Analyzing consumer shopping behavior from a large multi-category online store

Introduction & Background

- The advent of technology and the internet has led to an increasing demand for E-commerce industries.
- People of all ages prefer online shopping and increase in trend of online shopping was highly noticeable during the pandemic and post pandemic
- The tremendous growth in online shopping has created a need for the business to understand how the customer perceives online shopping and purchases to improve their over all business performance.
- Large-scale data analytics in e-commerce is still in its nascent stage and there is plenty to learn about it in all facets.
- Analyzing such data which records the online shopper user activity is knows as consumer shopping behavior analysis.

Goals & Objectives

- To do an in-depth analysis of the ecommerce dataset to gain insights on customer behavior and activity which can help business make strategic decisions.
- To understand big data analytics and how the evolving technologies help deal with such huge volume of data and leverage it to extract meaningful insights.

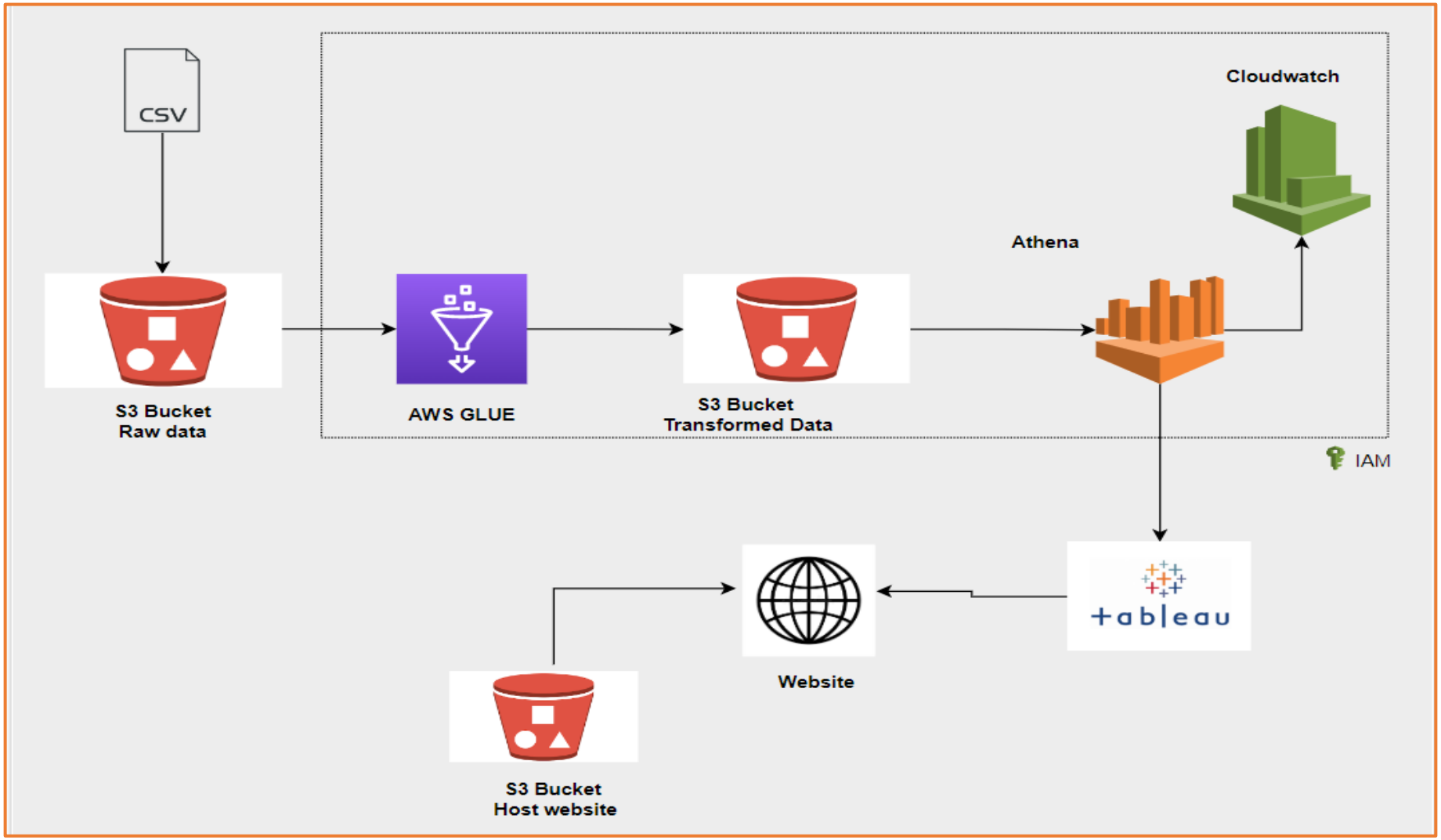
Project application & Impact

- The consumer shopping behavior analysis is the process of discovering, interpreting, and communicating data patterns and insights related to E-commerce online business.
- It helps in measuring the user behavior, market and performance trends, and ROI. This analysis can be used by the business to show ROI for the campaigns and make better decisions to reduce costs, increase sales, and make business improvements accordingly.

