2019 Electronics Sales Automation Content Management System

Group Name: Color Grid

1. Background

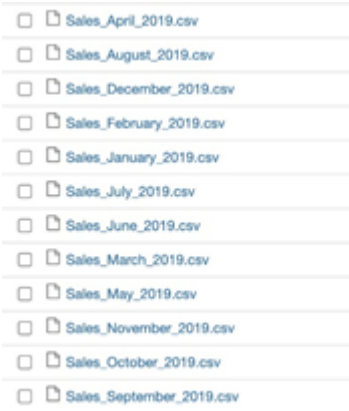
We have collected 12 months of sales data of Amazon electronic products, and we intend to build our own sales database based on 12 csv files. According to the database, we can understand the sales situation of Amazon electronic products in 2019, and we will provide 8 templates to help companies and enterprises to understand the past sales situation. It can provide reference for the next development of sales strategy, reasonable preparation of inventory, forecast order volume and other business actions. The reports have been stored into the database and the templates will be shown according to the selection of data as requested by the news user.

2. Objective

This project is to develop an automated sale management system focus on the sale situation in 2019.

3. Database

This is the original data we collected first. (12 CSV files)



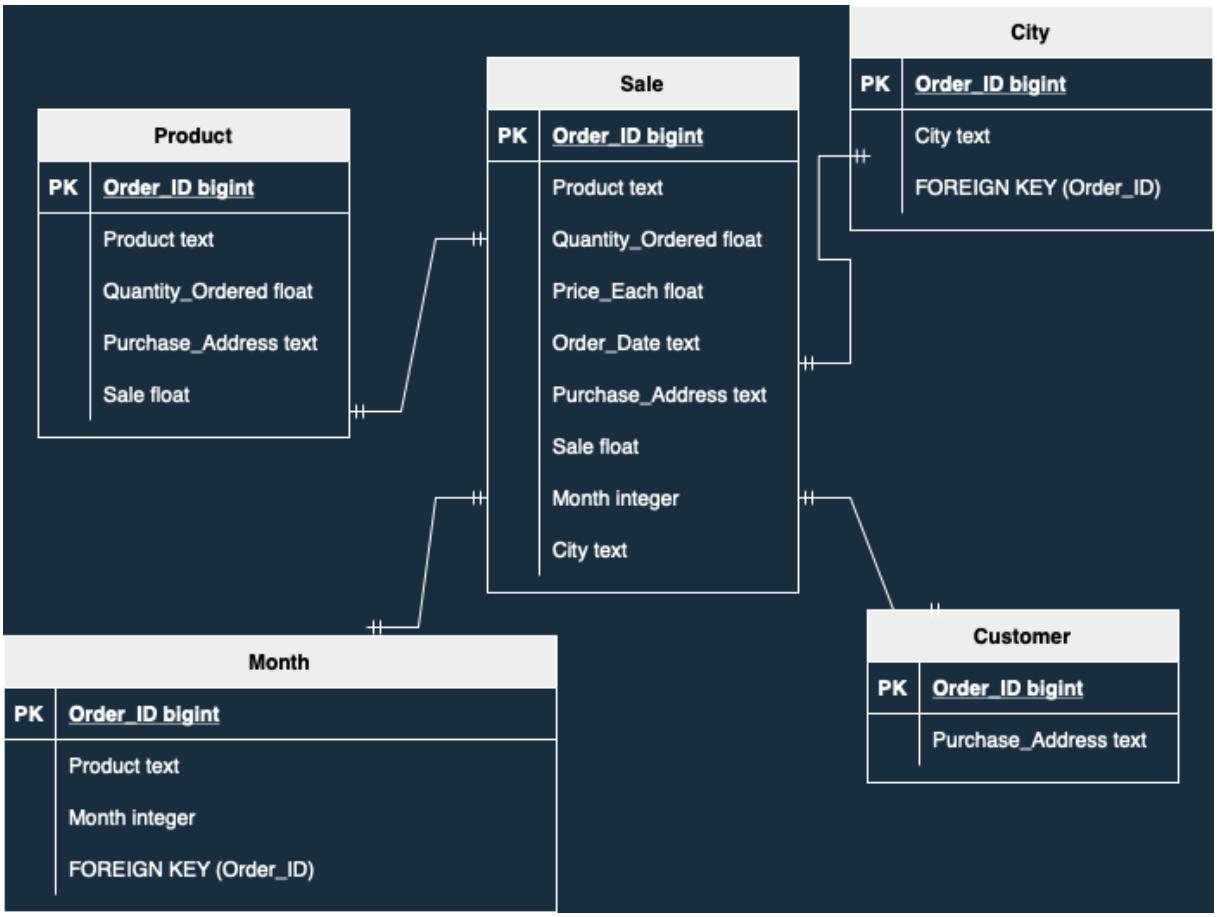
4. Solution

- Data cleaning with pandas for 12 csv files
- Analyze the connection between the tables and build our own sales database
- Improve the database, set up basic functions for the database (add, delete, query, etc.)
- Write templates, combined with SQLite, matplotlib to provide visual results and text version reports according to user 'select'.

