VIT-AP UNIVERSITY

Project: DataFlow Nexus

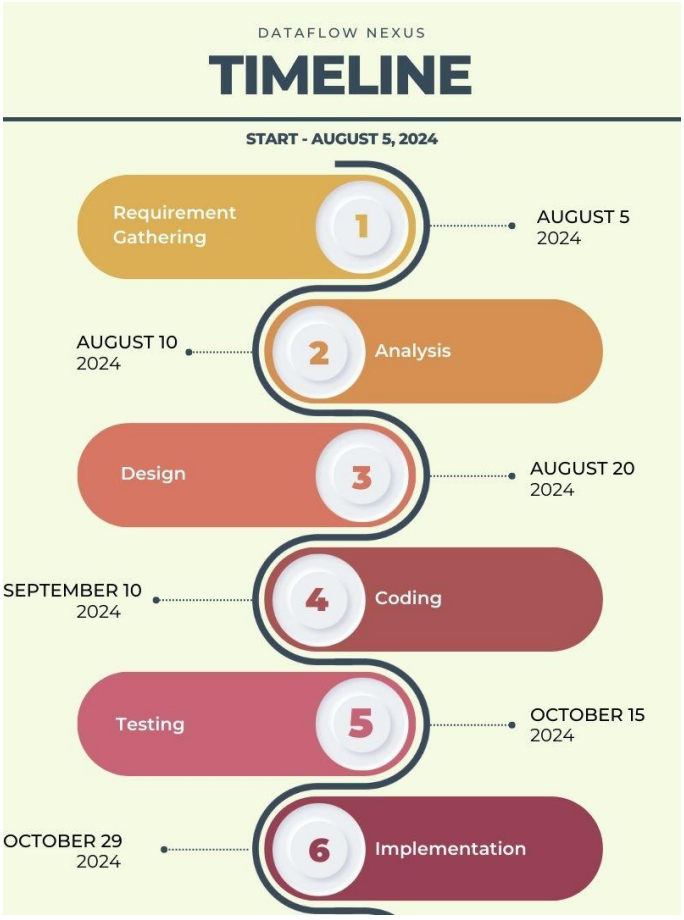
INDEX

Abstract

In this report, we have really looked into the sales data to figure out the numbers, the trends, the seasonal patterns, and the products that are flying off the charts. Our goal is to give some solid, actionable insights that can help and tune the sales strategies and make smarter decisions.

After cleaning up the data, we dug deeper to figure out what was happening. We then utilised some useful tools, such as Pandas, Matplotlib, and Seaborn, to visualise our findings. We observed the products that customers highly demand and determined the times when sales are at their highest.

With this kind of information, we can significantly boost our marketing efforts and manage our inventory more effectively. We also took a hard look at our current manual system and found that it is not very efficient and can be unreliable. That is why we are recommending a new automated system with upgraded features. This change should give us faster and more accurate insights, which means better performance and a stronger market position. Overall, switching to this new system should make everything run more smoothly and keep things running more efficiently.



Requirements

Hardware Requirements

A computer with at least 4 gb ram, 2.5 Ghz processor or higher, 500 gb hard drive (HDD or SSD)

Software Requirements

Operating system (Windows 10 or higher), Python 3.x, Jupyter Notebook, Python libraries: Panda, Matplotlib, Seaborn, MS – Excel, Power BI.

Existing System Drawbacks

The current system for analysing sales data is primarily manual and relies on basic spreadsheet tools. This approach has several drawbacks:

- Time-Consuming: Manual data entry and analysis are time-consuming and prone to errors.

- Limited Analysis: Basic spreadsheet tools offer limited capabilities for advanced data analysis and visualization.

- Lack of Real-Time Insights: The existing system does not provide real-time data analysis, leading to delays in decision-making.

- Scalability Issues: As the volume of sales data grows, the current system struggles to handle large datasets efficiently.

Proposed System Advantages

The proposed Sales Data Analysis system offers several advantages over the existing system:

- Automated Data Processing: Automates data cleaning and analysis, reducing time and errors.

- Advanced Analysis: Utilizes Python libraries for advanced data analysis and visualization, providing deeper insights.

- Real-Time Insights: Capable of real-time data analysis, enabling timely decision-making.

- Scalability: Designed to handle large datasets efficiently, ensuring scalability as the business grows.

- User-Friendly Interface: Provides a user-friendly interface for easy interaction and interpretation of data.

Functional Specification

The functional specification outlines the key functions and features that the system or application must support to meet the objectives of the project. The primary function of the

system is to analyze sales data to extract actionable insights that can drive better business decisions. This includes identifying sales trends, seasonal patterns, high-demand products, and peak sales periods. The system should also be capable of handling large volumes of sales data efficiently and be able to clean, process, and visualize this data using tools like Pandas, Matplotlib, and Seaborn. Additionally, the system will automate the process of data analysis, eliminating the reliance on the current manual and error-prone methods.

Module Specification

The system will be divided into several key modules, each responsible for a distinct aspect of the sales analysis and reporting process. These modules will communicate with each other to provide an integrated solution. Below are the primary modules:

Data Ingestion Module:

Responsible for importing raw sales data from external sources (e.g., CSV files, databases, APIs). This module will also handle data validation to ensure accuracy and completeness before passing it onto the cleaning module.

Data Cleaning and Preprocessing Module:

Handles missing values, outlier detection, and transformation of the raw data into a usable format.Ensures that data is standardized, removing duplicates and correcting inconsistencies.

Sales Analysis and Trend Detection Module:

Applies statistical techniques to identify trends, seasonality, and outliers in the sales data. Implements algorithms to detect high-demand products and periods of peak sales activity. Calculates key performance indicators (KPIs) such as total sales, average order value, and conversion rates.

Visualization Module:

Uses Matplotlib and Seaborn for data visualization. Displays sales trends over time, seasonal patterns, product performance graphs, and other visual insights that help with decision-making. Allows for interactive filtering and drill-down capabilities to explore specific data points or periods.

Reporting Module:

Generates automated reports with key insights, recommendations for sales strategies, and inventory management improvements. Reports can be customized for different stakeholders, including marketing teams, product managers, and executives.

Data Schema

The data schema defines the structure of the sales data that the system will process and analyze. It outlines the tables, fields, and relationships between different data entities. The schema ensures that the data is organized efficiently and can be easily queried for insights.

Tables:

1. **Calendar Table**

   Date: Date field for each record.

   Month: Month of the year.

   PYTD Total Sales: Prior Year-to-Date total sales.

   Week: Week of the year.

   Year: Year field.

   YoY Avg Price Growth: Year-over-Year average price growth.

2. **car_data**

   Annual Income: Annual income of the customer.

   Avg Price: Average price of cars.

   Avg Price Colour: Average price based on car color.

   Avg Price Diff: Difference in average prices.

   Body Style: Style or body type of the car (e.g., sedan, SUV).

   Car_id: Unique identifier for each car.

   Color: Color of the car.

   Company: Car manufacturing company.

   Customer Name: Name of the customer.

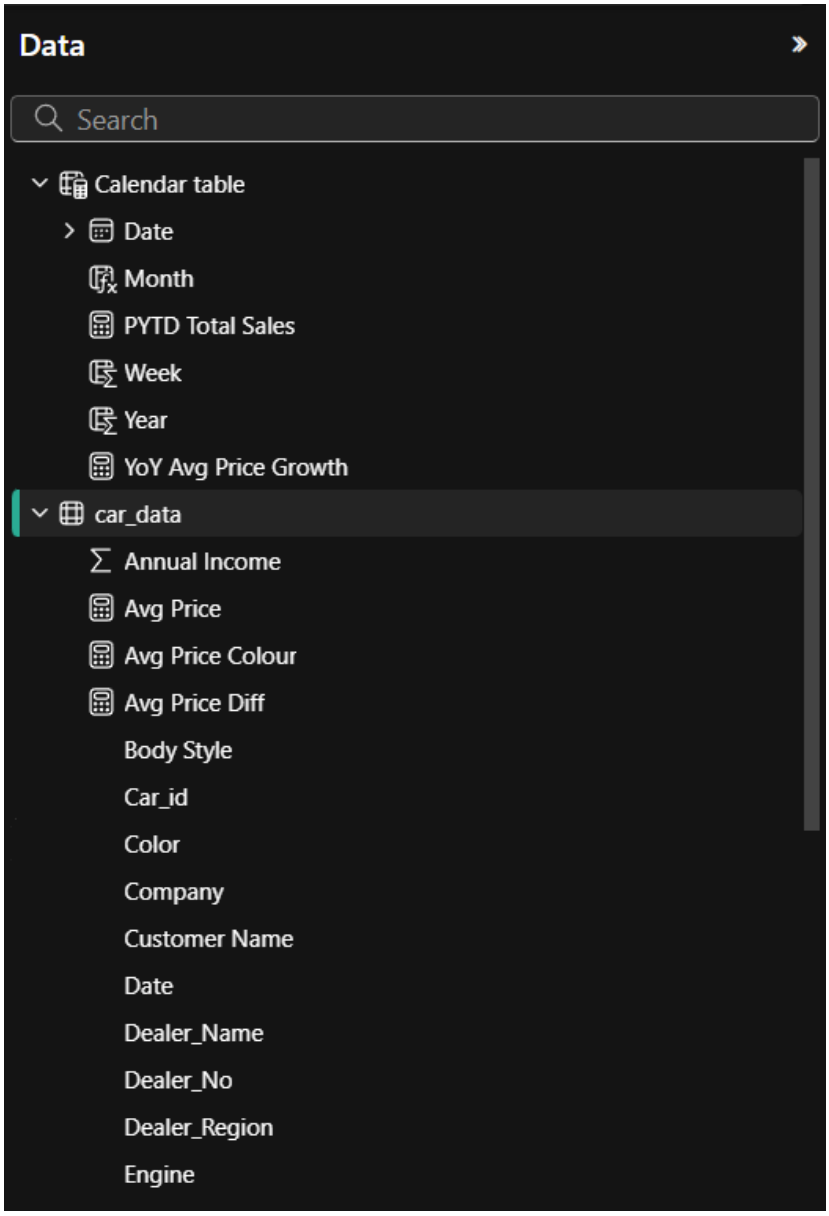
   Date: Date associated with each record.

   Dealer_Name: Name of the car dealer.

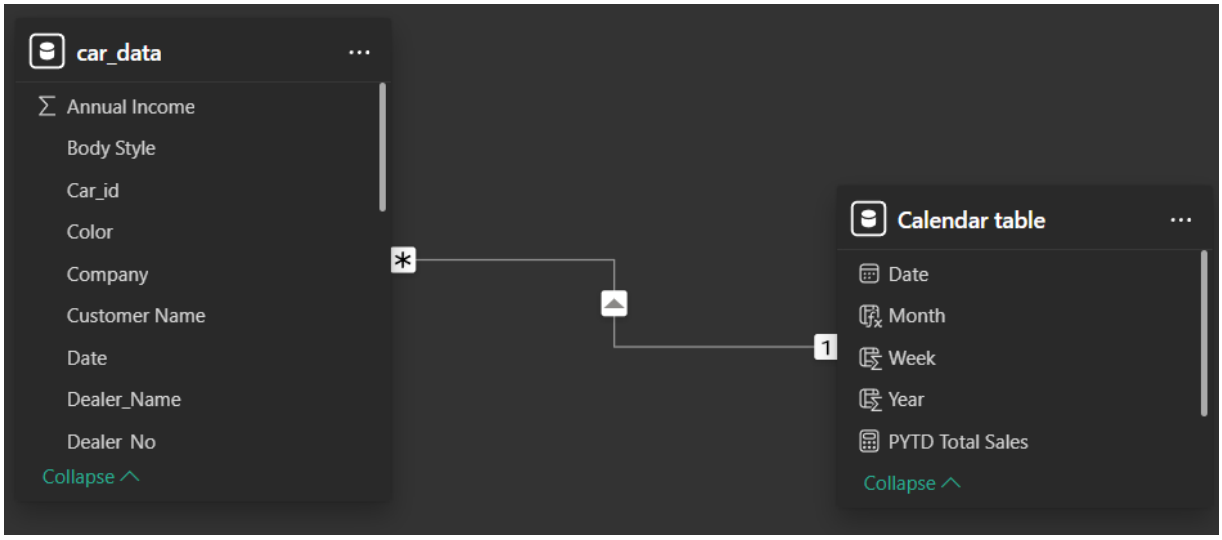
   Dealer_No: Dealer number.