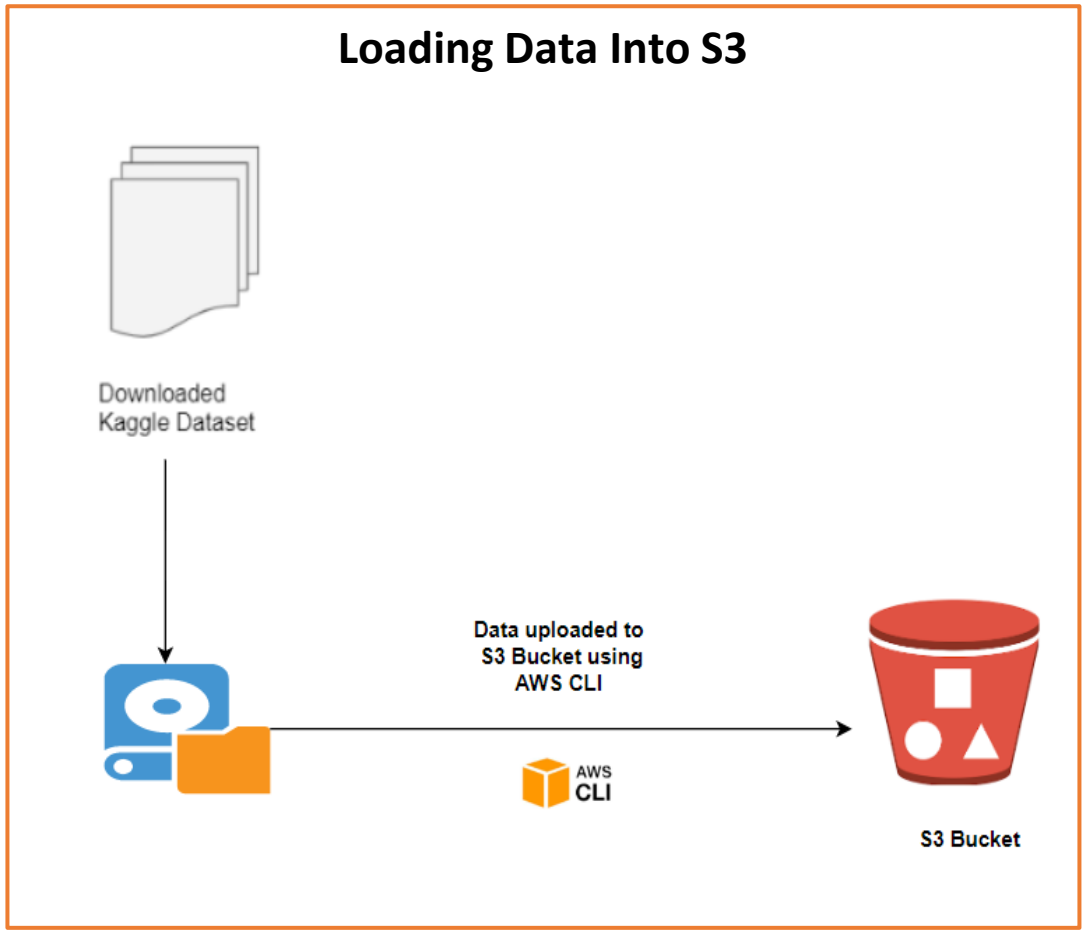
Data Description

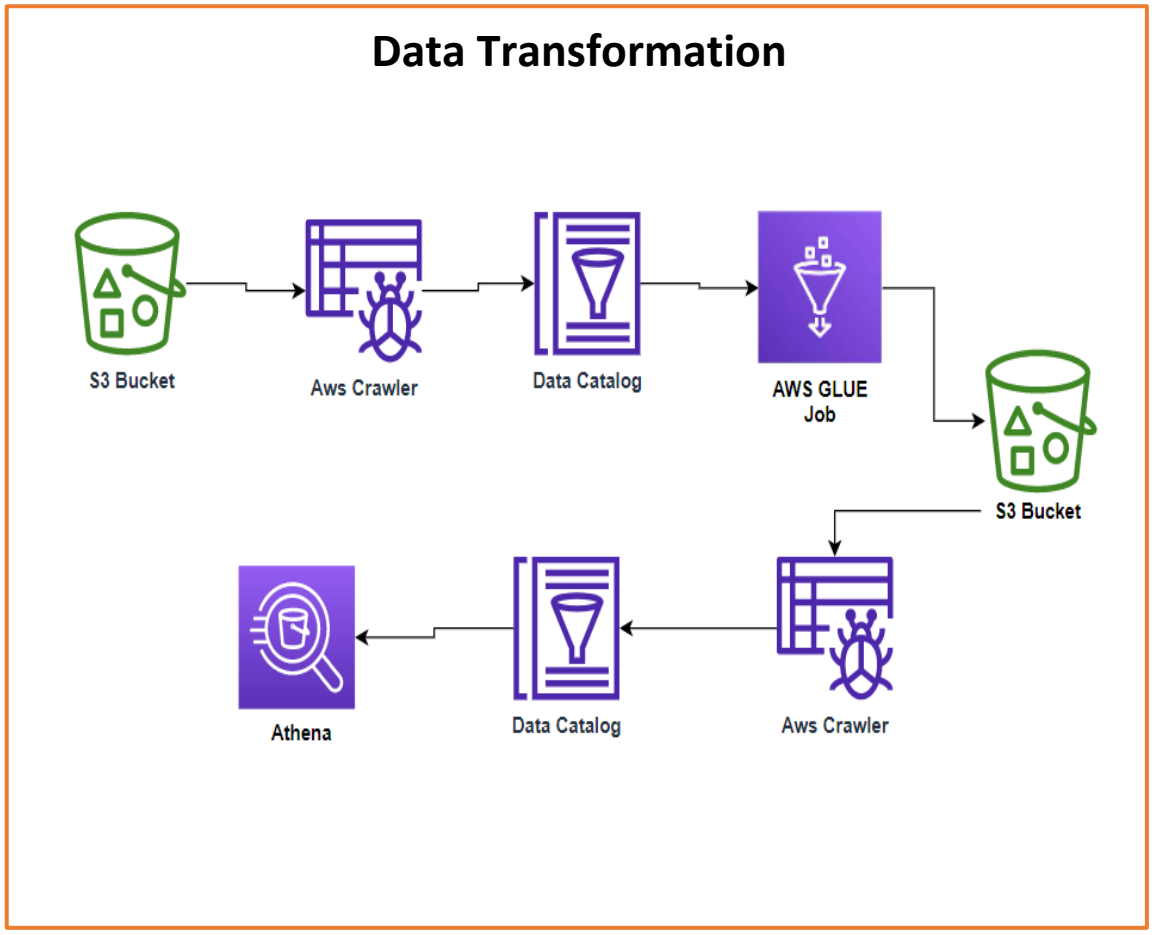
- Data Source: Kaggle
- Dataset from a multicategory e-commerce online store
- Data Size: 15GB
- Data period: October-November 2019
- Dataset comprises of attributes such as product ID, product category, product sub-category, price, user details, user session details, brand, event_type, etc describing the user shopping activity.
- Link: https://www.kaggle.com/datasets/mkechinov/ecommerce-behavior-data-from-multi-category-store

