INTRODUCTION

- **Objective**

1. Cleaning the Data
2. Analyze Sales Data to Derive Insights
3. Calculate Inventory Performance Metrics
4. Provide Actionable Recommendations
5. Visualize Insights Effectively

METHODOLOGY

- **Data Preprocessing:** Identified and handled missing data and duplicates. Organized data for further analysis.

- **Exploratory Data Analysis (EDA):** Analyzed sales patterns, highlighted bestsellers, and flagged items with low stock.

- **Key Metrics:** Computed Inventory Turnover Rate and Stock-to-Sales Ratio.

- **Insights & Recommendations:** Shared actionable suggestions based on the analysis.

CLEANING THE DATA

Data cleaning is an essential step to ensure the accuracy and reliability of analysis. For this project, the process included the following steps:

Duplicate Check: Verified if there were any duplicate rows in the dataset.

In this project, no duplicates were found. If duplicates existed, they could be handled using the drop_duplicates() function.

Handling Missing Values: Checked for missing (null) values in the dataset.

Identified two columns with null values. These were handled by replacing the null values with 0 using appropriate methods.

DATA CLEANING FLOW CHART

ANALYZE SALES DATA TO DERIVE INSIGHTS

Analyze Sales Trends Over Time to Identify Seasonal or Long-Term Demand Patterns:

• Determined the number of items sold each year and visualized the trends using a line chart for better understanding.

• Created an additional column, Seasonal Trends, to categorize yearly performance:

• If the number of items sold per year is less than 20, it's labeled as a Downfall Year.

• If the number of items sold is between 20 and 200, it's labeled as an Average year.

• If the number of items sold exceeds 200, it's categorized as a Profitable Year.