   Dealer_Region: Region where the dealer is located.

   Engine: Type or specification of the car engine.

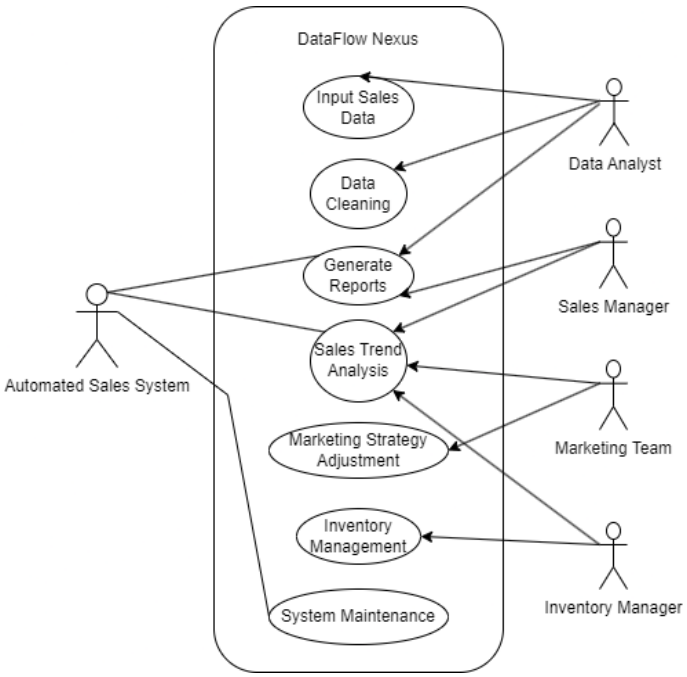


The car_data linked to the Calendar table



UML DIAGRAMS

User case diagram



System Functionality:

This diagram highlights key functionalities, such as data cleaning, report generation, and trend analysis, emphasizing the system's role in automating sales processes.

Actor Interactions:

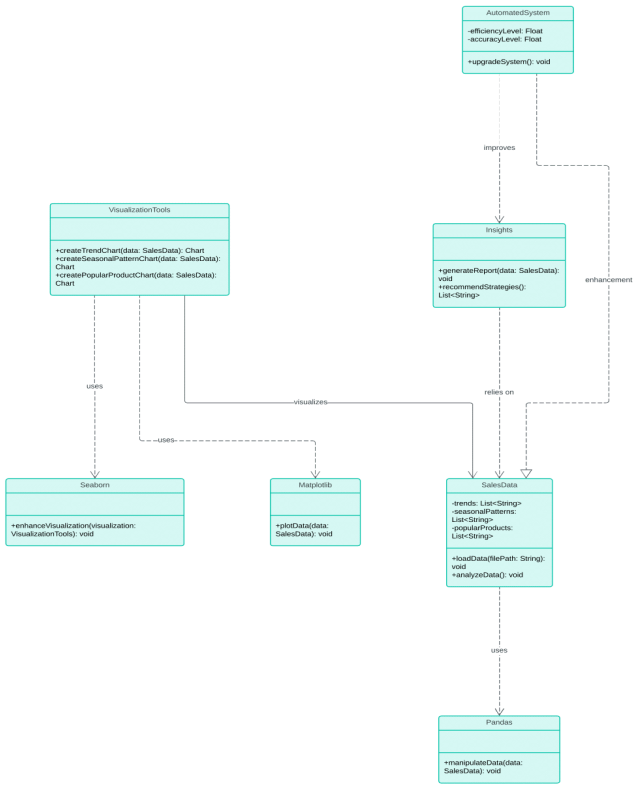
It shows how different users (data analysts, managers, and teams) interact with the system, helping to clarify responsibilities and workflows.

Why User Case?

Clarifies System Functions

Visualizes User Interactions

Class diagram



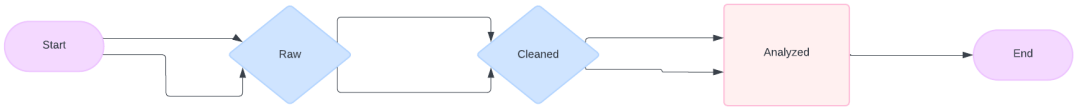
Central Role of SalesData: Emphasize that SalesData is the backbone of the system, connecting data loading, analysis, and visualization.

Pandas for Data Manipulation: Discuss how Pandas plays a crucial role in manipulating and preparing raw sales data for further analysis.

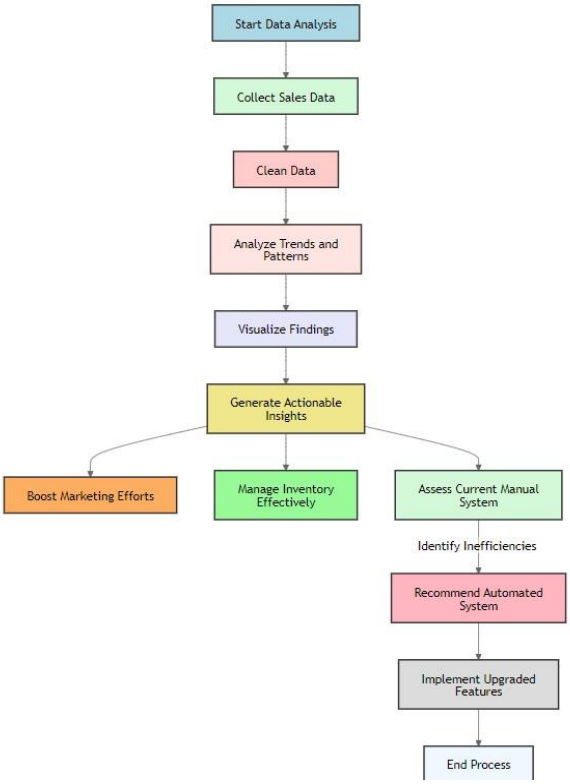
Visualization with Matplotlib and Seaborn: Show how basic visualizations are created using Matplotlib and enhanced with Seaborn for better readability and aesthetics.

Insights and Recommendations: Explain how insights are generated from the analysis of sales data and how recommendations are made based on the data.

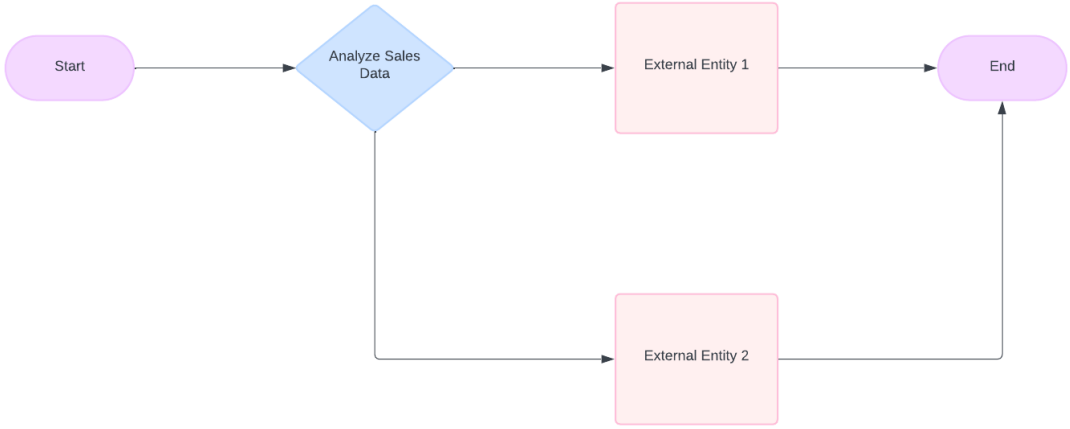
State diagram



Data Flow diagram Level - 0

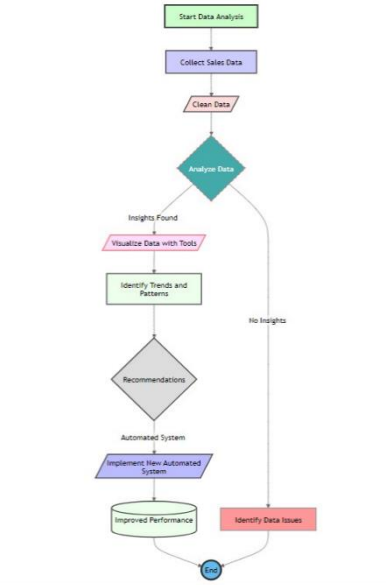


A Level 0 Data Flow Diagram, also known as a context diagram, provides a high-level overview of a system. It depicts the system as a single process with its boundaries and interactions with external entities. The diagram shows data flows between the system and these entities but does not detail internal processes. This level helps stakeholders understand the system's scope and its relationship with external users or systems.