System Design/ ELT Architecture



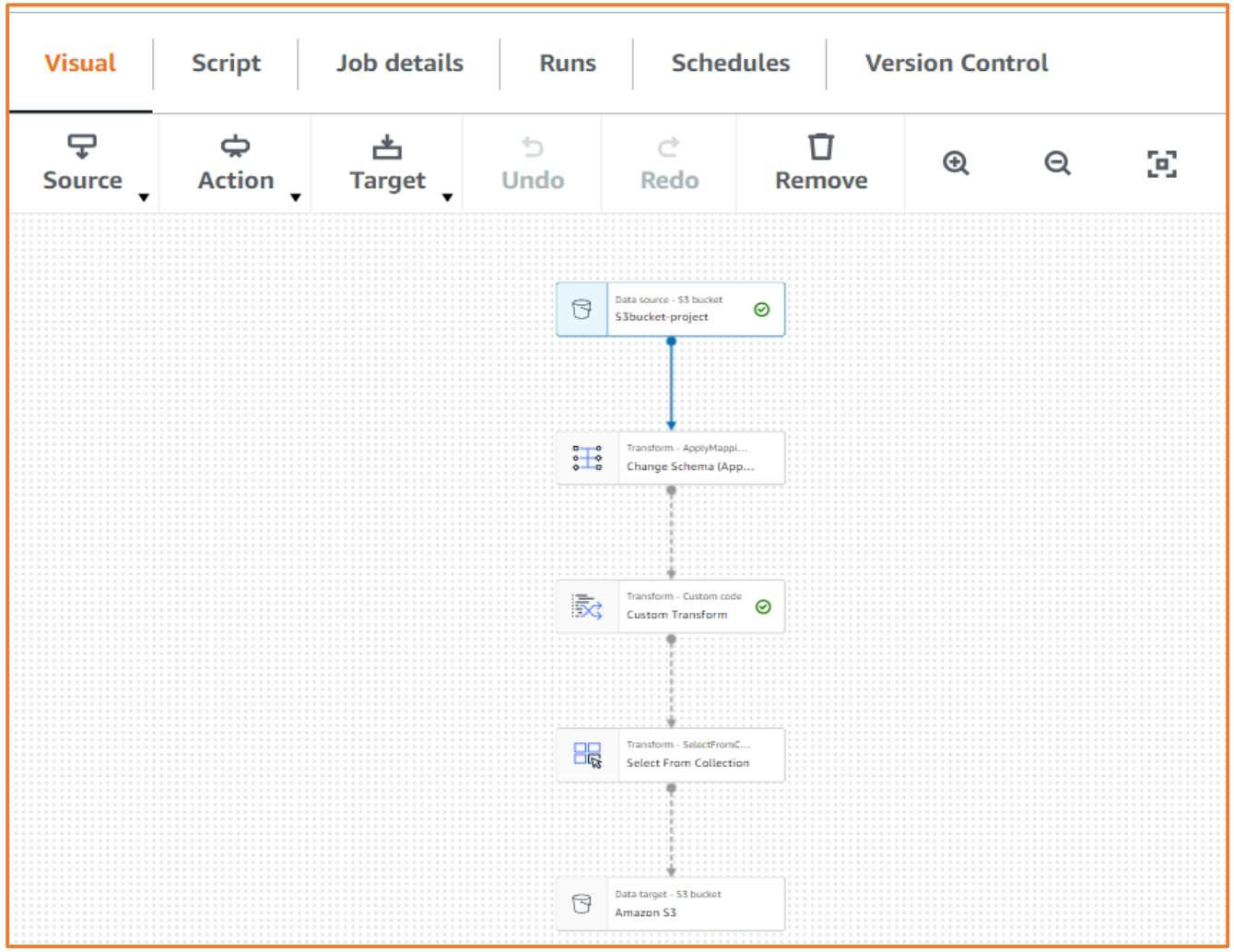
Data Loading And Transformation





ETL – Glue Job

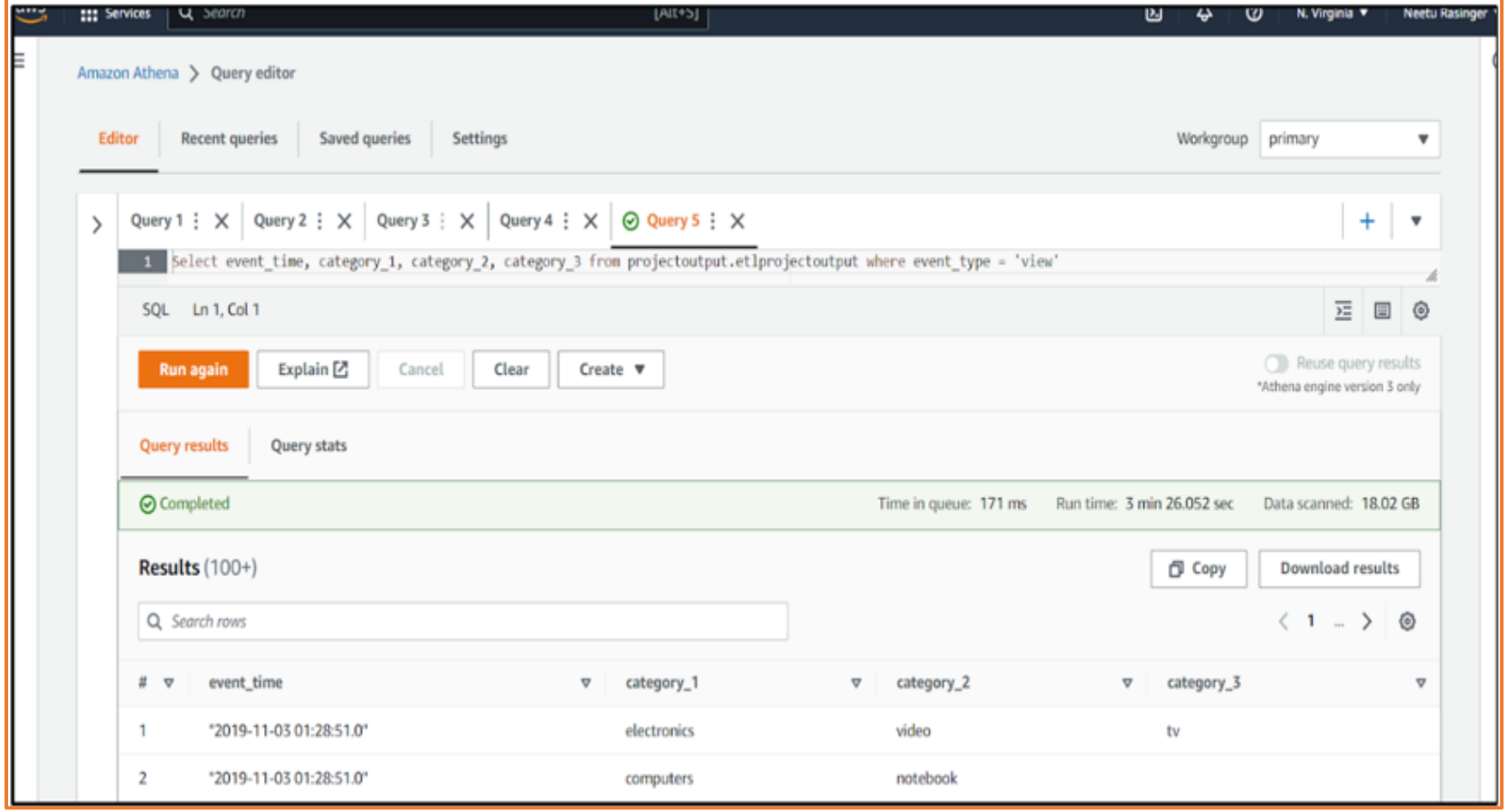
- The columns are modified with relevant datatypes.
- The column category_code is split into three columns.