SALES TRENDS CHART
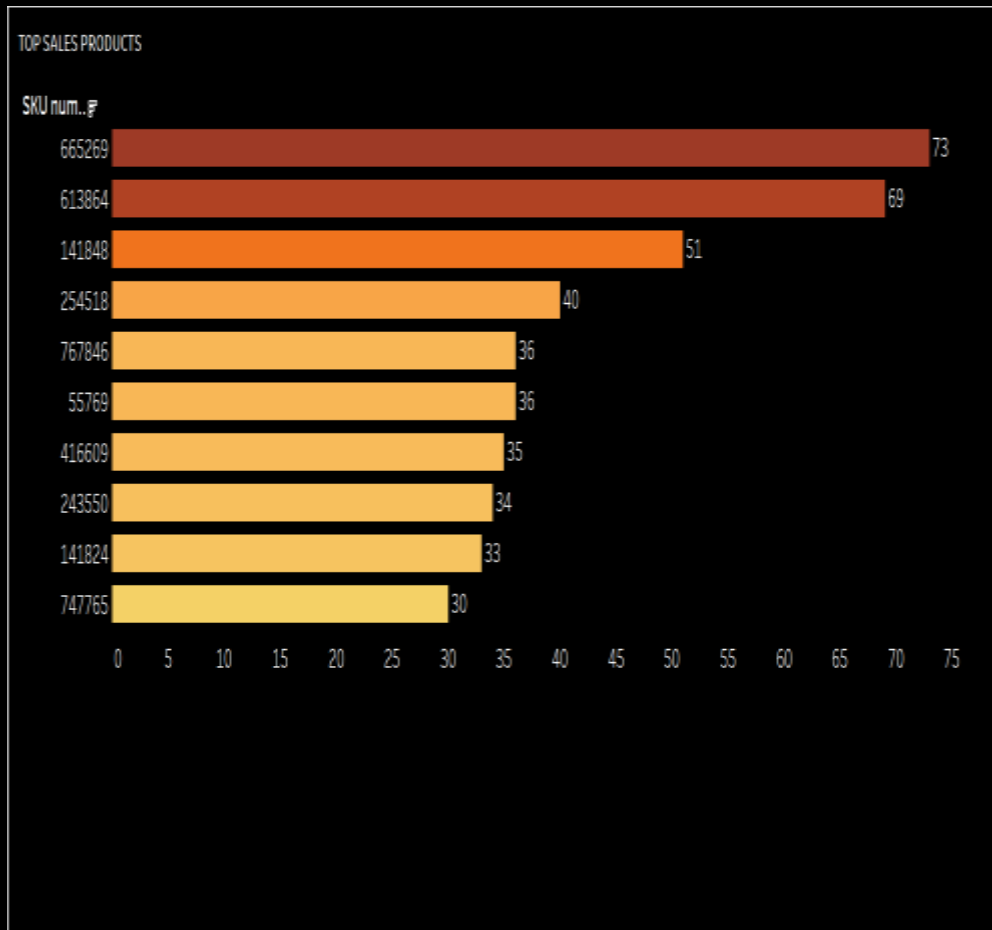

ANALYZE SALES TRANDS
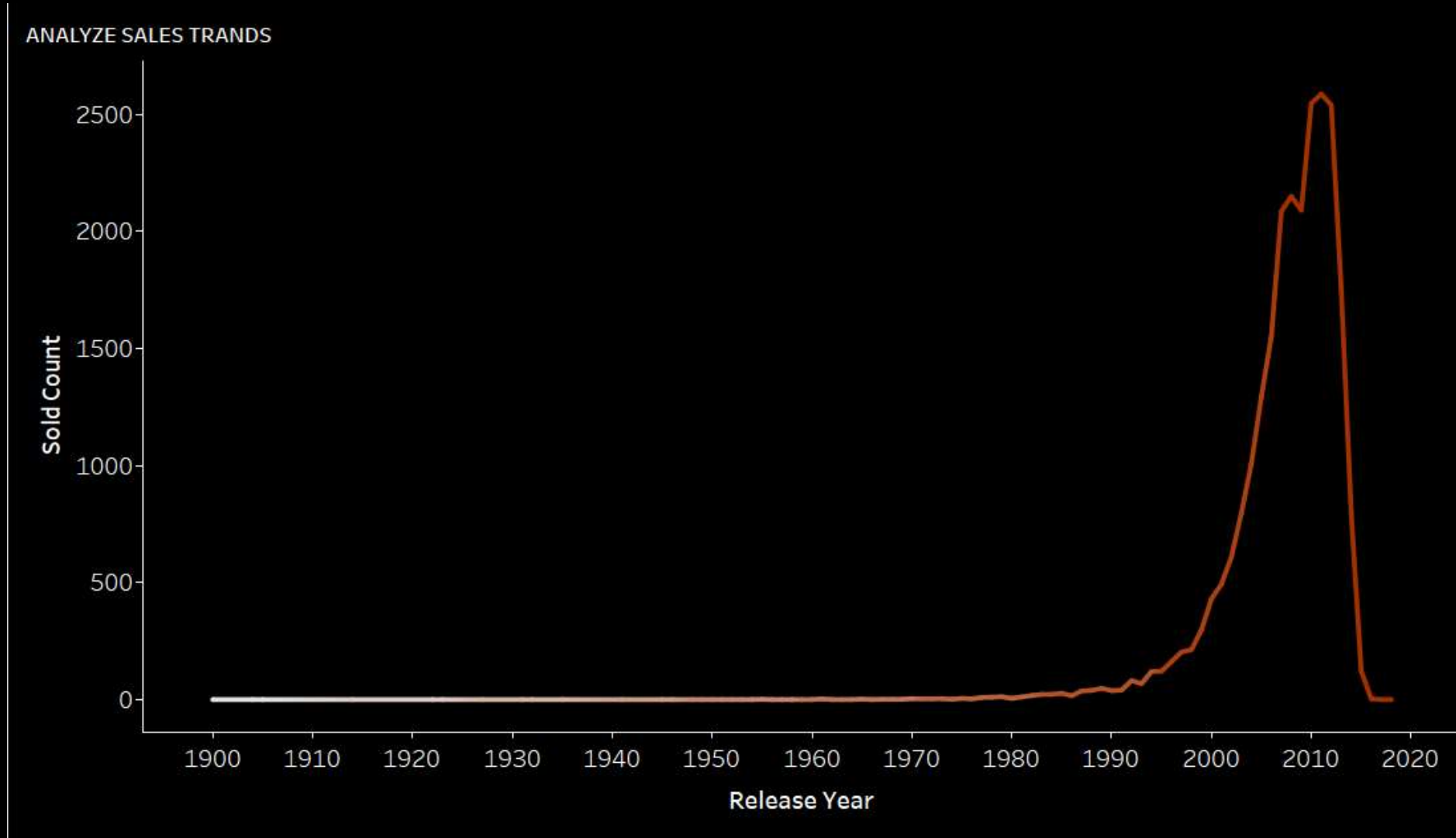
ANALYZE SALES DATA TO DERIVE INSIGHTS

Identify Top-Selling Products and Categories:

• Top-Selling Products: Extracted the top 10 SKU_numbers with the highest sales from the dataset to identify the most popular items.