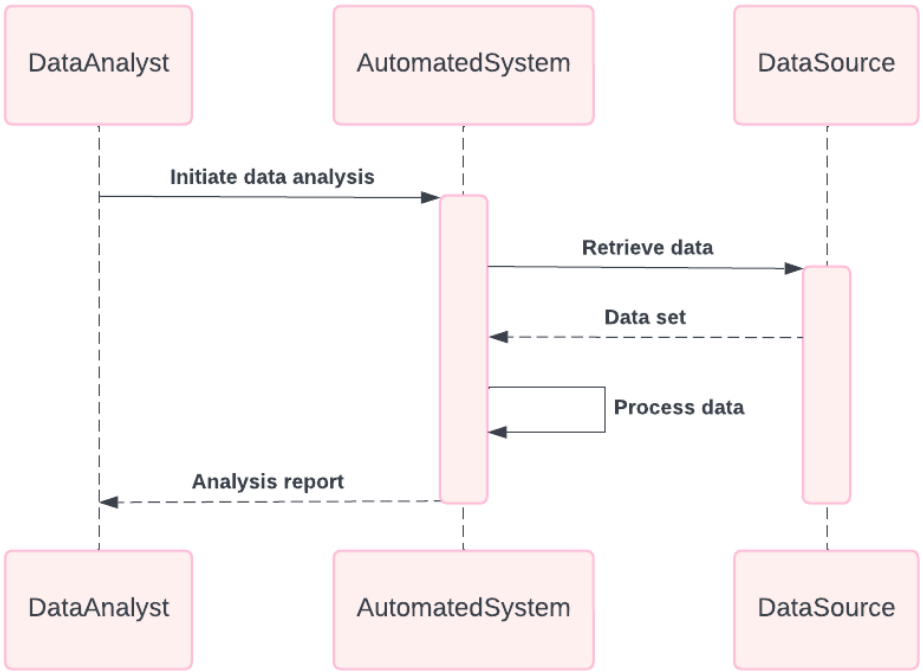


Data Flow diagram Level – 1

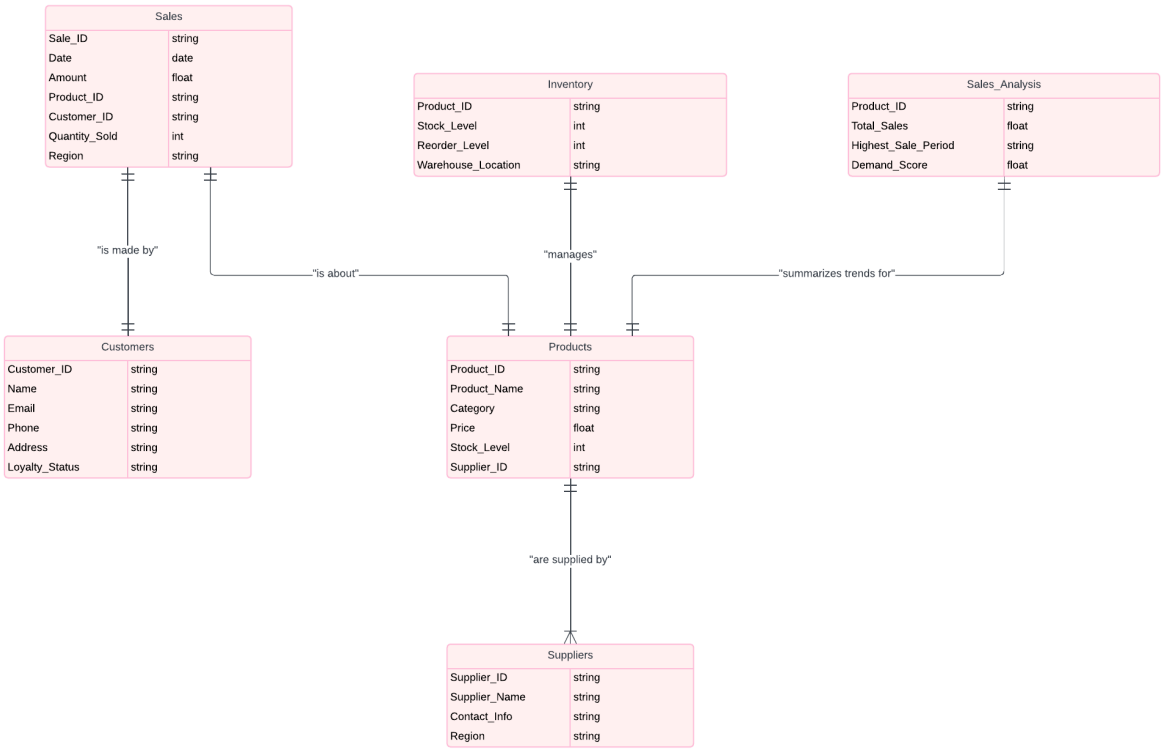
A Level 1 Data Flow Diagram breaks down the main process from the Level 0 diagram into its key sub-processes It shows how data flows between these sub-processes, data stores, and external entities. This level provides more detail than Level 0, allowing for a clearer understanding of the internal workings of the system and how data is processed at each stage. It helps identify specific functions and interactions within the overall system.

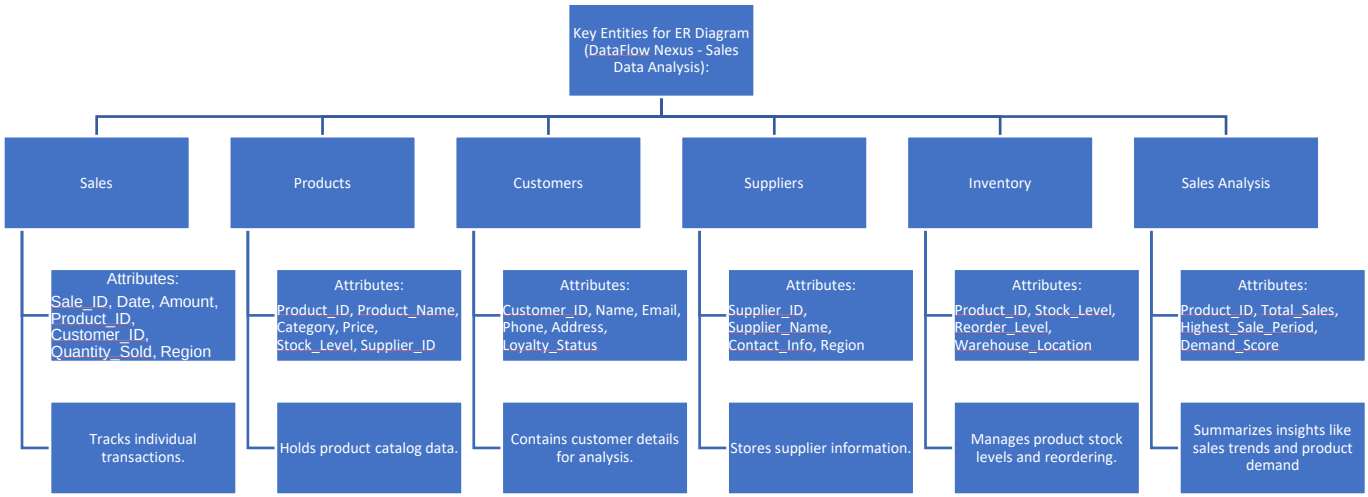


Sequence Diagram



ER diagram

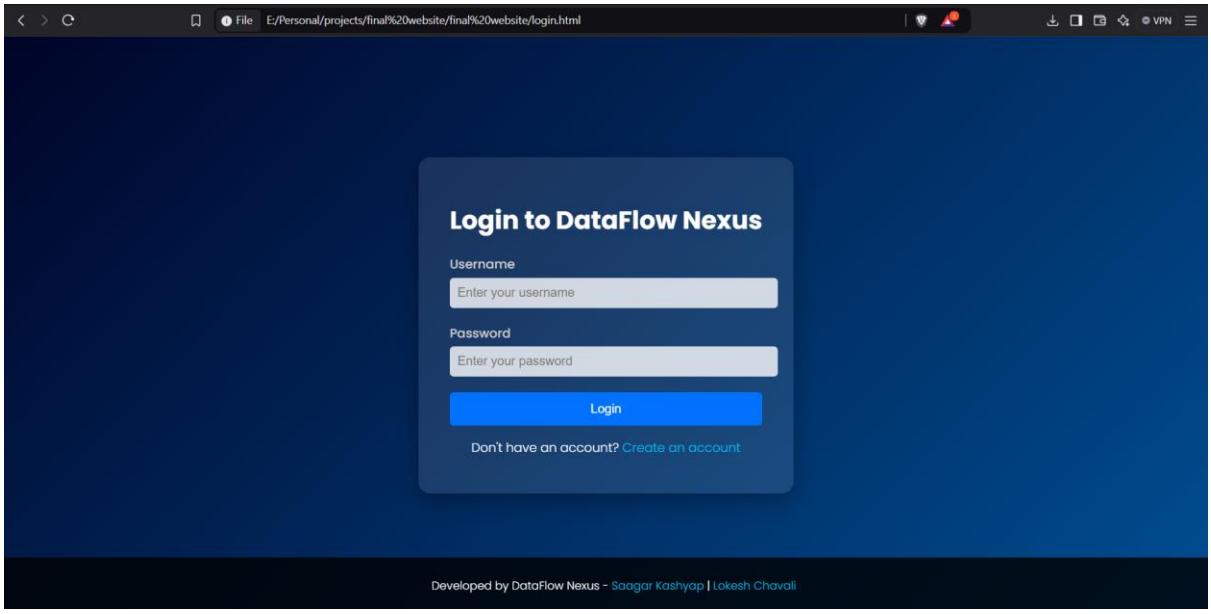

Sales
Sale_ID string
Date date
Amount float
Product_ID string
Customer_ID string
Quantity_Sold int
Region string
Inventory
Product_ID string
Stock_Level int
Reorder_Level int
Warehouse_Location string
Sales_Analysis
Product_ID string
Total_Sales float
Highest_Sale_Period string
Demand_Score float
"is made by"
"is about"
"manages"
"summarizes trends for"
Customers
Customer_ID string
Name string
Email string
Phone string
Address string
Loyalty_Status string
Products
Product_ID string
Product_Name string
Category string
Price float
Stock_Level int
Supplier_ID string
"are supplied by"
Suppliers
Supplier_ID string
Supplier_Name string
Contact_Info string
Region string


Key Entities for ER Diagram (DataFlow Nexus - Sales Data Analysis):
Sales
Products
Customers
Suppliers
Inventory
Sales Analysis
Attributes:
Sale_ID, Date, Amount, Product_ID, Customer_ID, Quantity_Sold, Region
Attributes:
Product_ID, Product_Name, Category, Price, Stock_Level, Supplier_ID
Attributes:
Customer_ID, Name, Email, Phone, Address, Loyalty_Status
Attributes:
Supplier_ID, Supplier_Name, Contact_Info, Region
Attributes:
Product_ID, Stock_Level, Reorder_Level, Warehouse_Location
Attributes:
Product_ID, Total_Sales, Highest_Sale_Period, Demand_Score
Tracks individual transactions.
Holds product catalog data.
Contains customer details for analysis.
Stores supplier information.
Manages product stock levels and reordering.
Summarizes insights like sales trends and product demand

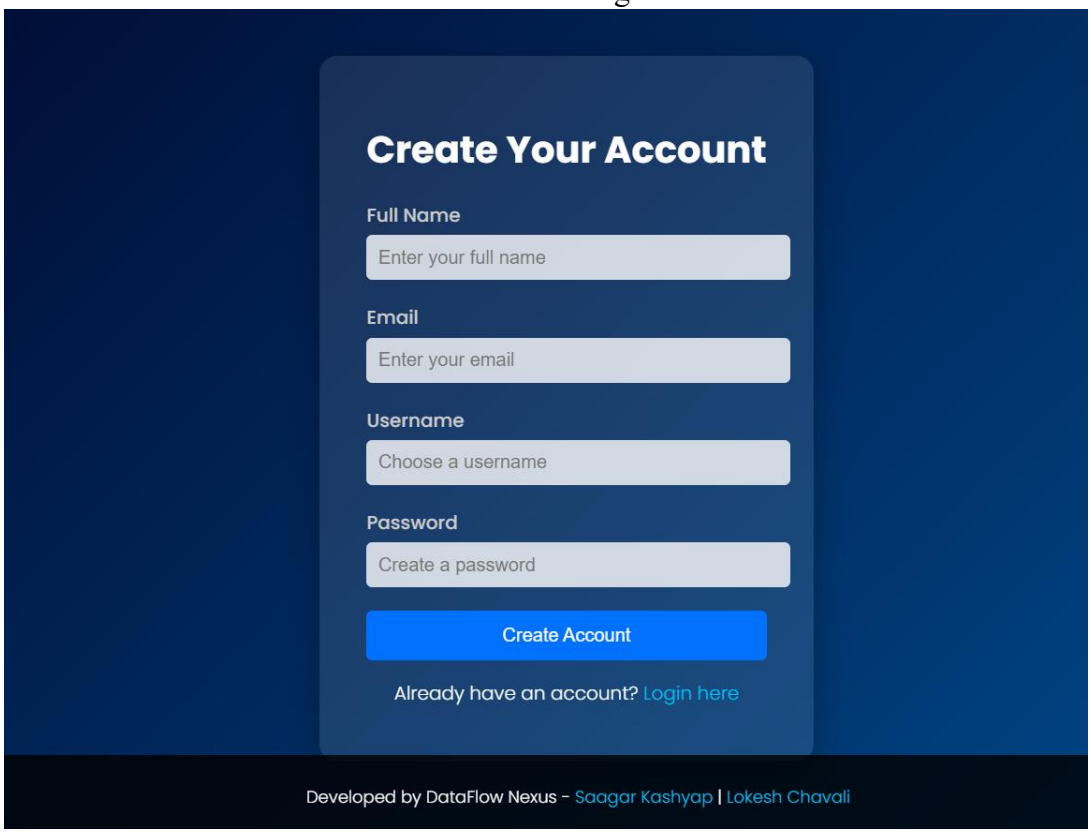
User Interface

The Website:

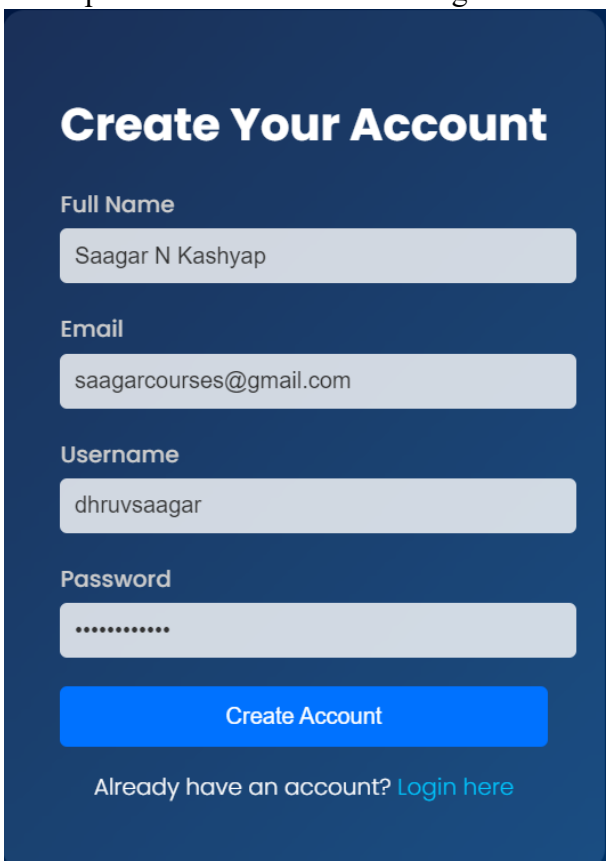
This is the login page and one can login to our website and upload the sales data and then get instant analysis of the data.



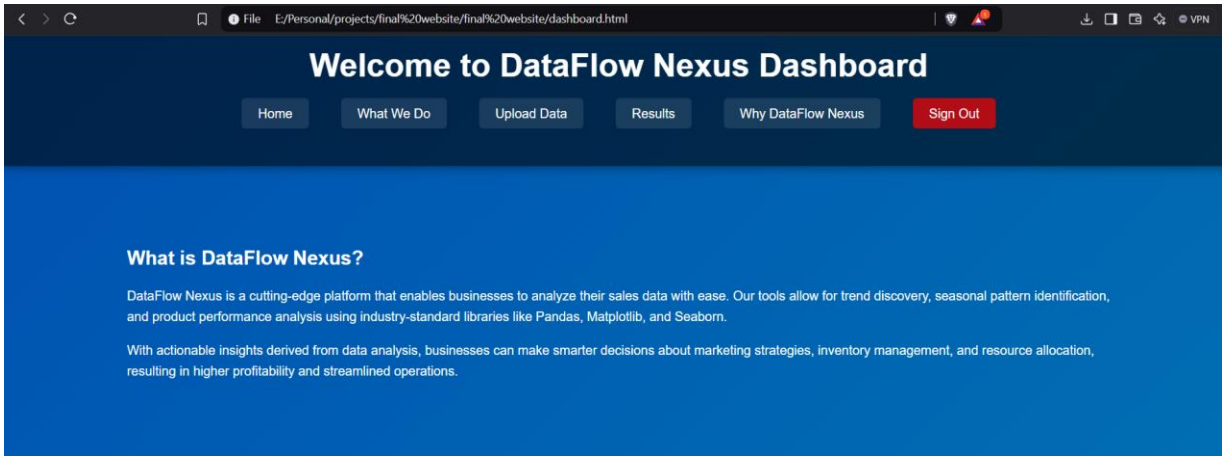
One can also create an account and then later login too



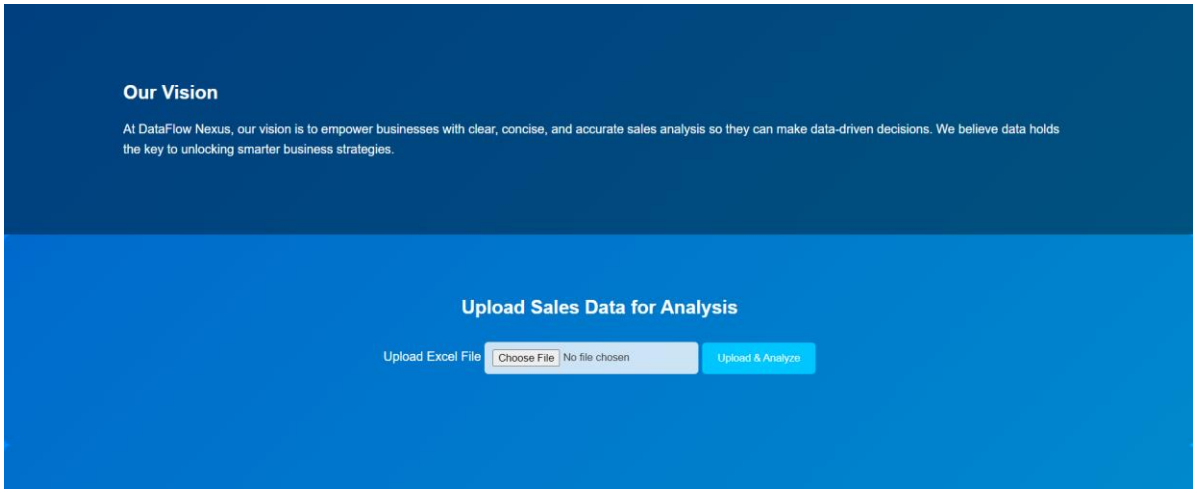
A sample to create a new user to login



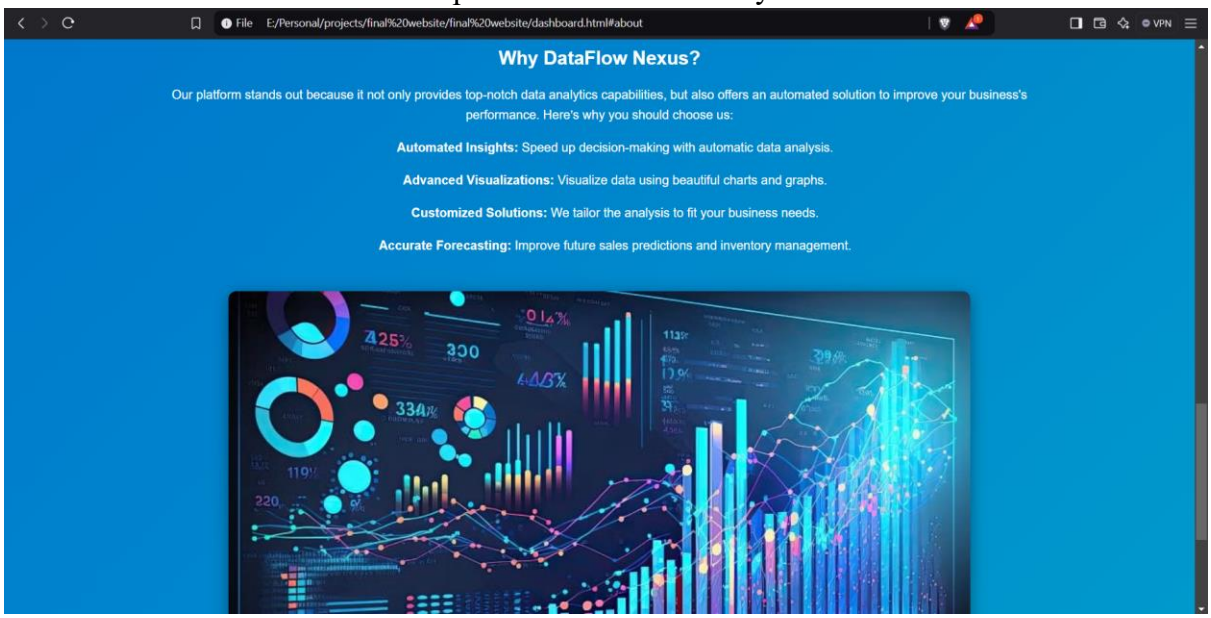
The DataFlow Nexus Dashboard, where one can navigate between uploading data and results and meanwhile check what our company is all about – What we do and why choose DataFlow Nexus.



Upload the Sales data for analysis



A small section of the website that provides info about Why DataFlow Nexus

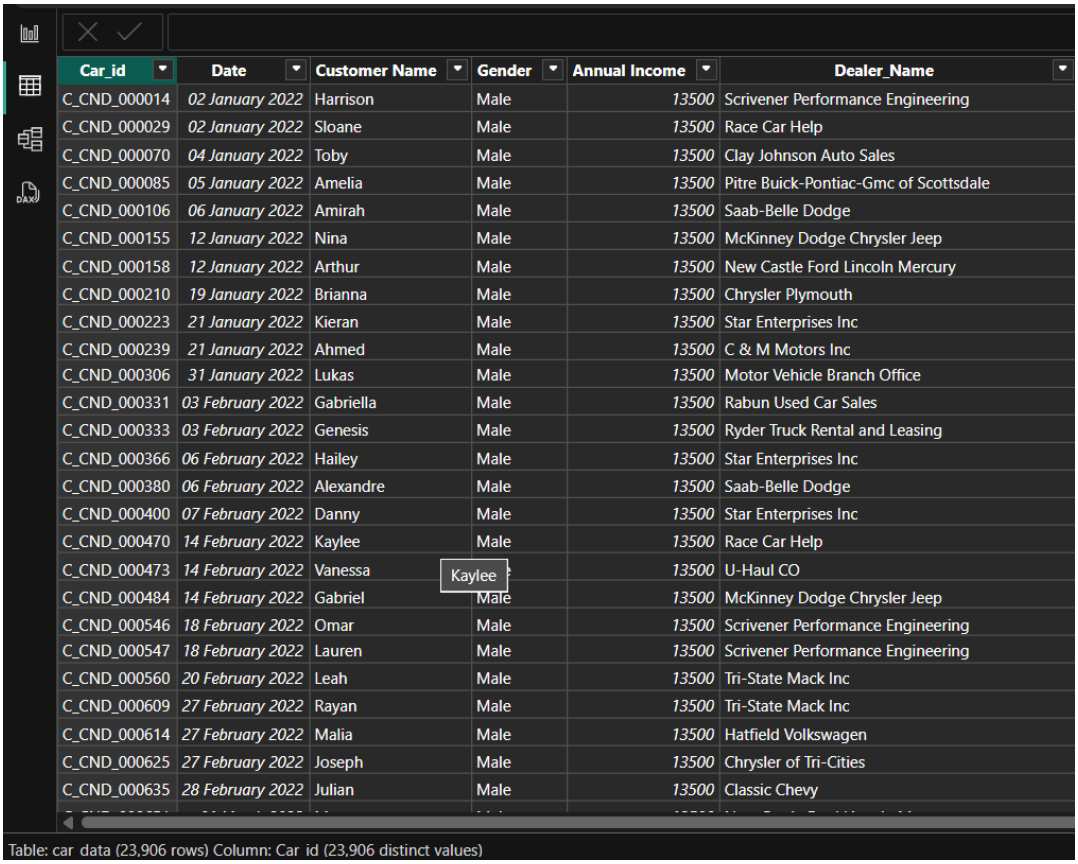


The use of PowerBi is done in the backend for the analysis of the data and also for the cleaning of the data python libraries are used and the data is cleaned and checked for duplication and garbage and empty values