Data Analysis

- Athena is serverless.
- In Athena the data in S3 bucket is analyzed using SQL.

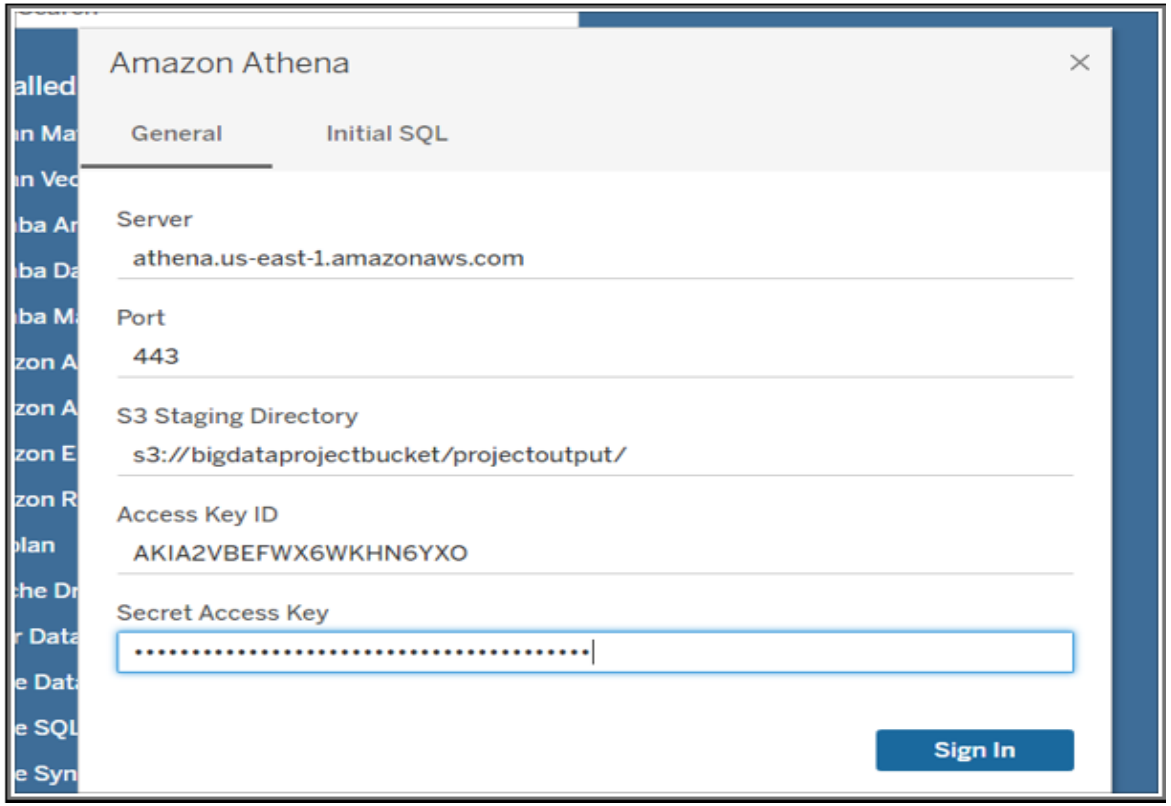
Querying Data in Athena



Connection To Tableau

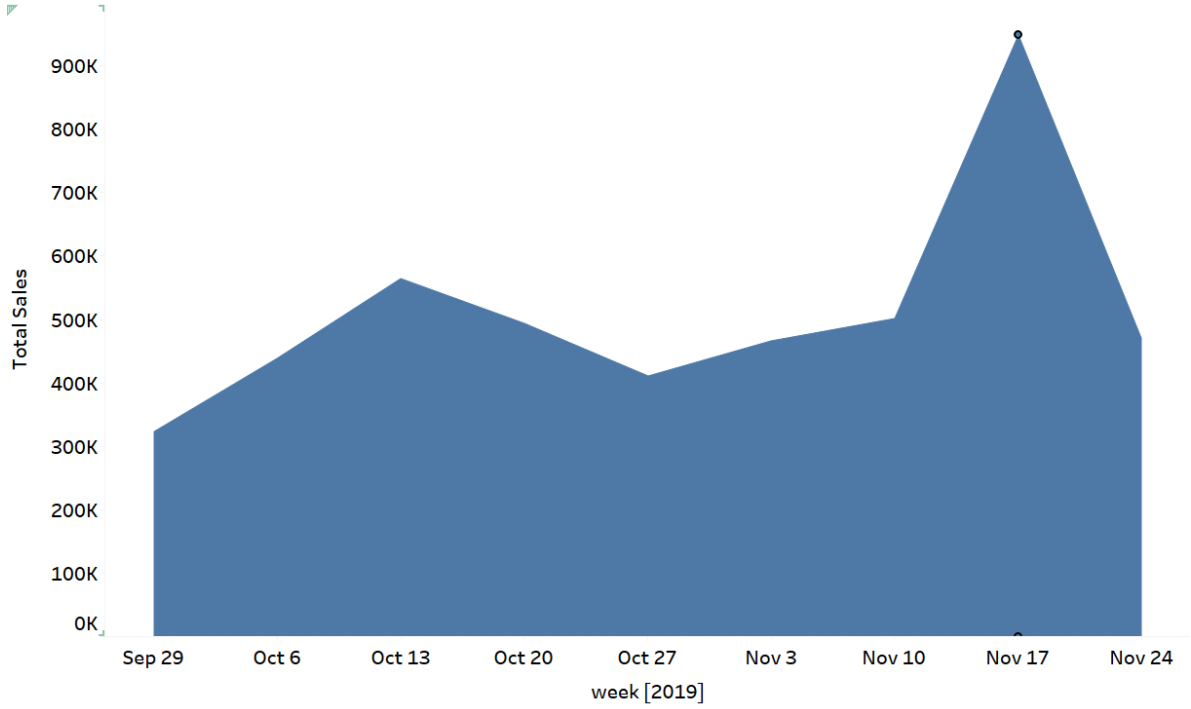
- Tableau desktop is used to create connections with Athena for creating dashboards.

