Age	Location	Category	Purchase:	Order Val	Sentiment	Rating
2	David Aus	cynthia65	Female	36	Port Willi	Sports	1	177.38	Positive	1
3	Christoph	kristina2!	Female	21	Moyermo	Clothing	9	594.38	Negative	3
4	Erika Thor	norma49(	Male	25	Port Bren	Home & K	2	633.04	Positive	2
5	Ms. Karer	julian01@	Female	46	Johnland	Clothing	9	574.48	Positive	5
6	Jonathan	brownma	Male	49	South Jan	Electronic	4	639.57	Negative	3
7	Stephanie	theresa67	Female	28	Port Mark	Books	8	939.96	Positive	5
8	Lauren Ro	jeff36@e	Male	47	West Kath	Sports	5	809.67	Negative	2
9	Amanda E	teresa03@	Male	59	Dustinfur	Books	9	299.45	Positive	2
10	Nicole Ha	randyrod	Male	59	Port Josh	Sports	2	838.21	Negative	5
11	Sonia Brig	ibarrayve	Female	20	Patterson	Electronic	3	843.76	Neutral	1
12	Carla Pen	bethcham	Female	56	Dylanport	Clothing	10	902.8	Neutral	3
13	Sheryl Sc	jamessan	Female	26	South Bria	Sports	10	330.73	Negative	4
14	Julie Mye	evansjohr	Male	36	Lawsonfu	Electronic	2	121.95	Positive	4
15	Rhonda B	hansonar	Female	21	Lindaberg	Clothing	9	437.34	Negative	2
16	Jacob Law	jose53@e	Female	28	North Ma	Sports	9	396.99	Neutral	3
17	Christoph	kiddnatas	Male	38	Kathleent	Books	4	115.49	Positive	5
18	Philip Col	gabriela4	Male	54	South Cur	Home & K	10	776.62	Negative	2
19	Ronald W	angela46	Female	46	Francisbe	Home & K	3	945.46	Neutral	2
20	James Per	amoore@	Male	32	East Meli	Sports	8	864.86	Neutral	3
21	Julia Sulli	lancemcir	Male	34	New Greg	Books	5	842.4	Negative	4
22	Kaylee Jer	smithdarr	Female	28	East Ryan	Clothing	4	123.01	Positive	1
23	Christoph	timothypa	Male	43	Mortonsi	Clothing	7	235.75	Positive	3
24	Shawn Wi	jeffrey45(	Male	25	North Ken	Sports	8	244.39	Negative	4
25	Kevin Leo	michele9:	Female	41	Megansta	Clothing	6	835.5	Negative	5
26	Tom Casta	taylor43@	Male	52	Lake Tara	Books	9	375.69	Positive	4
27	Charles K	gallegosk	Male	29	South Jen	Electronic	7	851.42	Positive	2
28	Rachel Le	caitlinpac	Female	55	Mooretov	Home & K	1	493.94	Negative	5
29	Joshua Jo	jon01@ex	Male	52	Davisside	Electronic	7	352.48	Negative	1
30	Margaret	brianajor	Female	52	Port Mau	Clothing	4	183.56	Neutral	4
31	Kara Herr	michael5:	Male	55	New Dona	Clothing	10	869.07	Negative	4
32	James Eva	rreyes@e	Male	51	East Carl	Books	4	554.55	Neutral	2
33	David Pat	qwhitaker	Male	46	Martinezb	Electronic	8	458.71	Neutral	3
34	Steve Tayl	matthew0	Female	31	Michelevi	Clothing	3	282.34	Neutral	3
35	Douglas M	cookphyll	Male	51	New Carla	Clothing	1	463.02	Positive	3
36	Jennifer T	spittman(	Female	33	South Joh	Sports	4	461.49	Neutral	5
37	Jared Nels	michelle8	Male	51	North Fra	Books	3	860.8	Positive	5
38	Sydney Co	shannon3	Male	26	Lake Rebe	Electronic	1	243.51	Positive	2
39	Bradley Fl	wsmith@	Male	25	West Thor	Electronic	9	427.95	Neutral	1

cleaned_ecommerce_data(1)