PowerBi

Table: Car_data is used to analyse the data and give the required output

23906 rows and the Car_id having 23906 distinct values



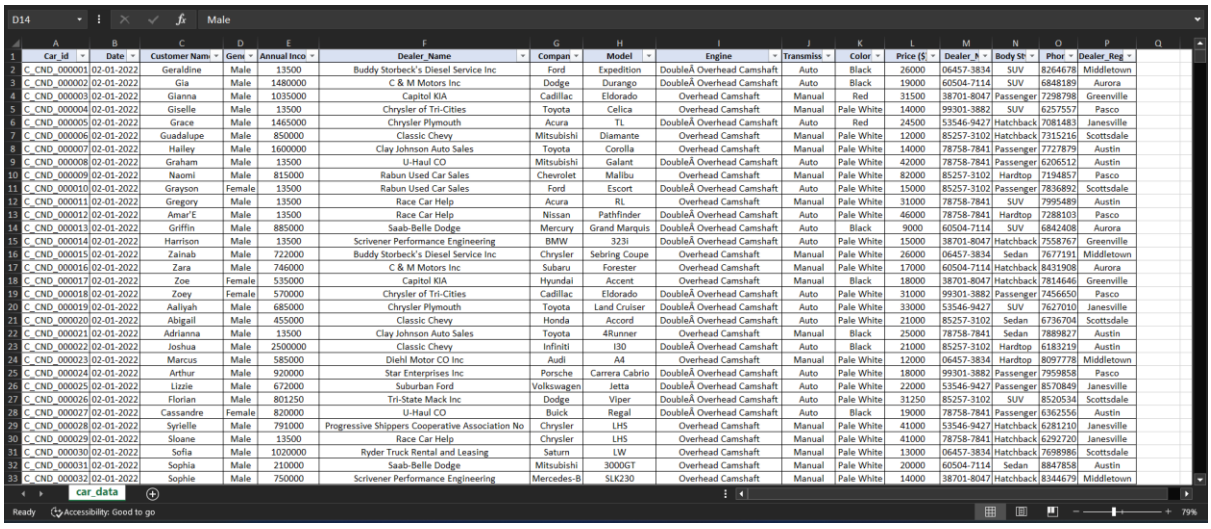
Car_id	Date	Customer Name	Gender	Annual Income	Dealer_Name
C_CND_000014	02 January 2022	Harrison	Male	13500	Scrivener Performance Engineering
C_CND_000029	02 January 2022	Sloane	Male	13500	Race Car Help
C_CND_000070	04 January 2022	Toby	Male	13500	Clay Johnson Auto Sales
C_CND_000085	05 January 2022	Amelia	Male	13500	Pitre Buick-Pontiac-Gmc of Scottsdale
C_CND_000106	06 January 2022	Amirah	Male	13500	Saab-Belle Dodge
C_CND_000155	12 January 2022	Nina	Male	13500	McKinney Dodge Chrysler Jeep
C_CND_000158	12 January 2022	Arthur	Male	13500	New Castle Ford Lincoln Mercury
C_CND_000210	19 January 2022	Brianna	Male	13500	Chrysler Plymouth
C_CND_000223	21 January 2022	Kieran	Male	13500	Star Enterprises Inc
C_CND_000239	21 January 2022	Ahmed	Male	13500	C & M Motors Inc
C_CND_000306	31 January 2022	Lukas	Male	13500	Motor Vehicle Branch Office
C_CND_000331	03 February 2022	Gabriella	Male	13500	Rabun Used Car Sales
C_CND_000333	03 February 2022	Genesis	Male	13500	Ryder Truck Rental and Leasing
C_CND_000366	06 February 2022	Hailey	Male	13500	Star Enterprises Inc
C_CND_000380	06 February 2022	Alexandre	Male	13500	Saab-Belle Dodge
C_CND_000400	07 February 2022	Danny	Male	13500	Star Enterprises Inc
C_CND_000470	14 February 2022	Kaylee	Male	13500	Race Car Help
C_CND_000473	14 February 2022	Vanessa	Male	13500	U-Haul CO
C_CND_000484	14 February 2022	Gabriel	Male	13500	McKinney Dodge Chrysler Jeep
C_CND_000546	18 February 2022	Omar	Male	13500	Scrivener Performance Engineering
C_CND_000547	18 February 2022	Lauren	Male	13500	Scrivener Performance Engineering
C_CND_000560	20 February 2022	Leah	Male	13500	Tri-State Mack Inc
C_CND_000609	27 February 2022	Rayan	Male	13500	Tri-State Mack Inc
C_CND_000614	27 February 2022	Malia	Male	13500	Hatfield Volkswagen
C_CND_000625	27 February 2022	Joseph	Male	13500	Chrysler of Tri-Cities
C_CND_000635	28 February 2022	Julian	Male	13500	Classic Chevy

Kaylee

Table: car_data (23,906 rows) Column: Car_id (23,906 distinct values)

Excel sheet

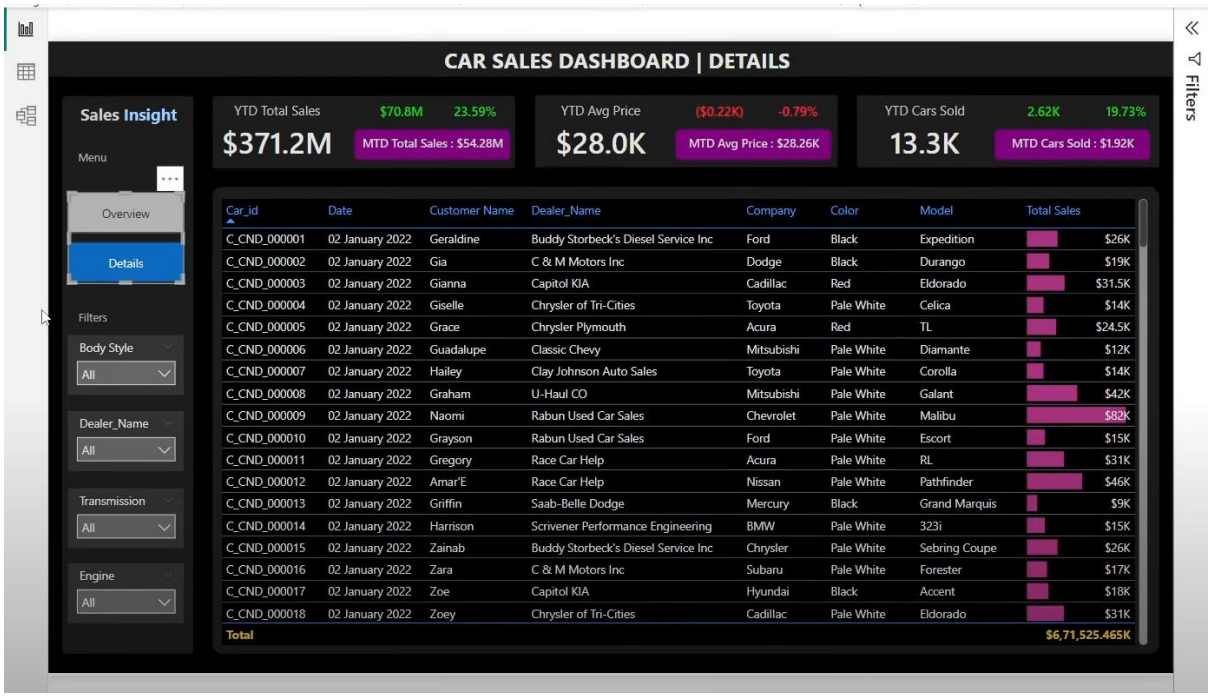
Cleaned sales data



Car_id	Date	Customer Nam	Gen	Annual Inco	Dealer_Name	Compan	Model	Engine	Transmiss	Color	Price ($)	Dealer_N	Body St	Phor	Dealer_Reg
C_CND_000001	02-01-2022	Geraldine	Male	13500	Buddy Storbeck's Diesel Service Inc	Ford	Expedition	DoubleÂ Overhead Camshaft	Auto	Black	26000	06457-3834	SUV	8264678	Middletown
C_CND_000002	02-01-2022	Gia	Male	1480000	C & M Motors Inc	Dodge	Durango	DoubleÂ Overhead Camshaft	Auto	Black	19000	60504-7114	SUV	6848189	Aurora
C_CND_000003	02-01-2022	Gianna	Male	1035000	Capitol KIA	Cadillac	Eldorado	Overhead Camshaft	Manual	Red	31500	38701-8047	Passenger	7298798	Greenville
C_CND_000004	02-01-2022	Giselle	Male	13500	Chrysler of Tri-Cities	Toyota	Celica	Overhead Camshaft	Manual	Pale White	14000	99301-3882	SUV	6257557	Pasco
C_CND_000005	02-01-2022	Grace	Male	1465000	Chrysler Plymouth	Acura	TL	DoubleÂ Overhead Camshaft	Auto	Red	24500	53546-9427	Hatchback	7081483	Janesville
C_CND_000006	02-01-2022	Guadalupe	Male	850000	Classic Chevy	Mitsubishi	Diamante	Overhead Camshaft	Manual	Pale White	12000	85257-3102	Hatchback	7315216	Scottsdale
C_CND_000007	02-01-2022	Hailey	Male	1600000	Clay Johnson Auto Sales	Toyota	Corolla	Overhead Camshaft	Manual	Pale White	14000	78758-7841	Passenger	7727879	Austin
C_CND_000008	02-01-2022	Graham	Male	13500	U-Haul CO	Mitsubishi	Galant	DoubleÂ Overhead Camshaft	Auto	Pale White	42000	78758-7841	Passenger	6206512	Austin
C_CND_000009	02-01-2022	Naomi	Male	815000	Rabun Used Car Sales	Chevrolet	Malibu	Overhead Camshaft	Manual	Pale White	82000	85257-3102	Hardtop	7194857	Pasco
C_CND_000010	02-01-2022	Grayson	Female	13500	Rabun Used Car Sales	Ford	Escort	DoubleÂ Overhead Camshaft	Auto	Pale White	15000	85257-3102	Passenger	7836892	Scottsdale
C_CND_000011	02-01-2022	Gregory	Male	13500	Race Car Help	Acura	RL	Overhead Camshaft	Manual	Pale White	31000	78758-7841	SUV	7995489	Austin
C_CND_000012	02-01-2022	Amar'E	Male	13500	Race Car Help	Nissan	Pathfinder	DoubleÂ Overhead Camshaft	Auto	Pale White	46000	78758-7841	Hardtop	7288103	Pasco
C_CND_000013	02-01-2022	Griffin	Male	885000	Saab-Belle Dodge	Mercury	Grand Marquis	DoubleÂ Overhead Camshaft	Auto	Black	9000	60504-7114	SUV	6842408	Aurora
C_CND_000014	02-01-2022	Harrison	Male	13500	Scrivener Performance Engineering	BMW	323i	DoubleÂ Overhead Camshaft	Auto	Pale White	15000	38701-8047	Hatchback	7558767	Greenville
C_CND_000015	02-01-2022	Zainab	Male	722000	Buddy Storbeck's Diesel Service Inc	Chrysler	Sebring Coupe	Overhead Camshaft	Manual	Pale White	26000	06457-3834	Sedan	7677191	Middletown
C_CND_000016	02-01-2022	Zara	Male	746000	C & M Motors Inc	Subaru	Forester	Overhead Camshaft	Manual	Pale White	17000	60504-7114	Hatchback	8431908	Aurora
C_CND_000017	02-01-2022	Zoe	Female	535000	Capitol KIA	Hyundai	Accent	Overhead Camshaft	Manual	Black	18000	38701-8047	Hatchback	7814646	Greenville
C_CND_000018	02-01-2022	Zoey	Female	570000	Chrysler of Tri-Cities	Cadillac	Eldorado	DoubleÂ Overhead Camshaft	Auto	Pale White	31000	99301-3882	Passenger	7456650	Pasco
C_CND_000019	02-01-2022	Aaliyah	Male	685000	Chrysler Plymouth	Toyota	Land Cruiser	DoubleÂ Overhead Camshaft	Auto	Pale White	33000	53546-9427	SUV	7627010	Janesville
C_CND_000020	02-01-2022	Abigail	Male	455000	Classic Chevy	Honda	Accord	DoubleÂ Overhead Camshaft	Auto	Pale White	21000	85257-3102	Sedan	6736704	Scottsdale
C_CND_000021	02-01-2022	Adrianna	Male	13500	Clay Johnson Auto Sales	Toyota	4Runner	Overhead Camshaft	Manual	Black	25000	78758-7841	Sedan	7889827	Austin
C_CND_000022	02-01-2022	Joshua	Male	2500000	Classic Chevy	Infiniti	I30	DoubleÂ Overhead Camshaft	Auto	Black	21000	85257-3102	Hardtop	6183219	Austin
C_CND_000023	02-01-2022	Marcus	Male	585000	Diehl Motor CO Inc	Audi	A4	Overhead Camshaft	Manual	Pale White	12000	06457-3834	Hardtop	8097778	Middletown
C_CND_000024	02-01-2022	Arthur	Male	920000	Star Enterprises Inc	Porsche	Carrera Cabrio	DoubleÂ Overhead Camshaft	Auto	Pale White	18000	99301-3882	Passenger	7959858	Pasco
C_CND_000025	02-01-2022	Lizzie	Male	672000	Suburban Ford	Volkswagen	Jetta	DoubleÂ Overhead Camshaft	Auto	Pale White	22000	53546-9427	Passenger	8570849	Janesville
C_CND_000026	02-01-2022	Florian	Male	801250	Tri-State Mack Inc	Dodge	Viper	DoubleÂ Overhead Camshaft	Auto	Pale White	31250	85257-3102	SUV	8520534	Scottsdale
C_CND_000027	02-01-2022	Cassandre	Female	820000	U-Haul CO	Buick	Regal	DoubleÂ Overhead Camshaft	Auto	Black	19000	78758-7841	Passenger	6362556	Austin
C_CND_000028	02-01-2022	Syrielle	Male	791000	Progressive Shippers Cooperative Association No	Chrysler	LHS	Overhead Camshaft	Manual	Pale White	41000	53546-9427	Hatchback	6281210	Janesville
C_CND_000029	02-01-2022	Sloane	Male	13500	Race Car Help	Chrysler	LHS	Overhead Camshaft	Manual	Pale White	41000	78758-7841	Hatchback	6292720	Janesville
C_CND_000030	02-01-2022	Sofia	Male	1020000	Ryder Truck Rental and Leasing	Saturn	LW	Overhead Camshaft	Manual	Pale White	13000	06457-3834	Hatchback	7698986	Scottsdale
C_CND_000031	02-01-2022	Sophia	Male	210000	Saab-Belle Dodge	Mitsubishi	3000GT	Overhead Camshaft	Manual	Pale White	20000	60504-7114	Sedan	8847858	Austin
C_CND_000032	02-01-2022	Sophie	Male	750000	Scrivener Performance Engineering	Mercedes-B	SLK230	Overhead Camshaft	Manual	Pale White	14000	38701-8047	Hatchback	8344679	Middletown