Connecting Tableau to Athena

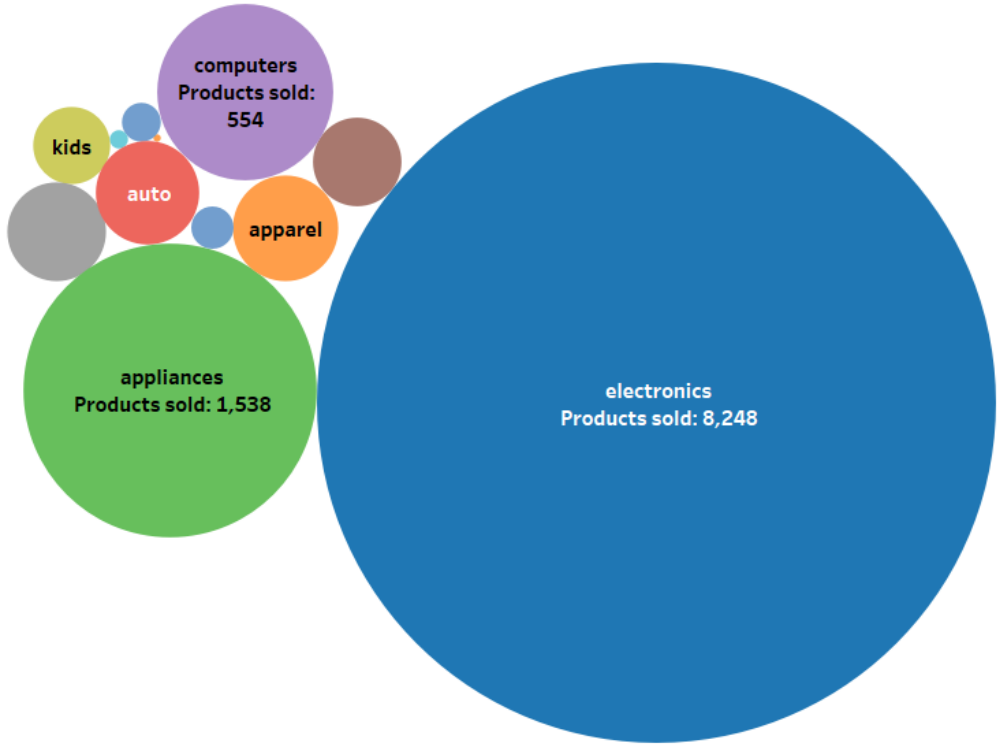


Data Visualizations

Total Sales per week

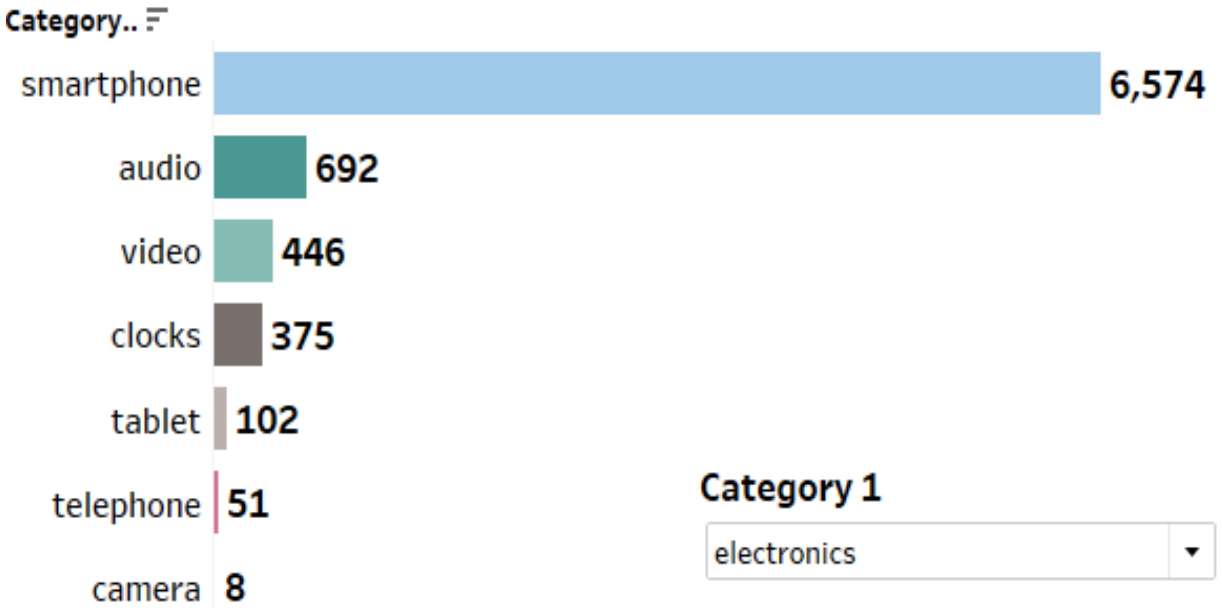


Top Sold Product Category

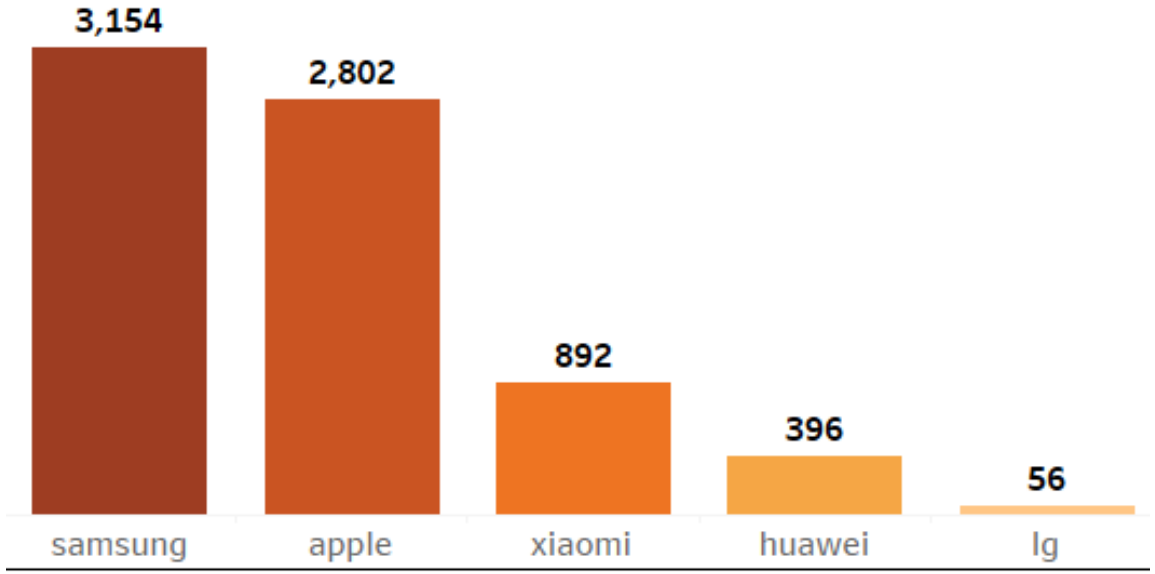


Data Visualizations

Top Sold Product Sub-category for Electronics

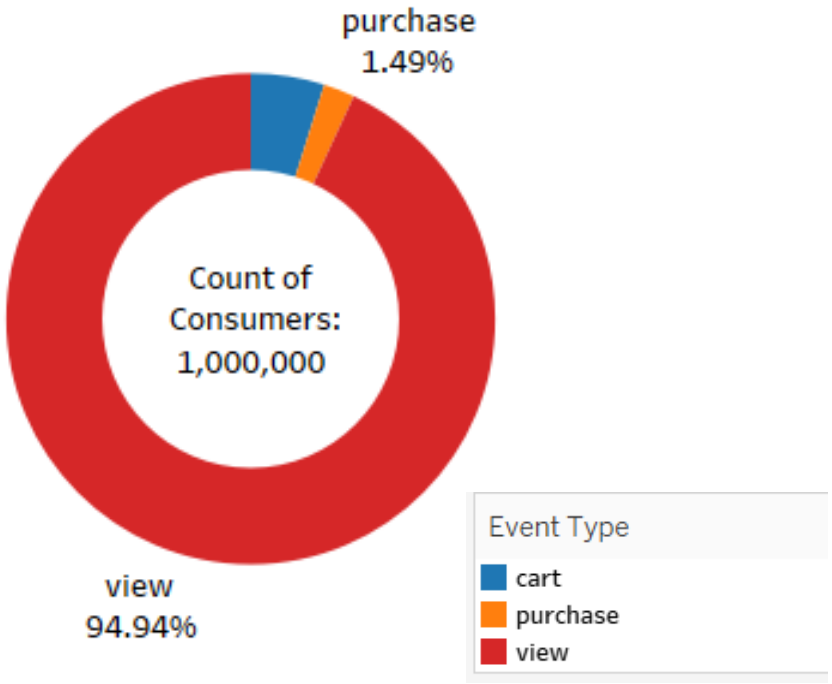


Popular Brand

