**Inventory Control Management with SQL: Analyzing Walmart Sales Data**



Recently, I took on a project to explore the role of **inventory control management** in retail, a crucial aspect of ensuring smooth operations and profitability for any product-based business.

Think about it: running out of a popular product during a peak season or overstocking items that aren’t selling well can significantly impact a business’s bottom line. That’s where inventory control comes in, helping businesses make smarter decisions about stocking, ordering, and sales strategies.

For this project, I chose the Walmart sales dataset, which offered a treasure trove of information: sales data spanning from 2010 to 2012, macroeconomic indicators like CPI, weather conditions, and even holiday data. With SQL as my tool of choice, I aimed to answer intriguing questions like:

* Which year had the highest sales?
* Did weather influence sales patterns?
* Do sales always spike during holidays?
* Identify top-performing stores and products
* Analyse for underperforming stores or products.

What started as a simple exercise quickly turned into a journey of discovery, uncovering patterns and insights that could help any retailer optimize their inventory planning. Let me walk you through how I approached this project and the fascinating insights I found along the way.

**Dataset Overview**

The dataset I used for this project is a historical record of Walmart sales, spanning from **February 5, 2010, to November 1, 2012**, contained in the file **Walmart\_Store\_sales**. This dataset is compact but rich in insights, making it a fantastic resource for analyzing retail trends and inventory management.

Here’s what the dataset includes:

* **Store**: The store number, identifying individual Walmart locations.
* **Date**: The week of sales, giving a time dimension for trend analysis.
* **Weekly\_Sales**: Sales figures for each store during the specified week.
* **Holiday\_Flag**: A binary flag indicating whether the week was a holiday (1 for holiday, 0 for non-holiday).
* **Temperature**: The temperature on the day of sales, providing insights into how weather might influence shopping habits.
* **Fuel\_Price**: The cost of fuel in the region, potentially affecting transportation costs and customer behavior.
* **CPI (Consumer Price Index)**: The prevailing CPI, reflecting inflation levels during the time.
* **Unemployment**: The prevailing unemployment rate, offering an economic context for sales trends.

The dataset also identifies specific **holiday events**, such as:

* **Super Bowl**
* **Labour Day**
* **Thanksgiving**
* **Christmas**

What makes this dataset particularly interesting is its breadth: it combines sales figures with external factors like **weather, fuel prices, and economic indicators**. This allows for a multi-dimensional analysis, where we can explore not only *what* happened but also *why*. For example:

* Did higher unemployment rates correlate with lower sales?
* Were holiday weeks consistently stronger in sales across all stores?
* How did fuel prices and weather conditions influence shopping patterns?

**Getting Started with the Data**

Before diving into the project objectives and solving problems, I started by downloading the Walmart sales dataset onto my machine. To work with the data effectively, I imported it into **MySQL Workbench**, which provided an intuitive interface for running queries and exploring the data.

Importing the dataset into MySQL Workbench was a straightforward process:

1. I saved the dataset as a .csv file.
2. Using the **Import Wizard** in MySQL Workbench, I created a new schema and loaded the data into a table called walmart.
3. After ensuring the data was imported correctly, I reviewed the table structure and confirmed that all fields were properly formatted for analysis.

**Project Objectives**

List the key questions or problems you aim to solve:

1. Identify the year with the highest sales.

select year(STR\_TO\_DATE((DATE), '%d-%b-%y')) as year,sum(weekly\_sales) as total\_sales  
,dense\_rank()over(order by sum(weekly\_sales) desc) as rnk   
from   
WalmartDataProject.walmart  
group by year(STR\_TO\_DATE((DATE), '%d-%b-%y'))  
order by sum(weekly\_sales) desc;

A screenshot of a phone

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2024 year has highest sales volume.

2. Evaluate the impact of holidays on sales trends.

SELECT   
 case when holiday\_flag = 1 then "Holiday" else "Not a Holiday" end as Holiday\_Info,   
 CONCAT('$',ROUND(AVG(Weekly\_Sales)/1000000, 2), 'M') AS Avg\_Weekly\_Sales,   
 CONCAT('$',ROUND(SUM(Weekly\_Sales)/1000000000,2), 'B') AS Total\_Sales,   
 COUNT(\*) AS Week\_Count  
FROM WalmartDataProject.walmart  
GROUP BY case when holiday\_flag = 1 then "Holiday" else "Not a Holiday" end;

A screenshot of a sales report

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**Holiday weeks sales are 7.69% more than non-holiday weeks.**

Though holiday weeks accounted for only 450**weeks**, they contributed **nearly 8%** of total sales, highlighting their importance.

3. How did fuel prices and weather conditions influence shopping patterns?

SELECT   
 year(STR\_TO\_DATE((DATE), '%d-%b-%y')) AS "Year",  
 ROUND(AVG(Fuel\_Price), 2) AS "Avg Fuel Price ($)",   
 CONCAT('$', ROUND(AVG(Weekly\_Sales) / 1000000, 2), 'M') AS "Avg Weekly Sales (Millions)"  
FROM WalmartDataProject.walmart  
GROUP BY year(STR\_TO\_DATE((DATE), '%d-%b-%y'))  
ORDER BY year(STR\_TO\_DATE((DATE), '%d-%b-%y'));  
  
  
SELECT   
 year(STR\_TO\_DATE((DATE), '%d-%b-%y')) AS "Year",  
 ROUND(AVG(Temperature), 1) AS "Avg Temperature (°F)",   
 CONCAT('$', ROUND(AVG(Weekly\_Sales) / 1000000, 2), 'M') AS "Avg Weekly Sales (Millions)"  
FROM WalmartDataProject.walmart  
GROUP BY year(STR\_TO\_DATE((DATE), '%d-%b-%y'))  
ORDER BY year(STR\_TO\_DATE((DATE), '%d-%b-%y'));

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Though the difference is small, we can see a correlation with fuel and weather to the sales.

In 2023, as the fuel price and temperature decreased, we could see slight increase in sales.