5. System operation

5. 1 Create database

According to the requirements, find the relationship between the tables, define the primary key, foreign key, etc. Finally build the database. The ER diagram as below:



Sale:

PRIMARY KEY Order_ID_bight
Product text
Quantity_Ordered float
Purchase_Address text
Sale float
Month integar
City text
Price_Each float
Order_Date text

Product:

PRIMARY KEY Order_ID_bight
Product text
Quantity_Address text
Purchase_Address text
Sale float

Month:
PRIMARY KEY Order_ID_bight
Product text
Month integar
FOREIGN KEY (Order_ID)

City:
PRIMARY KEY Order_ID_bight
City text
FOREIGN KEY (Order_ID)

Customer:
PRIMARY KEY Order_ID_bight
Purchase_Address text

We use the primary key to join all the tables, and the foreign key as a proof that can only change according to this fact table "Sale".

5. 2 Provide basic functions

① Insert
② Delete
③ Select

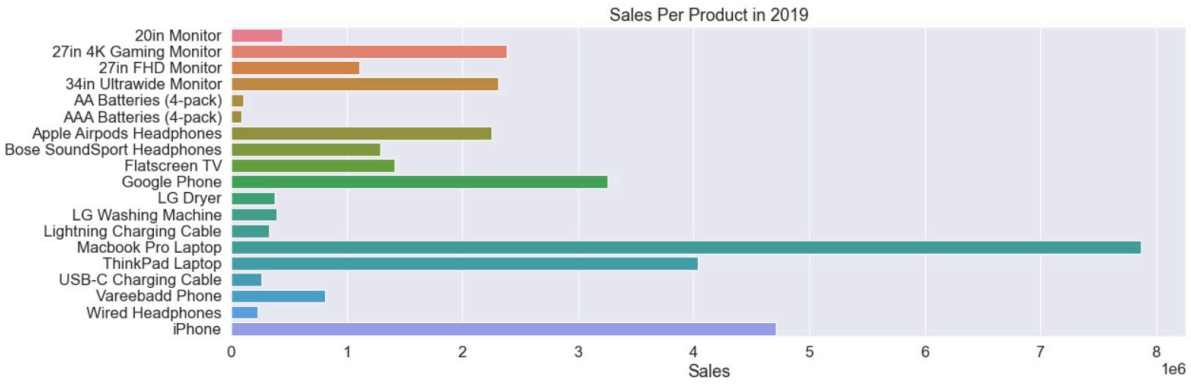
```
Please enter your option:

---------------------------
Please choose following option:
1.  add order to product
2.  add order to month
3.  add order to city
4.  delete order in product
5.  delete order in month
6.  delete order in city
7.  Enquiry Order Info in product
8.  Enquiry Order Info in month
9.  Enquiry Order Info in city
10.  Learn about {Product} info in 2019
11.  Learn about the sale info in {month}
12.  Purchase Frequency about {product} in different months
13.  Prediction about Purchase Possibility about {product} in {month}
14.  The info about quantity ordered per product in 2019
15.  The sale situation in 2019
16.  The info about quatity ordered in different months
17.  The sale info in different cities
18.  exit
```