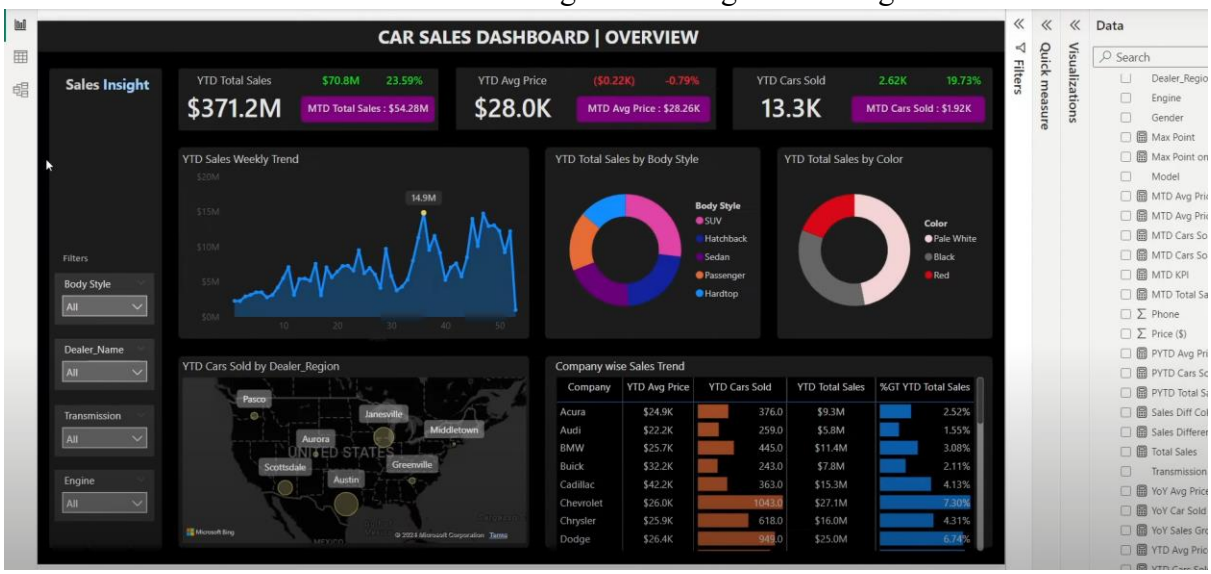
PowerBi Outputs

The details of the Car sales is shown and the total sales is shown in the form of a graph



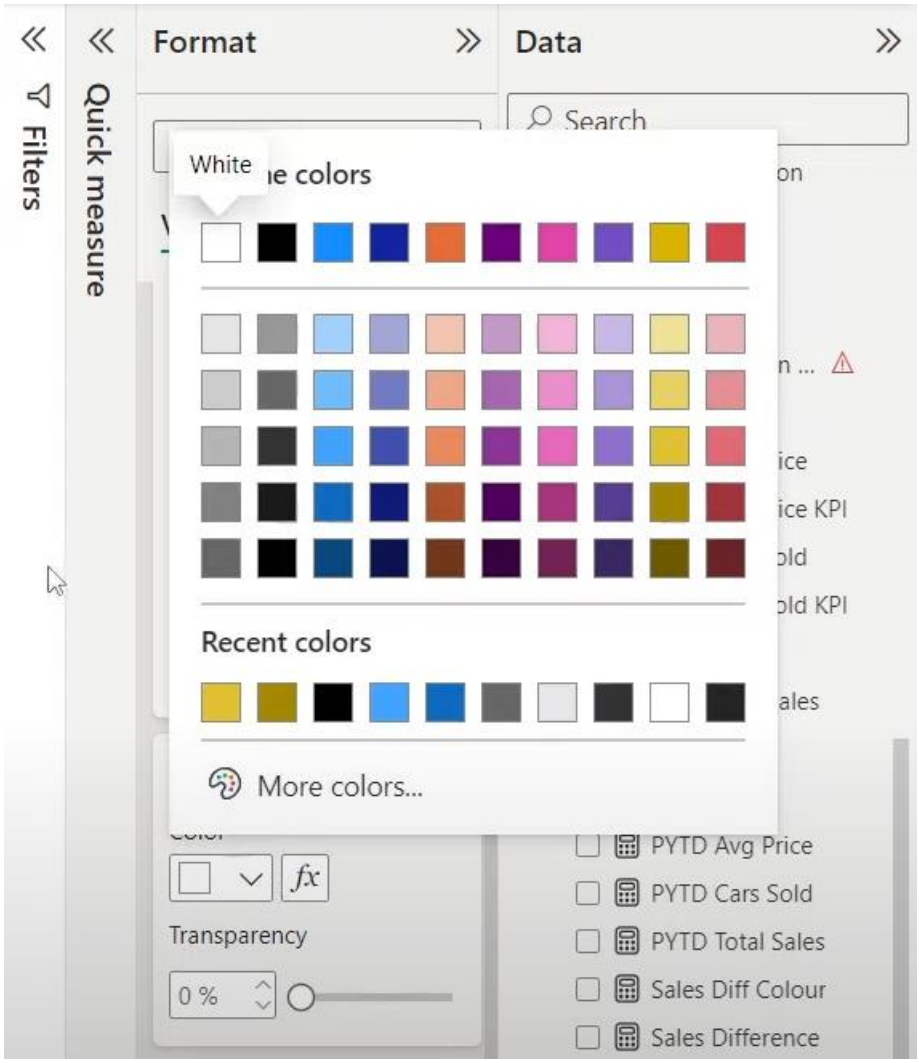
Car_id	Date	Customer Name	Dealer_Name	Company	Color	Model	Total Sales
C_CND_000001	02 January 2022	Geraldine	Buddy Storbeck's Diesel Service Inc	Ford	Black	Expedition	$26K
C_CND_000002	02 January 2022	Gia	C & M Motors Inc	Dodge	Black	Durango	$19K
C_CND_000003	02 January 2022	Gianna	Capitol KIA	Cadillac	Red	Eldorado	$31.5K
C_CND_000004	02 January 2022	Giselle	Chrysler of Tri-Cities	Toyota	Pale White	Celica	$14K
C_CND_000005	02 January 2022	Grace	Chrysler Plymouth	Acura	Red	TL	$24.5K
C_CND_000006	02 January 2022	Guadalupe	Classic Chevy	Mitsubishi	Pale White	Diamante	$12K
C_CND_000007	02 January 2022	Hailey	Clay Johnson Auto Sales	Toyota	Pale White	Corolla	$14K
C_CND_000008	02 January 2022	Graham	U-Haul CO	Mitsubishi	Pale White	Galant	$42K
C_CND_000009	02 January 2022	Naomi	Rabun Used Car Sales	Chevrolet	Pale White	Malibu	$82K
C_CND_000010	02 January 2022	Grayson	Rabun Used Car Sales	Ford	Pale White	Escort	$15K
C_CND_000011	02 January 2022	Gregory	Race Car Help	Acura	Pale White	RL	$31K
C_CND_000012	02 January 2022	Amar'E	Race Car Help	Nissan	Pale White	Pathfinder	$46K
C_CND_000013	02 January 2022	Griffin	Saab-Belle Dodge	Mercury	Black	Grand Marquis	$9K
C_CND_000014	02 January 2022	Harrison	Scrivener Performance Engineering	BMW	Pale White	323i	$15K
C_CND_000015	02 January 2022	Zainab	Buddy Storbeck's Diesel Service Inc	Chrysler	Pale White	Sebring Coupe	$26K
C_CND_000016	02 January 2022	Zara	C & M Motors Inc	Subaru	Pale White	Forester	$17K
C_CND_000017	02 January 2022	Zoe	Capitol KIA	Hyundai	Black	Accent	$18K
C_CND_000018	02 January 2022	Zoey	Chrysler of Tri-Cities	Cadillac	Pale White	Eldorado	$31K
Total							$6,71,525.465K

An overview of the Car sales is shown along with the regions in the globe too

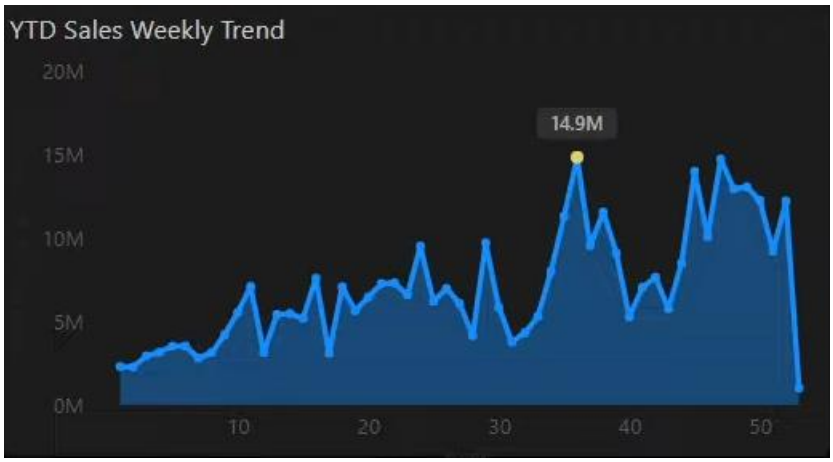


Company	YTD Avg Price	YTD Cars Sold	YTD Total Sales	%GT YTD Total Sales
Acura	$24.9K	376.0	$9.3M	2.52%
Audi	$22.2K	259.0	$5.8M	1.55%
BMW	$25.7K	445.0	$11.4M	3.08%
Buick	$32.2K	243.0	$7.8M	2.11%
Cadillac	$42.2K	363.0	$15.3M	4.13%
Chevrolet	$26.0K	1043.0	$27.1M	7.30%
Chrysler	$25.9K	618.0	$16.0M	4.31%
Dodge	$26.4K	949.0	$25.0M	6.74%

One can easily look forward for format and design and also visuals to make it look more graphical and do quick measures.