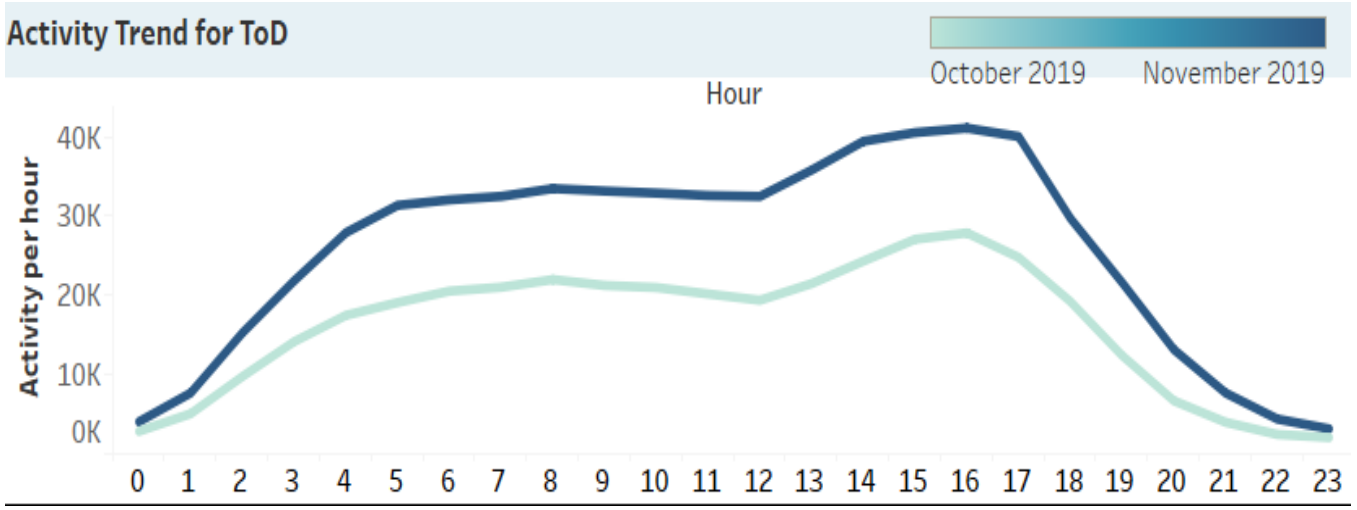


Data Visualizations

Distribution for each event



Activity Trend throughout the day

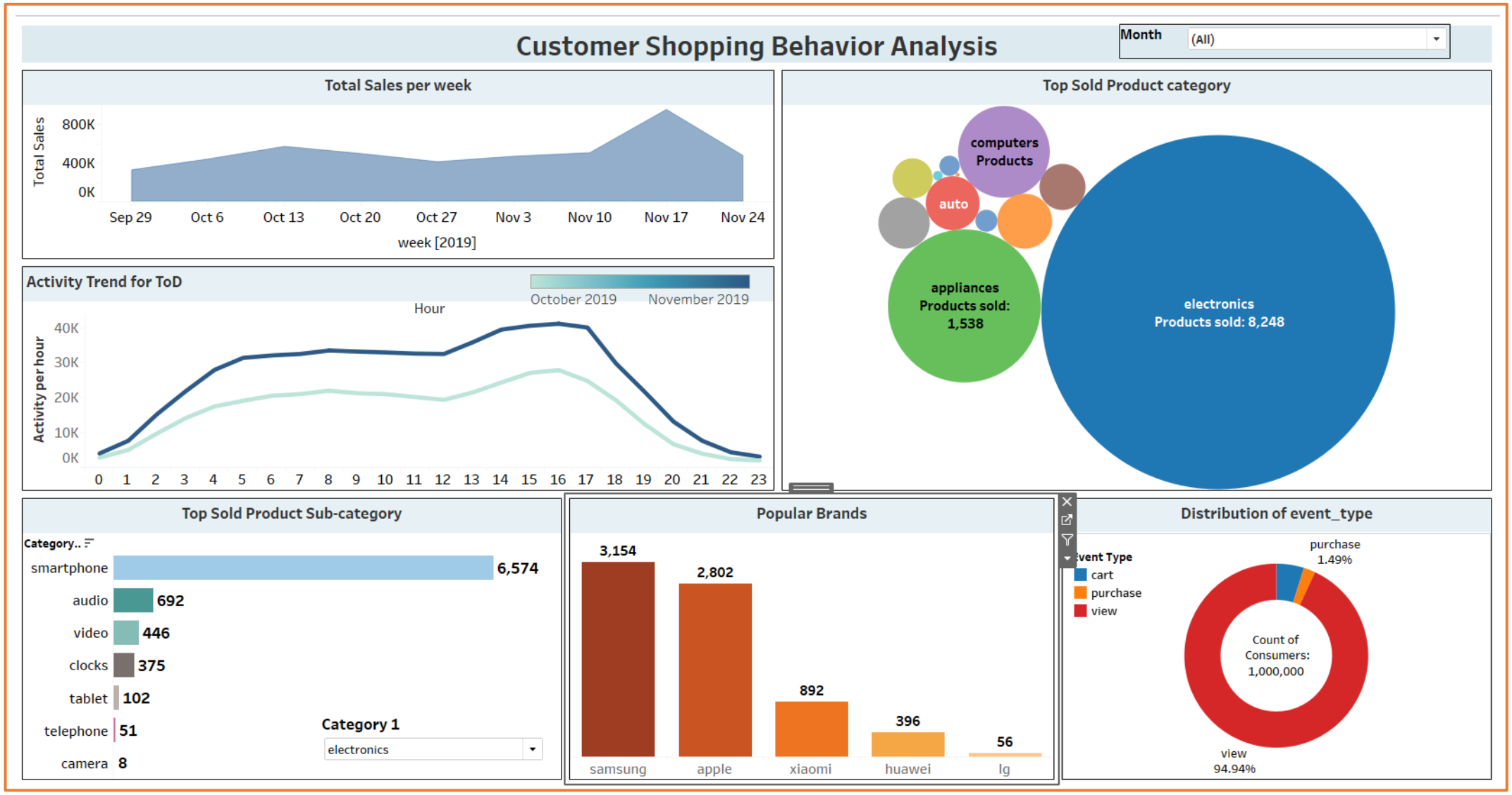


Data Visualizations

Month-Over-Month Growth %

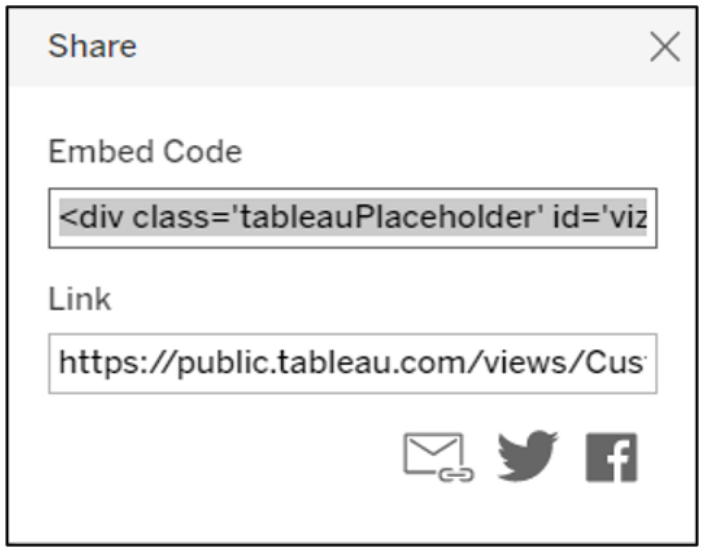
	Count of Products		Event_Time Earnings		Percentage Change	
Category 1	October	November	October	November	October	November
apparel	71	128	$6K	$10K	0.00%	72.82%
appliances	678	860	$119K	$167K	0.00%	40.60%
auto	95	96	$13K	$13K	0.00%	-3.25%
computers	243	311	$97K	$134K	0.00%	38.39%
construction	72	68	$10K	$7K	0.00%	-32.33%
electronics	3,839	4,409	$1,643K	$1,856K	0.00%	12.92%
furniture	74	100	$16K	$20K	0.00%	25.26%
kids	53	53	$9K	$8K	0.00%	-7.67%