5. 3 Provide templates

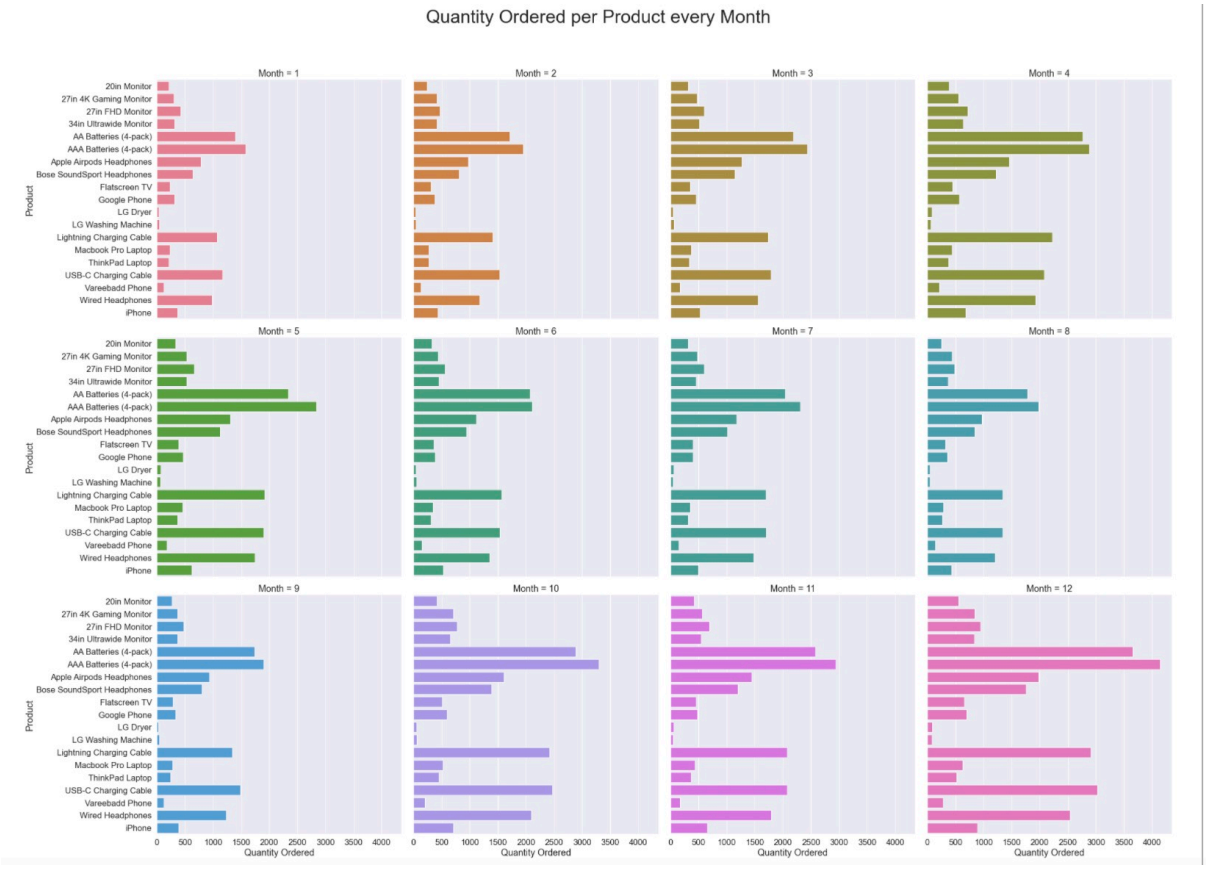
We will provide 8 templates as below:

1) The figure shows that the sales of all products in 2019. Macbook Pro Laptop has the highest sale with more than 7,867,600 dollars and iPhone has the second highest sale with 4,710,300. Products in the category of batteries have the lowest sales. Then the 3rd is Google Phone and the 4th is ThinkPad Laptop. In terms of brand, Apple contributes the most of total sales. In terms of product categories, computers and mobile phones accounted for most of the sales.