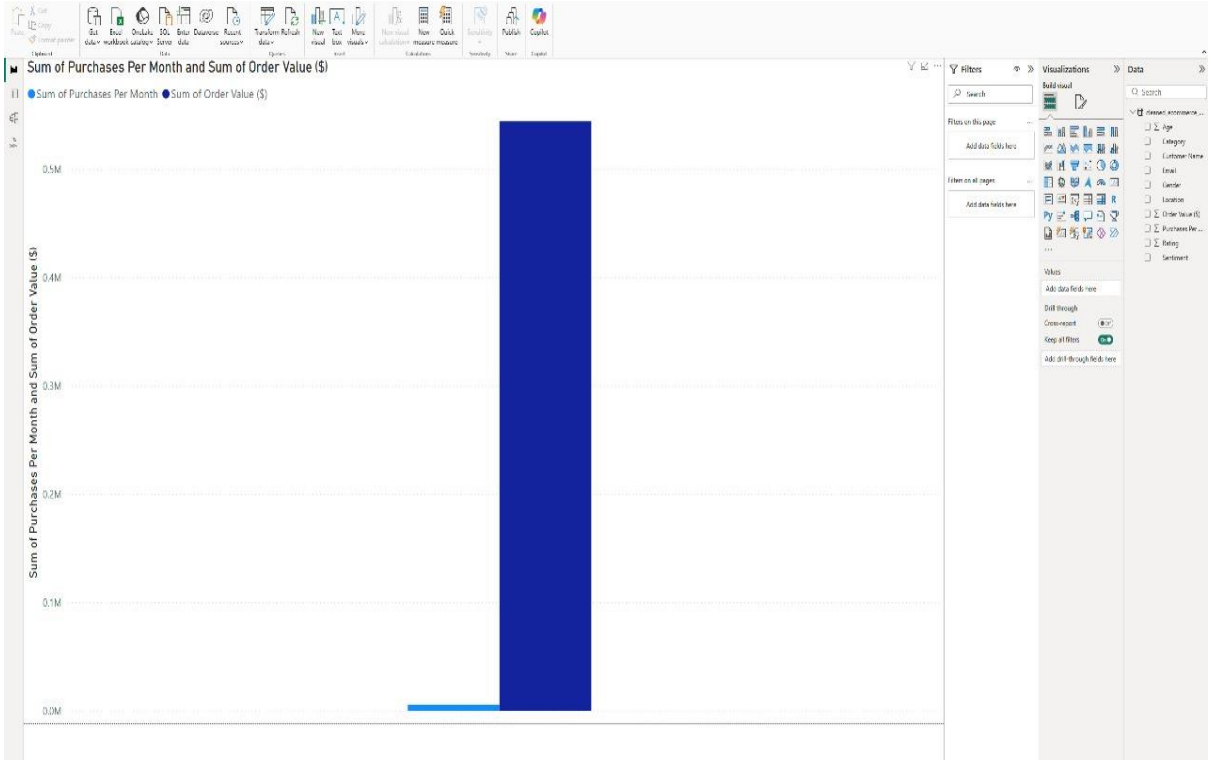
LINK : https://github.com/AAKASH-S005/Visual_Analytics_Dataset

OUTPUT

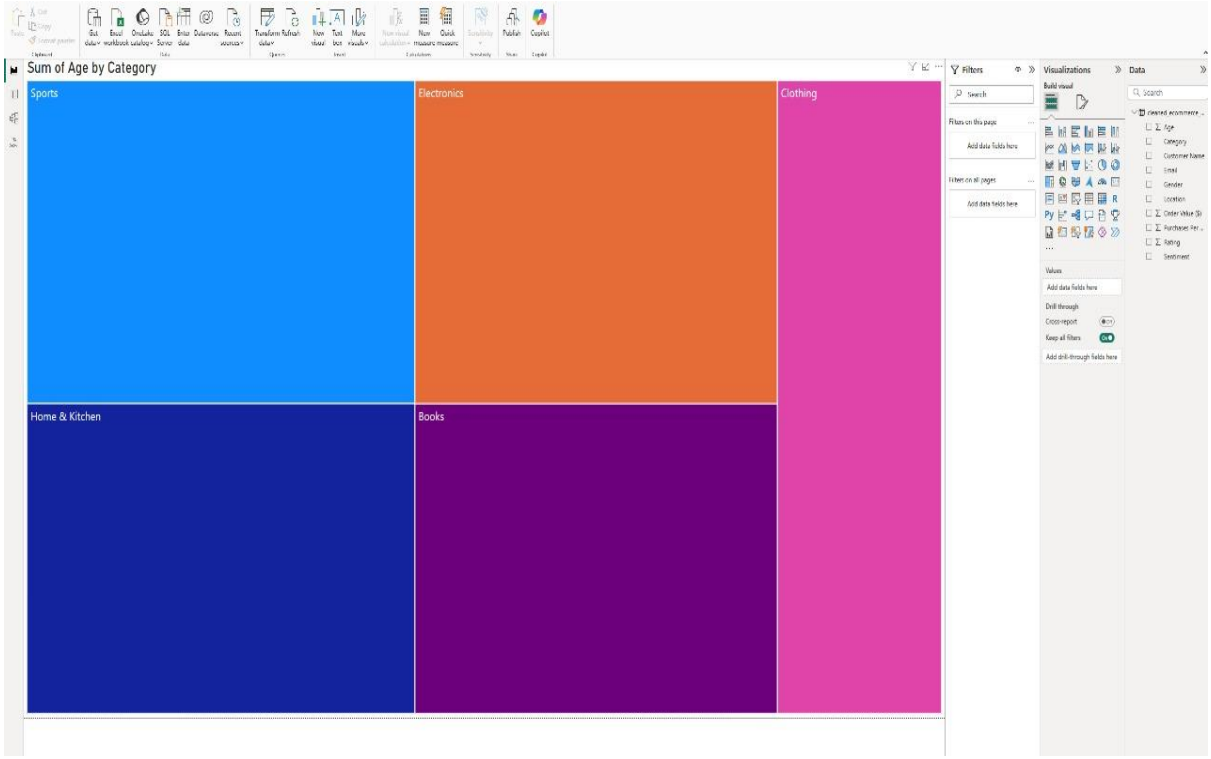
Sum of Rating by Category and Sentiment (**Clustered Column Chart)**



Sum of Purchases Per Month and Sum of Order Value ($) **(Clustered Bar Chart)**



Sum of Age by Category **(TreeMap chart)**



CONCLUSION

This Power BI project provides insightful visualizations of customer data, focusing on ratings, sentiment, purchases, and age distribution across product categories. The sentiment analysis reveals varying satisfaction levels, while purchase trends highlight significant differences in order values. The age distribution analysis helps identify target demographics for each category. These insights can assist businesses in optimizing marketing, inventory, and customer engagement strategies. The project demonstrates the power of data-driven decision-making and can be enhanced further with real-time analytics and predictive modelling. Overall, this analysis helps improve business strategies and customer satisfaction through informed decision-making.