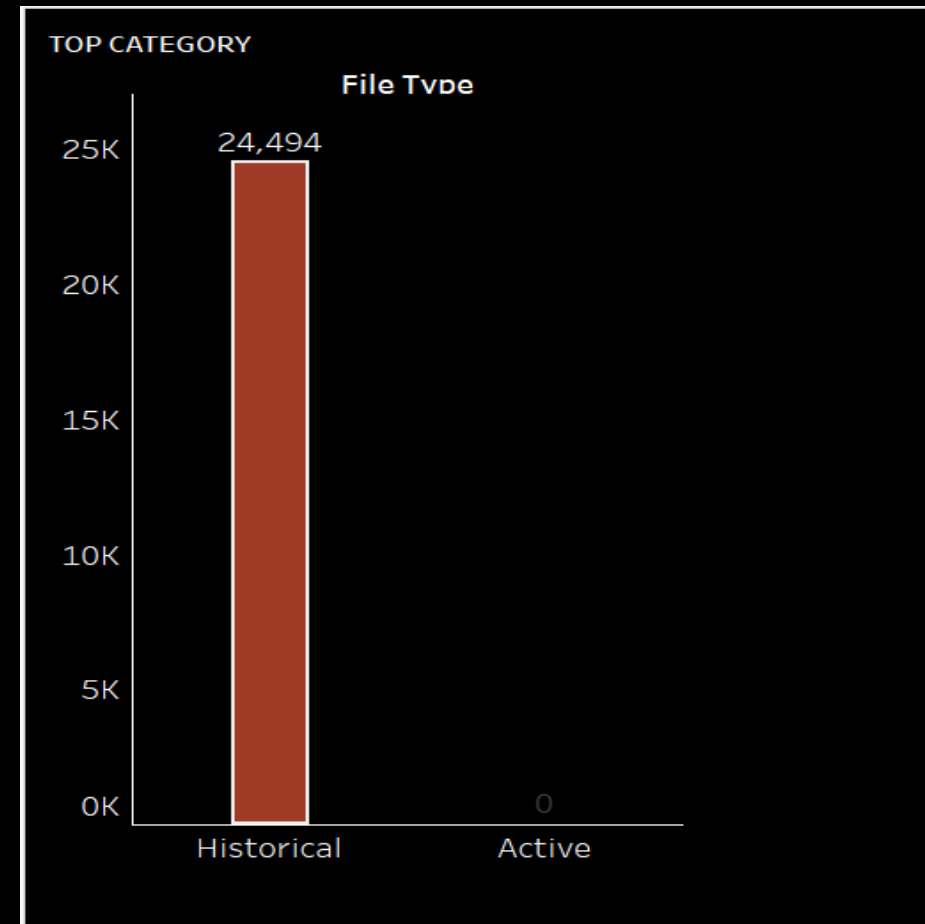• Top-Selling Categories: Analyzed the dataset to determine the category with the highest number of items sold.

TOP PRODUCTS AND CATEGORIES CHARTS

Top Products

Categories

TOP SALES PRODUCTS

SKU num..

SKU	Value
665269	73
613864	69
141848	51
254518	40
767846	36
55769	36
416609	35
243550	34
141824	33
747765	30

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

TOP CATEGORY

File Type

24,494

25K

20K

15K

10K

5K

0K

Historical   Active

0

ANALYZE SALES DATA TO DERIVE INSIGHTS

- Stock Levels and Low Stock Items:

- **Stock Levels:** Calculated the total stock available for each SKU_number and sorted the results in descending order to make it easier to understand.

- **Low Stock Items:** Identified items with stock levels below a set threshold of 10. Marked these as Low Stock Items and visualized them in a chart, excluding items with sufficient stock from the chart for better clarity.