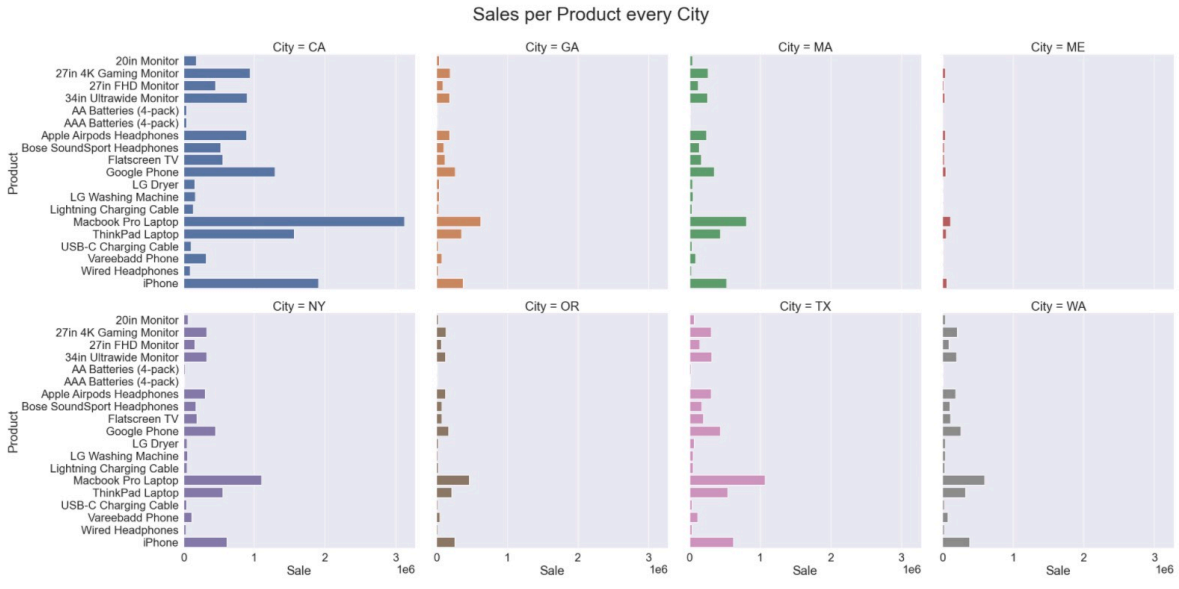


2) The figure shows that the quantity ordered of all products in 2019. AAA Batteries (4-pack) has the highest quantity ordered with 30,372 and AA Batteries (4-pack) has the second highest quantity ordered with 27,136. Then the 3rd is USB-C Charging Cable and the 4th is Lightning Charging Cable. The unit price of electronic equipment accessories is not high, and the contribution of sales is only a small part, but the order volume of electronic accessories is the largest.

3) This figure presents the quantity ordered of all products in different months. In this chart, we can compare the quantity ordered of the same product by month directly. The company could consider the storage combining with the figure. In the fourth quarter, the company should store more product.



4) This section is to understand the sales situation of this product list in each city, which helps sellers to adjust the product sales target according to the table. From the table, CA cities have higher demand for electronic products, and the sales of Macbook Pro Laptop is highest, which are close to the total sales of seven cities. In contrast, ME cities have less consumption for each electronic product. The company can adjust their marketing policies according to the situation of local cities.

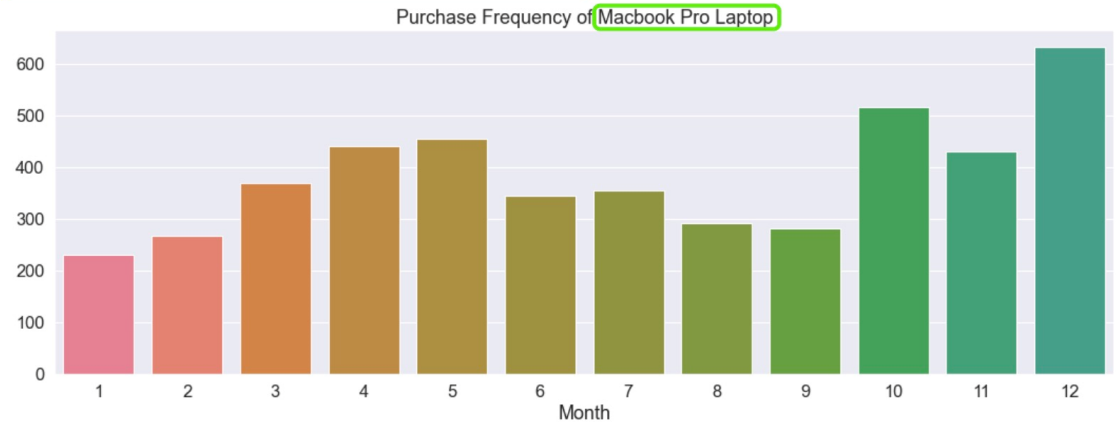


5) User input: {Product}

Output: Purchase Frequency of this Product in 2019

This template allows users to find the Purchase frequency of one product.

```
Please enter your option: 12
Please input product:Macbook Pro Laptop
In this month: 1, the purchase frequency is232.
In this month: 2, the purchase frequency is268.
In this month: 3, the purchase frequency is371.
In this month: 4, the purchase frequency is441.
In this month: 5, the purchase frequency is455.
In this month: 6, the purchase frequency is345.
In this month: 7, the purchase frequency is355.
In this month: 8, the purchase frequency is292.
In this month: 9, the purchase frequency is283.
In this month: 10, the purchase frequency is516.
In this month: 11, the purchase frequency is432.
In this month: 12, the purchase frequency is634.
```



6) User Input:{Month}

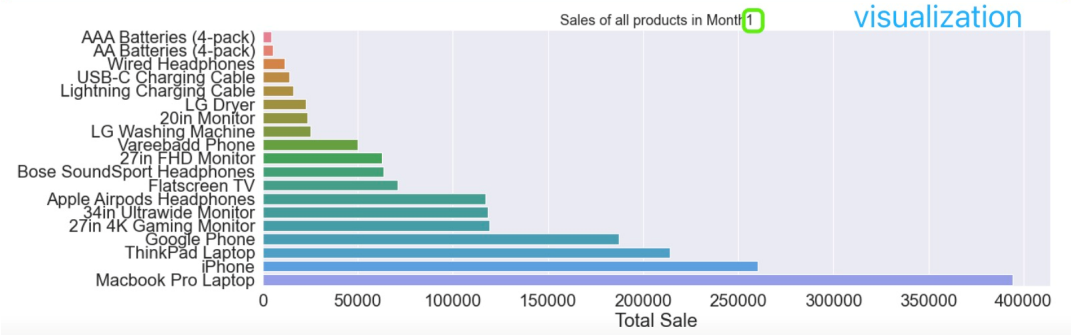
Output: Sales of all Product in this {Month}

This template allows users to check the sales of all product in a selected month.

```
Please enter your option: 11
Please input month (1-12):1
Product: AAA Batteries (4-pack), the sum sale is 4733.16999999989 in this month.
Product: AA Batteries (4-pack), the sum sale is 5352.960000000063 in this month.
Product: Wired Headphones, the sum sale is 11774.179999999833 in this month.
Product: USB-C Charging Cable, the sum sale is 14029.300000000203 in this month.
Product: Lightning Charging Cable, the sum sale is 16056.300000000252 in this month.
Product: LG Dryer, the sum sale is 22800.0 in this month.
Product: 20in Monitor, the sum sale is 23537.860000000077 in this month.
Product: LG Washing Machine, the sum sale is 25200.0 in this month.
Product: Vareebadd Phone, the sum sale is 50000.0 in this month.
Product: 27in FHD Monitor, the sum sale is 62845.80999999975 in this month.
Product: Bose SoundSport Headphones, the sum sale is 63593.63999999961 in this month.
Product: Flatscreen TV, the sum sale is 71100.0 in this month.
Product: Apple Airpods Headphones, the sum sale is 117300.0 in this month.
Product: 34in Ultrawide Monitor, the sum sale is 118556.88000000062 in this month.
Product: 27in 4K Gaming Monitor, the sum sale is 119336.94000000061 in this month.
Product: Google Phone, the sum sale is 187200.0 in this month.
Product: ThinkPad Laptop, the sum sale is 213997.85999999955 in this month.
Product: iPhone, the sum sale is 260400.0 in this month.
Product: Macbook Pro Laptop, the sum sale is 394400.0 in this month.
```

text

visualization



7) User input:{Product}

Output: Sale for every Month of this {Product}

This template helps users to check the sale of one Product in each month.

```
Please enter your option: 10
Please input product:Macbook Pro Laptop
In Month 1, the product Macbook Pro Laptop, total number of orders is 232.0.
In Month 2, the product Macbook Pro Laptop, total number of orders is 268.0.
In Month 3, the product Macbook Pro Laptop, total number of orders is 371.0.
In Month 4, the product Macbook Pro Laptop, total number of orders is 443.0.
In Month 5, the product Macbook Pro Laptop, total number of orders is 456.0.
In Month 6, the product Macbook Pro Laptop, total number of orders is 346.0.
In Month 7, the product Macbook Pro Laptop, total number of orders is 355.0.
In Month 8, the product Macbook Pro Laptop, total number of orders is 292.0.
In Month 9, the product Macbook Pro Laptop, total number of orders is 283.0.
In Month 10, the product Macbook Pro Laptop  total number of orders is 516.0.
In Month 11, the product Macbook Pro Laptop  total number of orders is 432.0.
In Month 12, the product Macbook Pro Laptop  total number of orders is 634.0.
```

8) User input:{Product}、[number] of Month

Output: In Month {number},the possibility of next order which is {Product} is{calculation of system}

This template allows users to check the possibility of buying a product in the next month.

```
Please enter your option: 13
Please input product:Macbook Pro Laptop
Please input month:3
In Month 3, the possibility of next order which is Macbook Pro Laptop is 2.5500034366623137%.
```

6. Conclusion

We have successfully created the 2019 Electronics Sales Automation Content Management System, which we can perform basic operations such as adding, deleting and querying to see the total number of sales and sales amounts of different electronics products for each month. Through visual analytics, we can use this data to summarize the sales of different products and understand the buying preferences of users. It also helps companies to forecast the sales of their products in different months to rationalise their inventory and tailor their sales strategies. We only provide 8 templates for this database, and companies can add more templates according to their actual situation.