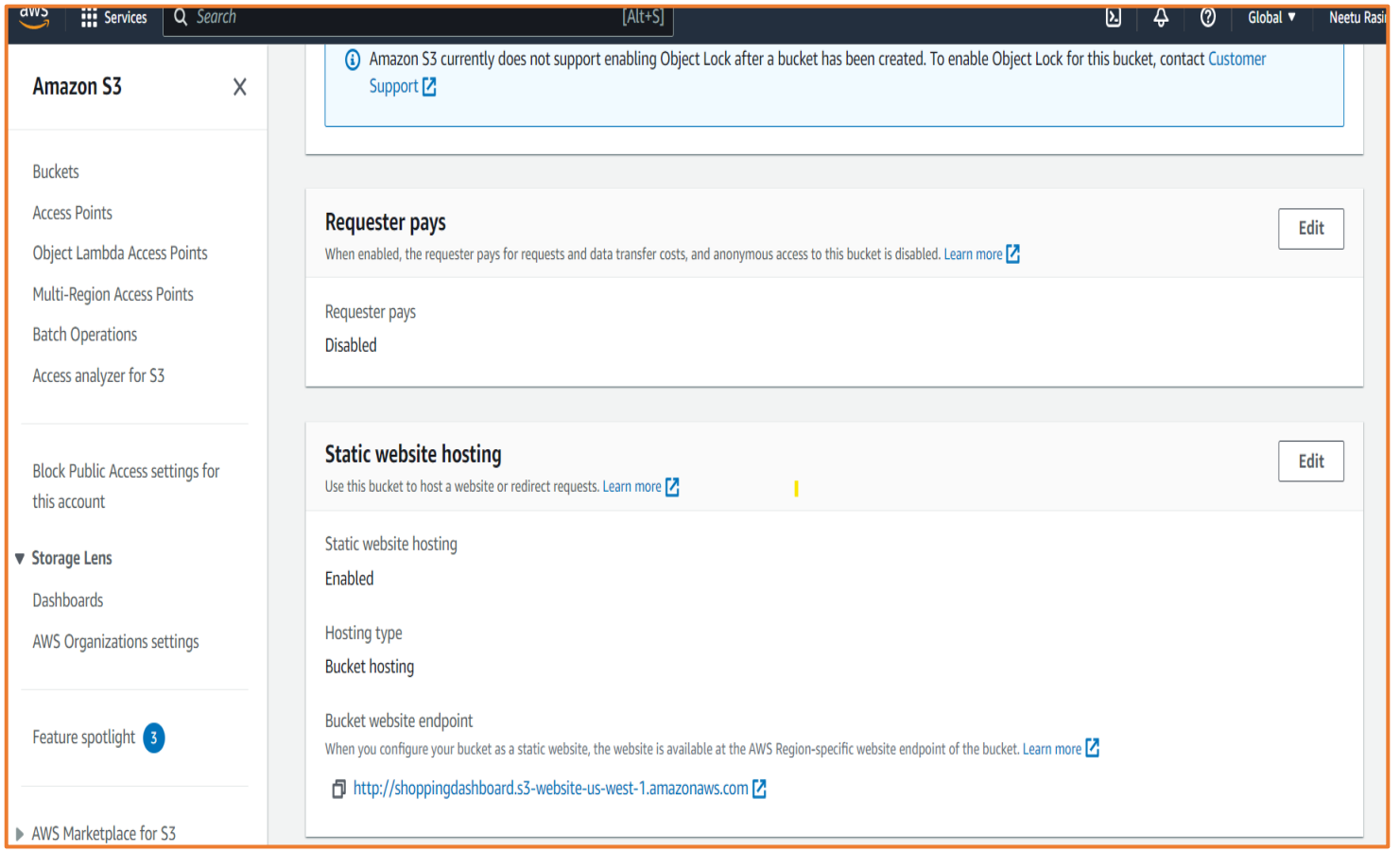
Dashboard


Customer Shopping Behavior Analysis
Month
(All)
Total Sales per week
Total Sales
800K
400K
0K
Sep 29
Oct 6
Oct 13
Oct 20
Oct 27
Nov 3
Nov 10
Nov 17
Nov 24
week [2019]
Top Sold Product category
computers Products
auto
appliances Products sold: 1,538
electronics Products sold: 8,248
Activity Trend for ToD
October 2019
November 2019
Hour
Activity per hour
40K
30K
20K
10K
0K
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Top Sold Product Sub-category
Category..
smartphone 6,574
audio 692
video 446
clocks 375
tablet 102
telephone 51
camera 8
Category 1
electronics
Popular Brands
3,154
2,802
892
396
56
samsung
apple
xiaomi
huawei
lg
Distribution of event_type
Event Type
cart
purchase
view
purchase 1.49%
Count of Consumers: 1,000,000
view 94.94%

Web Integration

Embedded Code In Tableau





Static website link: https://shoppingdashboard.s3.us-west-1.amazonaws.com/index.html

Conclusion

- Analyzed the most active hour and day for online shopping
- Observed the most purchased product category and sub-category by most users
- Observed the most popular brands for each product category.
- Consumer experience can be improved by ensuring that there is no server crash during the most active period.
- Offering discounts on products during weekdays can attract more users for shopping through the week further contributing to increase in sales.

Future Work

- Analyze Consumer shopping behavior for a couple of years. (High Volume data)
- Use machine learning algorithms for predicting the demands for products based on the consumer shopping behavior for inventory planning.
- Build recommendation systems to recommend the products to the users based on their past purchases and predicting their future purchases.

Image References

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Thank you