STOCK LEVEL AND LOW STOCK CHARTS

Low Stock Levels
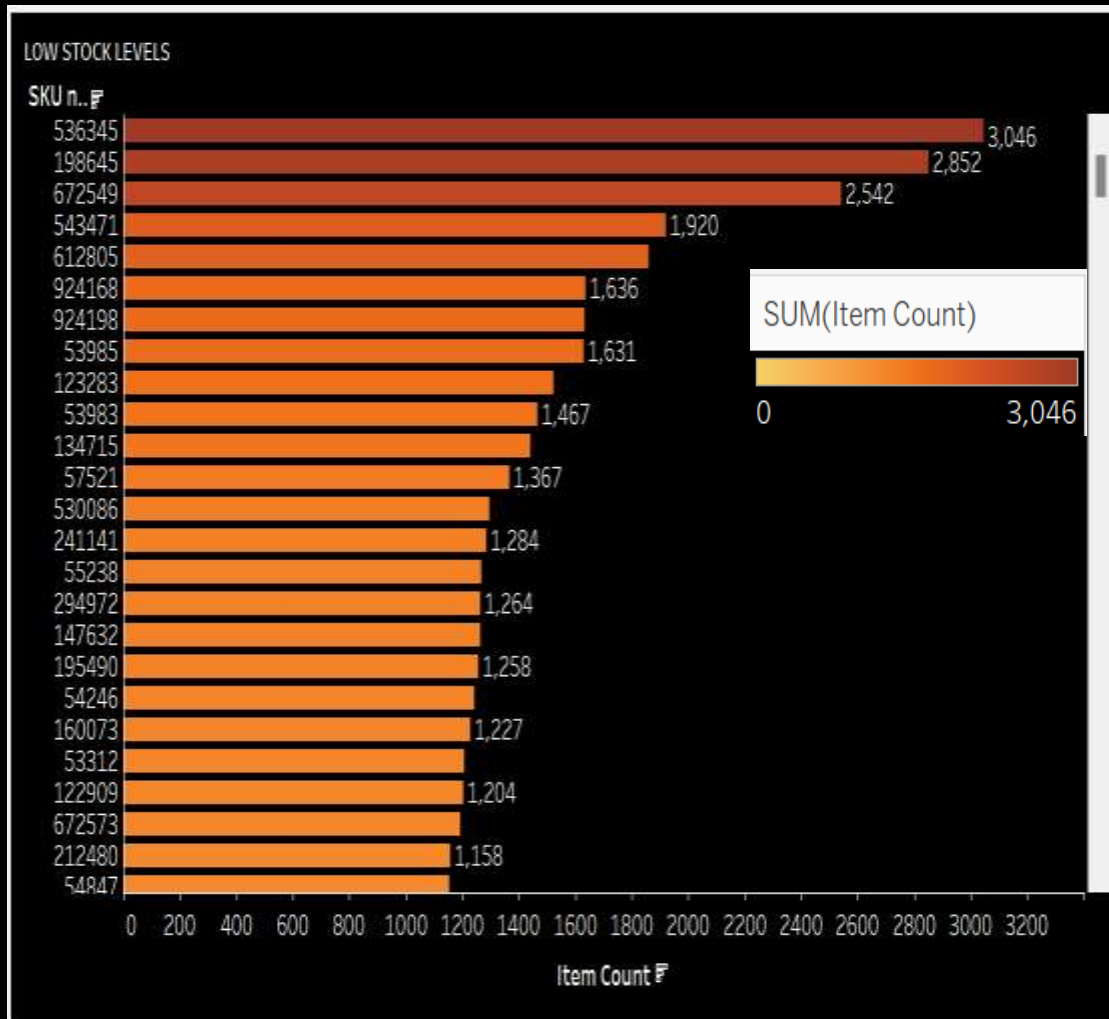
Low Stock
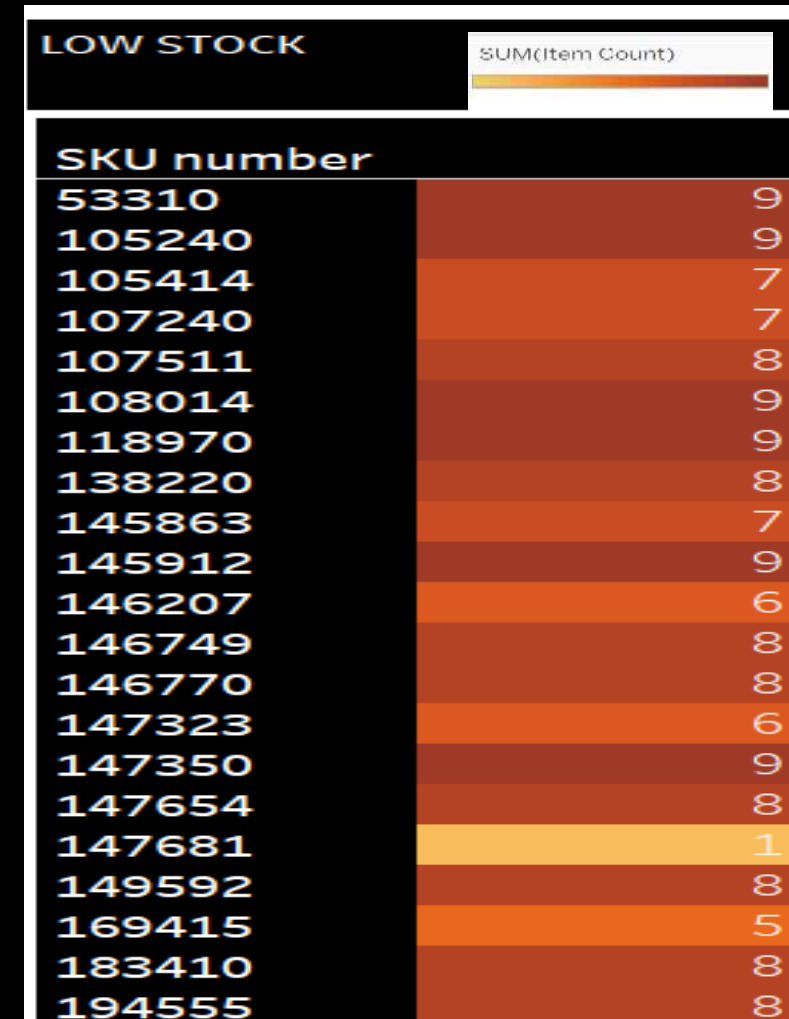
CALCULATE INVENTORY PERFORMANCE METRICS