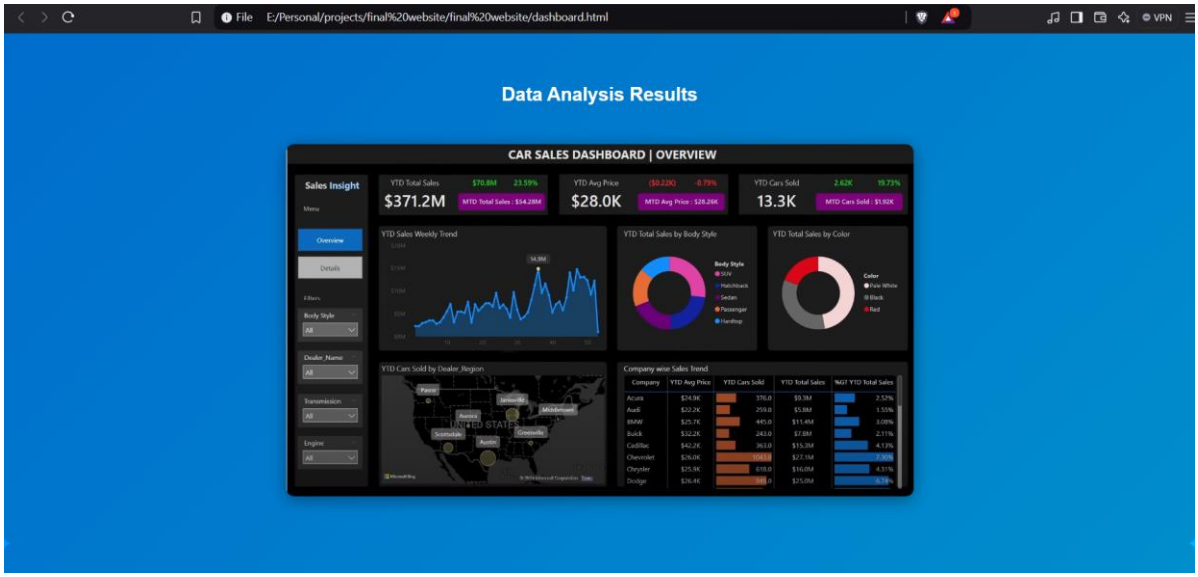


The Year to Day Sales Weekly trend shown and the peak of it also depicted.



The dashboard generated by the powerbi and it being only the overview

The results on the website being posted for the user to access it later on after analysis.



Codes

For the login page:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Login - DataFlow Nexus</title>
    <link rel="stylesheet" href="style.css">
    <link
href="https://fonts.googleapis.com/css2?family=Poppins:wght@300;500;700&display=swap
" rel="stylesheet">
</head>
<body>
    <div class="background-animation">
        <div class="circle"></div>
        <div class="circle"></div>
        <div class="circle"></div>
        <div class="circle"></div>
    </div>

    <div class="login-container">
        <div class="form-box">
            <h2>Login to DataFlow Nexus</h2>
            <form id="login-form" action="dashboard.html" method="POST">
                <div class="input-container">
                    <label for="username">Username</label>
                    <input type="text" id="username" name="username" placeholder="Enter your
username" required>
                </div>
```

```
            <div class="input-container">
                <label for="password">Password</label>
                <input type="password" id="password" name="password" placeholder="Enter your password" required>
            </div>
            <button type="submit" class="login-button">Login</button>
        </form>
        <p class="signup-link">Don't have an account? <a href="register.html">Create an account</a></p>
    </div>
</div>

<footer>
    <p>Developed by DataFlow Nexus - <a href="https://www.linkedin.com/in/saagar-n-kashyap-7231ab206" target="_blank">Saagar Kashyap</a> | <a href="https://www.linkedin.com/in/lokesh-chavali-610334258" target="_blank">Lokesh Chavali</a></p>
</footer>

<style>
    /* Background Animation */
    body, html {
        height: 100%;
        margin: 0;
        font-family: 'Poppins', sans-serif;
        background: linear-gradient(135deg, #000428, #004e92);
        overflow: hidden;
    }

    .background-animation {
        position: fixed;
        width: 100%;
```

```
    height: 100%;
    overflow: hidden;
    z-index: -1;
}

.circle {
    position: absolute;
    width: 600px;
    height: 600px;
    background-color: rgba(255, 255, 255, 0.1);
    border-radius: 50%;
    animation: float 10s infinite ease-in-out;
}

.circle:nth-child(1) {
    top: -100px;
    left: -100px;
}

.circle:nth-child(2) {
    bottom: -100px;
    right: -100px;
    animation-delay: 2s;
}

.circle:nth-child(3) {
    bottom: -150px;
    left: 50%;
    animation-delay: 4s;
}
```

```
.circle:nth-child(4) {
    top: 50%;
    left: -150px;
    animation-delay: 6s;
}

@keyframes float {
    0%, 100% {
        transform: translateY(0) translateX(0);
    }
    50% {
        transform: translateY(-50px) translateX(-50px);
    }
}

/* Login Form Styling */
.login-container {
    height: 100%;
    display: flex;
    justify-content: center;
    align-items: center;
}

.form-box {
    background: rgba(255, 255, 255, 0.1);
    padding: 30px 40px;
    border-radius: 15px;
    box-shadow: 0 10px 30px rgba(0, 0, 0, 0.3);
    text-align: center;
```

```
    backdrop-filter: blur(10px);
}

h2 {
    color: #fff;
    font-size: 2rem;
    margin-bottom: 20px;
}

.input-container {
    margin-bottom: 20px;
}

.input-container label {
    display: block;
    text-align: left;
    color: #ccc;
    margin-bottom: 5px;
}

.input-container input {
    width: 100%;
    padding: 10px;
    background: rgba(255, 255, 255, 0.8);
    border: none;
    border-radius: 5px;
    font-size: 1rem;
    color: #333;
}
```

```
.login-button {
    width: 100%;
    padding: 12px;
    background-color: #0072ff;
    color: #fff;
    border: none;
    border-radius: 5px;
    cursor: pointer;
    transition: background-color 0.3s;
    font-size: 1rem;
}

.login-button:hover {
    background-color: #004e92;
}

.signup-link {
    color: #fff;
    margin-top: 15px;
}

.signup-link a {
    color: #00c6ff;
    text-decoration: none;
}

.signup-link a:hover {
    text-decoration: underline;
}
```

```
        /* Footer Styling */
        footer {
            position: fixed;
            bottom: 0;
            width: 100%;
            text-align: center;
            padding: 10px;
            color: #fff;
            font-size: 0.9rem;
        }

        footer a {
            color: #00c6ff;
            text-decoration: none;
        }

        footer a:hover {
            text-decoration: underline;
        }
    </style>
</body>
</html>
```

For Registering

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Create Account - DataFlow Nexus</title>
    <link rel="stylesheet" href="style.css">
```

```
    <link
href="https://fonts.googleapis.com/css2?family=Poppins:wght@300;500;700&display=swap
" rel="stylesheet">
</head>
<body>
    <div class="background-animation">
        <div class="circle"></div>
        <div class="circle"></div>
        <div class="circle"></div>
        <div class="circle"></div>
    </div>

    <div class="register-container">
        <div class="form-box">
            <h2>Create Your Account</h2>
            <form id="register-form" action="dashboard.html" method="POST">
                <div class="input-container">
                    <label for="fullname">Full Name</label>
                    <input type="text" id="fullname" name="fullname" placeholder="Enter your full
name" required>
                </div>
                <div class="input-container">
                    <label for="email">Email</label>
                    <input type="email" id="email" name="email" placeholder="Enter your email"
required>
                </div>
                <div class="input-container">
                    <label for="username">Username</label>
                    <input type="text" id="username" name="username" placeholder="Choose a
username" required>
                </div>
                <div class="input-container">
```

```
                <label for="password">Password</label>
                <input type="password" id="password" name="password" placeholder="Create a password" required>
            </div>
            <button type="submit" class="register-button">Create Account</button>
        </form>
        <p class="login-link">Already have an account? <a href="login.html">Login here</a></p>
    </div>
</div>

<footer>
    <p>Developed by DataFlow Nexus - <a href="https://www.linkedin.com/in/saagar-n-kashyap-7231ab206" target="_blank">Saagar Kashyap</a> | <a href="https://www.linkedin.com/in/lokesh-chavali-610334258" target="_blank">Lokesh Chavali</a></p>
</footer>

<style>
    /* Background Animation */
    body, html {
        height: 100%;
        margin: 0;
        font-family: 'Poppins', sans-serif;
        background: linear-gradient(135deg, #000428, #004e92);
        overflow: hidden;
    }

    .background-animation {
        position: fixed;
        width: 100%;
        height: 100%;
```

```
    overflow: hidden;
    z-index: -1;
}

.circle {
    position: absolute;
    width: 600px;
    height: 600px;
    background-color: rgba(255, 255, 255, 0.1);
    border-radius: 50%;
    animation: float 10s infinite ease-in-out;
}

.circle:nth-child(1) {
    top: -100px;
    left: -100px;
}

.circle:nth-child(2) {
    bottom: -100px;
    right: -100px;
    animation-delay: 2s;
}

.circle:nth-child(3) {
    bottom: -150px;
    left: 50%;
    animation-delay: 4s;
}
```

```
.circle:nth-child(4) {
    top: 50%;
    left: -150px;
    animation-delay: 6s;
}

@keyframes float {
    0%, 100% {
        transform: translateY(0) translateX(0);
    }
    50% {
        transform: translateY(-50px) translateX(-50px);
    }
}

/* Register Form Styling */
.register-container {
    height: 100%;
    display: flex;
    justify-content: center;
    align-items: center;
}

.form-box {
    background: rgba(255, 255, 255, 0.1);
    padding: 30px 40px;
    border-radius: 15px;
    box-shadow: 0 10px 30px rgba(0, 0, 0, 0.3);
    text-align: center;
    backdrop-filter: blur(10px);
```

```
}

h2 {
    color: #fff;
    font-size: 2rem;
    margin-bottom: 20px;
}

.input-container {
    margin-bottom: 20px;
}

.input-container label {
    display: block;
    text-align: left;
    color: #ccc;
    margin-bottom: 5px;
}

.input-container input {
    width: 100%;
    padding: 10px;
    background: rgba(255, 255, 255, 0.8);
    border: none;
    border-radius: 5px;
    font-size: 1rem;
    color: #333;
}

.register-button {
```

```
    width: 100%;
    padding: 12px;
    background-color: #0072ff;
    color: #fff;
    border: none;
    border-radius: 5px;
    cursor: pointer;
    transition: background-color 0.3s;
    font-size: 1rem;
}

.register-button:hover {
    background-color: #004e92;
}

.login-link {
    color: #fff;
    margin-top: 15px;
}

.login-link a {
    color: #00c6ff;
    text-decoration: none;
}

.login-link a:hover {
    text-decoration: underline;
}

/* Footer Styling */
```

```
        footer {
            position: fixed;
            bottom: 0;
            width: 100%;
            text-align: center;
            padding: 10px;
            color: #fff;
            font-size: 0.9rem;
        }

        footer a {
            color: #00c6ff;
            text-decoration: none;
        }

        footer a:hover {
            text-decoration: underline;
        }
    </style>
</body>
</html>
```

For the Dashboard

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>DataFlow Nexus Dashboard</title>
    <link rel="stylesheet" href="style.css">
```

```
    <style>
        /* Center the analysis image and loading button */
        #results .container {
            display: flex;
            flex-direction: column;
            align-items: center;
            justify-content: center;
            text-align: center;
        }

        #loading-button {
            display: none;
            margin-top: 10px;
        }

        #analysis-image {
            display: none;
            margin-top: 20px;
            width: 100%;
            max-width: 800px;
        }
    </style>
</head>
<body>
    <header>
        <div class="container">
            <h1>Welcome to DataFlow Nexus Dashboard</h1>
            <nav>
                <ul>
                    <li><a href="#home">Home</a></li>
```

```
            <li><a href="#about">What We Do</a></li>
            <li><a href="#upload">Upload Data</a></li>
            <li><a href="#results">Results</a></li>
            <li><a href="#why">Why DataFlow Nexus</a></li>
            <li><a href="login.html" class="sign-out">Sign Out</a></li>
          </ul>
        </nav>
      </div>
    </header>

    <section id="home">
      <div class="container">
        <div class="content">
          <h2>What is DataFlow Nexus?</h2>
          <p>
            DataFlow Nexus is a cutting-edge platform that enables businesses to analyze their sales data with ease. Our tools allow for trend discovery, seasonal pattern identification, and product performance analysis using industry-standard libraries like Pandas, Matplotlib, and Seaborn.
          </p>
          <p>
            With actionable insights derived from data analysis, businesses can make smarter decisions about marketing strategies, inventory management, and resource allocation, resulting in higher profitability and streamlined operations.
          </p>
        </div>
      </div>
    </section>

    <section id="about">
      <div class="container">
        <h2>Our Vision</h2>
```

```
        <p>At DataFlow Nexus, our vision is to empower businesses with clear, concise, and accurate sales analysis so they can make data-driven decisions. We believe data holds the key to unlocking smarter business strategies.</p>
      </div>
    </section>

    <section id="upload">
      <div class="container">
        <h2>Upload Sales Data for Analysis</h2>
        <form id="upload-form">
          <label for="file-upload">Upload Excel File</label>
          <input type="file" id="file-upload" accept=".xls, .xlsx" required>
          <button type="submit">Upload & Analyze</button>
          <button id="loading-button" disabled>Loading...</button>
        </form>
      </div>
    </section>

    <section id="results">
      <div class="container">
        <h2>Data Analysis Results</h2>
        <!-- Analysis image centered and initially hidden -->
        <img src="E:/Personal/projects/ksd.jpg" id="analysis-image" alt="Sales Data Visualization">
      </div>
    </section>

    <section id="why">
      <div class="container">
        <h2>Why DataFlow Nexus?</h2>
        <p>
```

Our platform stands out because it not only provides top-notch data analytics capabilities, but also offers an automated solution to improve your business's performance. Here’s why you should choose us:

Automated Insights: Speed up decision-making with automatic data analysis.

Advanced Visualizations: Visualize data using beautiful charts and graphs.

Customized Solutions: We tailor the analysis to fit your business needs.

Accurate Forecasting: Improve future sales predictions and inventory management.

<img src="https://www.simplilearn.com/ice9/free_resources_article_thumb/data_analyticstrendsmin.jpg" alt="Why DataFlow Nexus">

</section>

<footer>

Developed by DataFlow Nexus - Saagar Kashyap | Lokesh Chavali

Contact: 8688343933 | 9945372427 | saagarcourses@gmail.com

</footer>

<script>

document.getElementById("upload-form").addEventListener("submit", function(event) {

event.preventDefault(); // Prevent form submission to handle it manually

```
        // Show loading button and hide the submit button
        document.querySelector("button[type='submit']").style.display = "none";
        document.getElementById("loading-button").style.display = "inline-block";

        // Simulate file upload and analysis process
        setTimeout(() => {
            // Hide loading button and display the analysis image
            document.getElementById("loading-button").style.display = "none";
            document.getElementById("analysis-image").style.display = "block";
        }, 3000); // Simulating a 3-second loading time
    });
  </script>
</body>
</html>
```

CSS style and code

```
body {
    font-family: 'Poppins', sans-serif;
    margin: 0;
    padding: 0;
    background: linear-gradient(135deg, #0072ff, #00c6ff);
    color: #f0f0f0;
}

h1, h2, h3 {
    font-weight: 700;
    color: #fff;
}
```

```
p {
    font-weight: 300;
    line-height: 1.6;
}

.container {
    width: 80%;
    margin: 0 auto;
    padding: 20px 0;
}

/* Header Styling */
header {
    background-color: rgba(0, 0, 0, 0.7);
    padding: 20px 0;
    color: white;
    text-align: center;
    box-shadow: 0px 4px 10px rgba(0, 0, 0, 0.3);
}

header h1 {
    font-size: 2.5rem;
}

nav ul {
    list-style: none;
    padding: 0;
    display: flex;
    justify-content: center;
    margin-top: 15px;
```

```
}

nav ul li {
    margin: 0 20px;
}

nav ul li a {
    color: white;
    text-decoration: none;
    font-weight: 500;
    padding: 10px 20px;
    background-color: rgba(255, 255, 255, 0.1);
    border-radius: 5px;
}

nav ul li a:hover {
    background-color: rgba(255, 255, 255, 0.3);
}

nav ul li a.sign-out {
    background-color: rgba(255, 0, 0, 0.7);
}

nav ul li a.sign-out:hover {
    background-color: rgba(255, 0, 0, 0.9);
}

/* Section Styling */
section {
    padding: 50px 0;
```

```
    color: #fff;
}

#home {
    background-color: rgba(0, 0, 0, 0.3);
    padding: 60px 0;
}

#about {
    background-color: rgba(0, 0, 0, 0.5);
    padding: 60px 0;
}

#upload, #results, #why {
    background-color: rgba(0, 0, 0, 0.2);
    text-align: center;
    border-radius: 10px;
    padding: 40px 20px;
}

#upload form, #register form {
    margin: 20px 0;
}

#upload label, #register label {
    font-weight: 500;
}

#upload input, #register input {
    margin: 10px 0;
```

```
    padding: 10px;
    background-color: rgba(255, 255, 255, 0.8);
    color: #333;
    border-radius: 5px;
    border: none;
}

#upload button, #register button {
    padding: 12px 20px;
    background-color: #00c6ff;
    color: #fff;
    border-radius: 5px;
    border: none;
    cursor: pointer;
    transition: background-color 0.3s;
}

#upload button:hover, #register button:hover {
    background-color: #0072ff;
}

#results img, #why img {
    margin-top: 30px;
    width: 80%;
    border-radius: 10px;
    box-shadow: 0px 4px 20px rgba(0, 0, 0, 0.4);
}

/* Footer Styling */
footer {
```

```
    background-color: rgba(0, 0, 0, 0.8);
    color: white;
    text-align: center;
    padding: 10px 0;
}

footer a {
    color: #00c6ff;
    text-decoration: none;
}

footer a:hover {
    text-decoration: underline;
}
```

Database Table Structure

Main Table: Sales
This table will store individual sales transactions and reference the other tables with foreign keys.

Column Name	Data Type	Description
OrderID	INT	Primary Key (Auto Increment)
OrderDate	DATE	Date of the sale
RegionID	INT	Foreign Key referencing Region Table
ManagerID	INT	Foreign Key referencing Manager Table
SalesManID	INT	Foreign Key referencing SalesMan Table
ItemID	INT	Foreign Key referencing Item Table
Units	INT	Number of units sold
Unit_price	DECIMAL	Price per unit
Sale_amt	DECIMAL	Total sale amount

Region Table

This table will store unique regions.

Column Name	Data Type	Description
RegionID	INT	Primary Key (Auto Increment)
RegionName	VARCHAR	Name of the region (e.g., East, West, Central)

Manager Table

This table will store unique managers.

Column Name	Data Type	Description
ManagerID	INT	Primary Key (Auto Increment)
ManagerName	VARCHAR	Name of the manager

SalesMan Table

This table will store unique salespersons.

Column Name	Data Type	Description
SalesManID	INT	Primary Key (Auto Increment)
SalesManName	VARCHAR	Name of the salesperson

Item Table

This table will store unique items.

Column Name	Data Type	Description
ItemID	INT	Primary Key (Auto Increment)
ItemName	VARCHAR	Name of the item (e.g., Television)

Future Prospects

Automation and Scalability

Plans to implement advanced automation for faster, more accurate data processing, reducing dependency on manual operations. Scaling the system to handle larger datasets as the business grows.

Machine Learning Integration

Incorporating machine learning algorithms to predict future sales trends and customer preferences. Using predictive analytics to enhance marketing strategies and inventory management.

Real-Time Data Analysis

Transition to real-time data processing to allow instant decision-making. Implementing dashboards for dynamic, up-to-date data insights.

Cross-Platform Compatibility

Expanding access to data analysis results across multiple devices and platforms. Developing a mobile app for easier access to insights and reports on the go.

Bibliography

Sales Data - Sourced from Kaegal for a comprehensive dataset that includes information on sales trends, customer demographics, and product categories, providing insights for effective sales strategy development.

Data Cleaning Techniques - Followed best practices from GeeksforGeeks, including handling missing values, outliers, and data transformation methods to ensure data accuracy and improve model performance.

HTML, CSS, and Styling Tips - Referred to GeeksforGeeks articles for structuring and styling web pages, focusing on HTML5 and CSS3 for responsive design, accessibility, and enhancing the user interface and experience across devices.

Power BI for Data Visualization - Used Microsoft Power BI Documentation for creating effective visualizations, including bar charts, heat maps, and time series graphs, to analyze and present sales data in an engaging and informative way.

Python Libraries - Leveraged GeeksforGeeks and Python Documentation for using Pandas for data manipulation, Matplotlib and Seaborn for visualizing patterns and trends, and Scikit-learn for implementing machine learning models to predict future sales.

Statistical Analysis and Forecasting - Consulted *The Elements of Statistical Learning* by Hastie, Tibshirani, and Friedman for understanding advanced statistical models and forecasting techniques used in predictive analytics for sales.

Data Science and Machine Learning - Incorporated techniques from *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow* by Aurélien Géron to apply machine learning algorithms for sales prediction and trend analysis.

Business Intelligence Techniques - Referenced articles from *TDWI* (The Data Warehousing Institute) and *Gartner* for best practices in business intelligence, focusing on actionable insights through data-driven decision-making.

Data Ethics and Privacy - Consulted *Data and Goliath* by Bruce Schneier to ensure adherence to ethical guidelines and data privacy standards when handling customer information and sales data.

Database Management Systems - Drew upon *Database Systems: The Complete Book* by Hector Garcia-Molina, Jeffrey D. Ullman, and Jennifer Widom for database design principles and management of large-scale datasets.