Inventory Turnover:

• This is an essential performance metric that evaluates how effectively a company sells and replenishes its inventory within a specific period.

• It reflects the number of times inventory is sold or utilized during that timeframe, offering insights into operational efficiency and demand patterns.

To find the inventory turnover

Inventory turnover = Total Sales / Average Inventory

Average inventory = Average of total item count

CALCULATE INVENTORY PERFORMANCE METRICS

Stock to Sales ratio

❖ It measures the amount of inventory a business holds compared to the volume of sales it generates. This ratio helps businesses evaluate whether their inventory levels are aligned with sales performance.

To find stock to sales ratio

Stock to sales ratio = Average Inventory / Total sales

CALCULATE INVENTORY PERFORMANCE METRICS

Reorder Point:

•The reorder point is the inventory level at which a business needs to reorder stock to prevent stockouts. It ensures that new inventory is received before the current stock is exhausted, accounting for demand during the replenishment period.

•In this analysis, the lead time was set to 7 days. Since the dataset provides sales data on a yearly basis, the average daily sales were calculated by dividing the total annual sales by 365. The reorder point was then determined based on this calculation.

To get reorder point(ROP)

ROP = Average daily sales * Lead days

Average daily sales = Total Sales/ 365

PROVIDE ACTIONABLE RECOMMENDATIONS

1. In first parts of this I make top products to high demand products and convert top products into a sentence like "Ensure sufficient stock levels for SKU XXXXXX is high Demand Products" to make into a readable format.

2. In second part I make low stock items recommendation by using SKU_numbers and item count and make a sentence like "Reorder SKU XXXXXX as current stock (no of items which is below to the threshold) is low demand product" for easy to understand.

VISUALIZE INSIGHTS EFFECTIVELY

For Visualize this project I use one of the most popular visualization tool Tableau and make a chart to compare all the things which is given in questions.

1. **Sales Trends and variation over time**

   Visualization Type: Line Chart

   Purpose: sales trends over years.

   Example:

         x- axis: Years

         y- axis: Sold Count

VISUALIZE INSIGHTS EFFECTIVELY

2. Top Selling Products and Categories

Visualization Type: Bar chart(top Products), Column Chart(Categories)
Purpose: Identify top-performing products or categories.

Top Products
x- axis: Sold Count
y- axis: SKU_number

Top Categories
x- axis: File Type
y-axis: Sold Count

VISUALIZE INSIGHTS EFFECTIVELY

3. Stock levels and Low-stock items

Visualization Type: Bar Chart

Purpose: To find the no of items are available.

x-axis: Item Count

y-axis: SKU_number

❖ **For Low Stock item I make a table and colored it by in increasing order**

VISUALIZE INSIGHTS EFFECTIVELY

Finally, I created an interactive and visually appealing dashboard that consolidates all the key insights and metrics from the project. The dashboard includes: