Intelligent Sales Analytics Dashboard

AN INTERNSHIP REPORT

Submitted by

Manthan Hiteshkumar Jadav

210020107073

In fulfillment for the award of the

degree Of

BACHELOR OF ENGINEEERING

In

Computer Engineering

AHMEDABAD INSTITUTE OF TECHNOLOGY

Gujarat Technology University, Ahmedabad

April, 2025

AHMEDABAD INSTITUTE OF TECHNOLOGY

CERTIFICATE

This is to certify that the Summer internship report submitted along with the project entitled **"Intelligent Sales Analytics Dashboard: Unveiling Trends and Key Metrics for Business Growth"** has been carried out by **Manthan Hiteshkumar Jadav** under my guidance in partial fulfillment for the degree of Bachelor of Engineering in Computer engineering, 8th Semester of Gujarat Technological University, Ahmadabad during the academic year 2024-25.

Ms. Binoli Shah	**Dr. Dushyantsinh Rathod**
Internal Guide	**Head of the Department**

18/01/2025

Manthan Jadav
Hitesh C Jadav, Jawahar Navodaya Vidyalaya Ambheti,
Behind Power Grid, Ta. Kaparada, Dist. Valsad-396191.

Manthan Jadav,

We are pleased to offer you an internship in the AI/ML department at INFOLABZ IT SERVICES PVT LTD as Jr. Intern. Your internship shall commence on 20 January 2025. During Your internship tenure you will work with our Data Science team. The terms and conditions of your internship with the company are set forth below:

1. Subject to your acceptance of the terms and conditions contained herein, your project and responsibilities during the Term will be determined by the supervisor assigned to you for the duration of the internship.
2. Working hours and shift regarding information will be assigned to intern after the internship commences.
3. You will sign a confidential agreement with the company before you commence your internship.
4. The internship cannot be construed as an employment or an offer of employment with INFOLABZ IT SERVICES PVT LTD.
5. Work from home is permitted under approved circumstances with at least one day's prior request. However, **This internship will be in physical mode**. Employees can work remotely for a maximum of seven days, particularly when coinciding with holidays.

Please confirm your acceptance of the terms of this offer in four working days from issue date of this letter without failing which, we have the right to cancel the internship. We look forward to having you on our team! If you have any questions, please feel free to reach out to us.

INFOLABZ AHMEDABAD

From HR department
INFOLABZ IT SERVICES PVT LTD, AHMEDABAD

INFOLABZ IT SERVICES PVT. LTD.
WEB DEVELOPMENT | APP DEVELOPMENT | DATA SCIENCE | IOT

Date: 21/04/2025

TO WHOM IT MAY CONCERN

This is to certify that Manthan Jadav, a student of Ahmedabad Institute of Technology has successfully completed their internship in the field of Data Analyst from 20 January 2025 to 19 April 2025 under the guidance of Mr. Kirit Suthar.

During their internship, they focused on data analysis, visualization, and interpretation using tools such as Python, SQL, and Power BI. Additionally, they worked on creating interactive dashboards and reports to present data findings effectively.

During the period of their internship program with us, they had been exposed to different processes and were found diligent, hardworking, and inquisitive.

We wish them every success in their life and career.

INFOLABZ AHMEDABAD

From HR department
INFOLABZ IT SERVICES PVT LTD,
AHMEDABAD

+91 8866662662
+91 8141236662
contact@infolabz.in
www.infolabz.in
405 Vraj Avenue, Above SAM'S Pizza
Nr, Commerce Six Rd, Navrangpura,
Ahmedabad, Gujarat 380009

GUJARAT TECHNOLOGICAL UNIVERSITY

CERTIFICATE FOR COMPLETION OF ALL ACTIVITIES AT ONLINE PROJECT PORTAL

B.E. SEMESTER VIII, ACADEMIC YEAR 2024-2025

Date of certificate generation : 18 April 2025 (15:04:18)

This is to certify that, ***Jadav Manthan Hiteshkumar*** (Enrolment Number - 210020107073) working on project entitled with ***Intelligent Sales Analytics Dashboard: Unveiling Trends and Key Metrics for Business Growth*** from ***Computer Engineering*** department of ***AHMEDABAD INSTITUTE OF TECHNOLOGY, GOTA, AHMEDABAD*** had submitted following details at online project portal.

Internship Project Report	**Completed**

Name of Student : Jadav Manthan Hiteshkumar

Name of Guide : Mrs. Binoli Sapan Shah

Signature of Student : _____

*Signature of Guide : _____

Disclaimer :
This is a computer generated copy and does not indicate that your data has been evaluated. This is the receipt that GTU has received a copy of the data that you have uploaded and submitted as your project work.

*Guide has to sign the certificate, Only if all above activities has been Completed.

AHMEDABAD INSTITUTE OF TECHNOLOGY

DECLARATION

I hereby declare that the Internship report submitted along with the Internship entitled **"Intelligent Sales Analytics Dashboard"** submitted in partial fulfilment for the degree of Bachelor of Engineering in Computer Engineering to Gujarat Technological University, Ahmadabad, is a bonfide record of original project work carried out by me at **"INFOLABZ IT SERVICES PVT. LTD."** supervision of **Mr. Kirit Suthar** and that no part of this report has been directly copied from any student's reports or taken from any other source, without providing due reference.

Name of the Student	Sign of Student
Manthan Jadav	

ACKNOWLEDGEMENT

I wish to express our sincere gratitude to our external guide Mr. Kirit Suthar for continuously guiding me at the company and answering all my doubts with patience. I would also like to thank you my Internal guide Ms. Binoli Shah for helping us through our internship by giving us the necessary suggestions and advices along with their valuable co-ordination in completing this internship.

I would also like to thank my parents, friends and all the members of the family for their precious support and encouragement which they had provided in completion of my work. In addition to that, I would also like to mention the company personals who gave me the permission to use and experience the valuable resources required to the internship. Thus, in conclusion to the above said, I once again thank the staff members of Infolaz IT Services Pvt. Ltd. for their valuable support in completion of the project.

Thank you All,

Manthan Jadav

210020107073

ABSTRACT

AHMEDABAD INSTITUTE OF TECHNOLOGY
ISO 9001 : 2000 Certified (Engg. College)
Nr. Vasantnagar Township, Gota Ognaj Road, Ahmedabad-380060. Guj. (INDIA)
Ph. : 02717-241132, 241133 Fax No. : 02717-241132
E-mail : info@aitindia.in Website : www.aitindia.in

Intelligent Sales Analytics Dashboard

Submitted By

Manthan Hiteshkumar Jadav

Supervised By

Prof. Binoli Shah

Infolabz IT Services Pvt. LTd.
Ahmedabad, Gujarat 380009

Abstract

This project focused on leveraging data-driven methodologies to extract insights, optimize business processes, and enhance decision-making. The project involved data collection, cleaning, and processing from diverse sources such as databases, APIs, and spreadsheets. Advanced exploratory data analysis (EDA) techniques were used to uncover patterns, trends, and anomalies. Key visualization tools like Power BI, Streamlit, and Python libraries (Matplotlib, Seaborn) were employed to create interactive dashboards and reports.

List of Figures

List of Tables

Table of Contents

CHAPTER 1: OVERVIEW OF ORGANIZATION

1.1 HISTORY:

Established in 2011, we are a distinguished entity within the IT industry, operating as a subsidiary of a prominent parent IT corporation. Our enduring presence in the market attests to our solid reputation and unwavering commitment to excellence.

Our core strength lies in our highly qualified and experienced team, meticulously prepared to confront and conquer any challenges that may arise. Our dedicated team comprises seasoned experts proficient in a wide array of cutting-edge technologies. Additionally, we maintain specialized teams for UI/UX and graphic design. Our clientele spans the globe, with hundreds of satisfied clients benefiting from our comprehensive services.

In this segment, we maintain dedicated teams specifically tasked with API and web service management, as well as crafting contemporary material designs. Our unyielding dedication to innovation is evident in every app we create, as we continually seek to expand our horizons and knowledge with each project.

InfoLabz proudly offers industry-oriented live project training, catering to students pursuing CE/IT (BE/B.TECH & DIPLOMA ENGINEERING), BCA/MCA, BSc IT/MSc IT degrees. Our training programs provide students with invaluable hands- on experience, bridging the divide between theoretical knowledge and real-world application. This immersive experience empowers students to gain a deeper understanding of engineering principles and apply their acquired skills to develop practical software and live websites.

1.2 DIFFERENT PRODUCTS:

UI/UX and Graphic Design Services : UI/UX and graphic design services focus on creating visually appealing and user-friendly digital experiences. We specialize in crafting intuitive interfaces, ensuring seamless user interactions across websites and mobile applications. Our team leverages the latest design trends and tools to deliver aesthetically pleasing and highly functional solutions.

Branding & Logo Design : A strong brand identity is crucial for business success, and we help clients establish a compelling visual presence through our branding and logo design services. Our designers create distinctive logos and brand elements that reflect a company's values, ensuring consistency across all marketing channels.

API and Web Services: The Company specialize in developing robust and scalable APIs and web services that facilitate seamless communication between different applications. Our API solutions enhance business operations by enabling secure data exchange, automation, and integration with third-party systems.

IT Training & Live Project Training : IT training and live project training programs are designed to equip students and professionals with real-world technical skills. Through hands-on learning experiences, participants gain industry-relevant expertise that bridges the gap between academic knowledge and professional requirements.

Internship Programs in Emerging Technologies : To prepare students for the evolving IT landscape, we offer internship programs in cutting-edge technologies such as AI, blockchain, cloud computing, and cybersecurity. These programs provide valuable industry exposure, enhancing employability and technical expertise.

1.3 WORK BEING CARRIED OUT IN EACH DEPARTMENT:

Various Departments:

UI/UX and Graphic Design Services	• Web and Mobile UI/UX Design • Branding & Logo Design • Interactive Prototyping
API and Web Services	• Custom API Development & Integration • Secure Payment Gateway Integration • Third-Party Service Integration

1.4 EACH STAGES OF PRODUCTION:

• **Assemble the right team:** We handle all aspects of vetting and choosing the right team that you don't have the time, expertise, or desire to do.

• **Sprint planning:**
Sprint roadmap is a collective planning effort. Team members collaborate to clarify items and ensure shared understanding

• **Tech architecture:**
We break monolithic apps into microservices. Decoupling the code allows teams to move faster and more independently.

• **Iterative delivery:**
We divide the implementation process into several checkpoints rather than a single deadline.

• **Code reviews:**
Code reviews before release help detect issues like memory leaks, file leaks, performance signs, and general bad smells.

• **Stand-ups & weekly demos:** Stand-ups, weekly demos, and weekly reviews make sure everyone is on the same page and can raise their concerns.

CHAPTER 2: INTRODUCTION TO INTERNSHIP & PROJECT

2.1 PROJECT SUMMARY:

The **Intelligent Sales Analytics Dashboard** is designed to provide businesses with a comprehensive view of their sales performance through interactive and data- driven visualizations. This project focuses on analyzing key sales metrics over time, enabling users to uncover trends and patterns across different regions, product categories, and sales personnel.

The dashboard incorporates various visualization techniques, including line graphs, bar charts, and heatmaps, to present sales data in an intuitive and actionable format. By leveraging these insights, businesses can optimize their sales strategies, improve decision-making, and drive growth. The primary objective is to empower stakeholders with real-time analytics, helping them identify opportunities, monitor performance, and enhance overall sales efficiency.

2.2 PURPOSE:

The purpose of this project is to create an intelligent sales analytics dashboard that provides real-time, accurate, and comprehensive insights into sales performance. The dashboard aims to facilitate data-driven decision-making by offering interactive visualizations that highlight trends and key metrics across various dimensions, such as region, product category, and salesperson. By enabling users to drill down into the data, the system helps optimize sales strategies and improve overall business growth.

2.3 OBJECTIVE OF INTERNSHIP:

A great internship offers the knowledge and skills required to become successful in a specific career field. Employers spend a great deal of time and money on training their new employees, and they know that they can eliminate a lot of this time by hiring someone with previous knowledge and experience.

Internship Offers Many Advantages Like:

- Job experiences
- Research
- Experience
- Helps to guide career goals,
- create a professional network.

I have experienced many of the good things during my internship period and still learning more. I have learned APIs Integration, which was completely new for me so it was seemed too difficult. But now I am enjoying the APIs and SQL technology. I have learned End to End Data Analysis while my internship period. Understood about teamwork which indicate collaborative effort of a team to achieve a common goal or to complete a task in the most effective and efficient way. This concept is seen within the greater framework of a team, which is a group of interdependent individuals who work together towards a common goal. Then Work should do before the deadline otherwise it will badly impact on impression. And a lot more. So, an ideal internship is one that offers the student a progressively challenging work experience, supported by an organization that provides solid orientation, training, supervision, and feedback.

2.4 BRIEF LITERATURE REVIEW:

- Sales analytics has become a crucial aspect of business intelligence, enabling organizations to optimize strategies through data-driven insights. Prior research highlights the importance of interactive dashboards in sales performance analysis, emphasizing their role in trend identification, sales forecasting, and decision-making (Chen et al., 2020). Studies show that visual analytics, such as line graphs and heatmaps, improve data interpretation and facilitate real-time monitoring of key metrics.
- Furthermore, business intelligence tools like Power BI and Tableau have been widely adopted for their ability to integrate large datasets and provide dynamic reporting (Davenport & Harris, 2018).
- This project builds upon these findings by developing an **Intelligent Sales Analytics Dashboard**, leveraging visualization techniques to analyze sales data across regions, product categories, and sales personnel. The goal is to enhance decision-making capabilities and drive business growth through actionable insights.

2.5 TECHNOLOGIES USED:

- **IDE: PyCharm**
  PyCharm is an Integrated Development Environment (IDE) designed for Python development. It offers advanced features like intelligent code completion, debugging tools, and integrated version control, making it easier to write and manage Python scripts for data analysis and visualization. PyCharm enhances productivity by providing a structured environment for coding and project management.

- **Programming language:**
  Python
  Python is a versatile and widely used programming language in data analysis. It provides powerful libraries such as **Pandas, NumPy, and SciPy** for data manipulation and statistical analysis. Python's simplicity and extensive ecosystem make it ideal for processing, analyzing, and visualizing large datasets efficiently.

  SQL(Structured Query Language)
  SQL employed for efficient data retrieval, filtering, and management of structured sales data stored in databases.

- **Analytics Tools :**
  Power BI
  Power BI is a business intelligence tool by Microsoft that enables interactive data visualization and reporting. It connects to various data sources, processes large datasets, and provides insights through dashboards and reports. Power BI helps businesses make data-driven decisions by offering powerful visualization and analytical capabilities.

  Streamlit
  Streamlit is an open-source Python framework for building interactive web applications, particularly for data visualization and machine learning projects. It allows users to develop dashboards and analytical applications quickly without extensive front-end development, making it an ideal choice for presenting data insights dynamically.

- **Visualization Libraries:**
  Data visualization plays a crucial role in analytics, and Python offers several libraries for this purpose:

  Matplotlib
  Matplotlib is used for creating static, animated, and interactive visualizations.

  Seaborn
  Seaborn provides enhanced statistical visualization capabilities.

  Plotly
  Plotly enables interactive visualizations, such as dynamic charts and dashboards.

- **Operating System:** Windows

CHAPTER 3: PROJECT & INTERNSHIP PLANNING

3.1 PLANNING:

12-week Data Analyst Internship is structured to provide a well-planned and resource-efficient learning experience. The program focuses on **scheduling, staffing, risk management, and cost estimation** to ensure a smooth execution of training and project work.

Key Planning Aspects:

- **Manpower & Resource Scheduling:**
  - Allocation of mentors, project supervisors, and necessary software tools (SQL, Python, Power BI, APIs Integration, Streamlit).
  - Weekly training modules and hands-on project work.
- **Staff Organization & Plans:**
  - Assigning tasks to interns based on skill levels.
  - Rotational training on data analytics tools and techniques.
- **Risk Identification & Management:**
  - Addressing potential challenges like data inconsistencies, tool adaptability, and time constraints.
  - Ensuring proper guidance and troubleshooting support.
- **Cost, Duration & Effort Estimation:**
  - **Cost:** Resources allocated for software, training, and mentorship.
  - **Duration:** 12 weeks with structured weekly milestones.
  - **Efforts:** Balanced workload, combining theory, hands-on training, and project execution.
- **Monitoring & Control:**
  - Weekly progress tracking through milestone-based evaluations.
  - Continuous feedback loops to ensure learning effectiveness.

3.2 WORK PLAN DURING INTERNSHIP:

Learnt data structures of Python	Lists Tuples Arrays Dictionary – Key-Value Pair For & while Loop Functions of Python
Learnt APIs Integration	Fundamentals of API Dynamic vs Static APIs Filtering & Displaying Data
Learnt Numpy Library	Implemented Numpy array operation Covert API response → Numpy Array for Efficient data analysis
Learnt Pandas Library	Basics of Pandas Pandas Series from Dictionary Numpy Array → Pandas Series
Learnt Matplotlib & Seaborn	Basics of data visualization. Creating line plots and scatter plots. Customizing plots: Labels, titles, and Legends. Creating bar charts and histograms Subplots and multiple plots in one figure.
Learnt Streamlit	Developed an interactive dashboard using Streamlit. Explored layout option and user interactivity. Developed Signup and Login Forms in streamlit. Integrated it with csv file to store user data Enhanced UI for login credentials.
Project Work **(Intelligent Sales Analytics Dashboard)**	Creates Signup and Login Forms in streamlit. Gather sales data, clean and preprocess it Use Plotly and Matplotlib to create dynamic charts. Build a user-friendly interface using Streamlit for real-time data insights. Implement filters for region, product category, and salesperson to enable in-depth analysis.

3.3 PROJECT DEVELOPMENT APPROACH AND JUSTIFICATION:

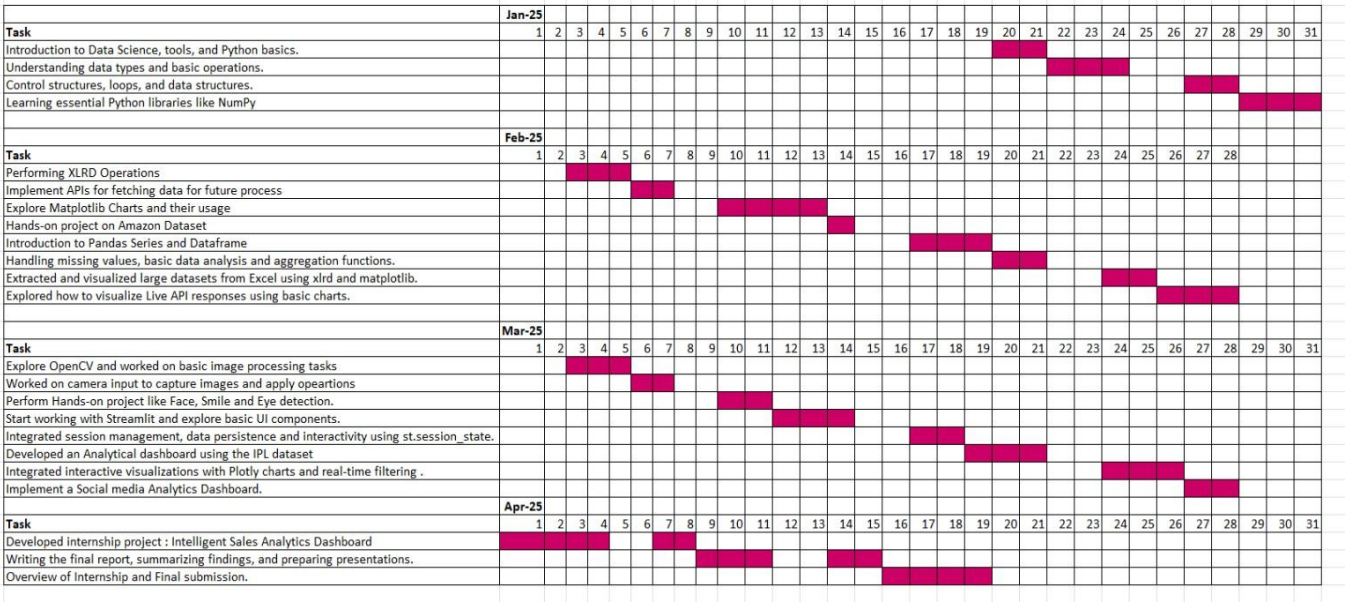
The Intelligent Sales Analytics Dashboard is developed using an **agile and iterative approach**, ensuring flexibility, continuous improvements, and real-time feedback.

- **Requirement Analysis & Planning:** Identify key sales metrics, user needs, and data sources.
- **Data Collection & Preprocessing:** Gather, clean, and structure data for analysis
- **Exploratory Data Analysis (EDA):** Identify patterns and trends using statistical analysis.
- **Dashboard Development:** Build interactive visualizations using Power BI, Python (Matplotlib, Seaborn, Plotly) and Streamlit.
- **Testing & Refinement:** Ensure accuracy, usability, and performance optimization.
- **Deployment & Feedback:** Deploy the dashboard and gather user insights for further enhancements.

3.4 ROLES AND RESPONSIBILITY:

- Continue to learn your skills as a data analyst.
- Focus on depth of knowledge and expertise in a certain language, analysis tools, and area of the insights.
- Learn soft skills to be better eligible for real world interaction with client and colleagues.
- Teamwork, Documentation & Presentation is a key aspects for any data analyst.
- Develop habits of following industry standards and good practices for data analyst under the guidance of a mentor.
- Chose the right way to learn new things.
- It is important to choose the right channel and ways to gain knowledge to become successful.

3.5 GANTT CHART:



3.1 Gantt Chart

CHAPTER 4: SYSTEM ANALYSIS

4.1 STUDY OF CURRENT SYSTEM:

Sales analytics primarily relies on traditional reporting methods, including spreadsheets and static reports, which often lack interactivity and real-time insights. Businesses face challenges in analyzing large volumes of sales data efficiently, making it difficult to track performance across different regions, product categories, and sales representatives. Data is often scattered across multiple sources, requiring extensive manual effort for consolidation, cleaning, and analysis. Additionally, the absence of **automated visualizations and dashboards** limits the ability to identify trends, forecast sales, and make data-driven decisions quickly. Without a centralized, interactive analytics system, businesses struggle with delayed reporting, lack of real-time insights, and inefficiencies in decision-making processes. Hence, there is a need for a **dynamic, intelligent sales analytics dashboard** that can seamlessly integrate data, provide interactive visualizations, and enable businesses to make informed decisions for growth and optimization.

4.2 PROBLEMS AND WEEKENESSES OF CURRENT SYSTEM:

In many Organization, The Sales analytics suffers from inefficiencies due to **manual data processing, lack of real-time insights, and limited interactivity** in reporting. Sales data is often fragmented across multiple sources, making it difficult to consolidate and analyze efficiently. The reliance on static reports and spreadsheets results in **delayed decision-making, poor trend identification, and increased human errors**. Additionally, the absence of automated dashboards restricts businesses from gaining quick, data-driven insights, affecting their ability to optimize sales strategies and respond to market changes promptly.

4.3 REQUIREMENTS OF NEW SYSTEM:

There are some problems that exist in traditional systems, and those are given as follows:

- **Real-time Data Processing**: The dashboard should retrieve and process sales data in real-time, providing up-to-date insights on sales performance.
- **Data Integration**: The system should integrate sales data from various sources (e.g. spreadsheets, databases) into a centralized platform for analysis.
- **Interactive Visualizations**: The dashboard must offer various types of visualizations such as line charts, bar graphs, pie charts, and heatmaps to display key metrics like revenue, sales volume, and customer behavior.
- **Export and Reporting**: Users should be able to export reports and data visualizations for presentations or further analysis.
- **Mobile Compatibility**: The dashboard should be responsive and accessible from mobile devices to accommodate on-the-go decision-making.

4.4 SYSTEM FEASIBILITY:

The Intelligent Sales Analytics Dashboard is highly feasible as it aligns with the organization's objectives by enabling data-driven decision-making, improving sales performance analysis, and optimizing business strategies.

4.4.1 Does the system contribute to the overall objectives of the organization?

Yes, the system contributes to the overall objectives of the organization.

- The system enhances **sales tracking, trend analysis, and forecasting**, helping businesses identify growth opportunities.
- It provides **real-time insights**, enabling better decision-making and sales optimization.

4.4.2 Can the system be implemented using the current technology and within the given cost and schedule constraints?

Yes, the system be implemented using the current technology and within the given cost and schedule constraints.

- The system can be developed using **current technologies** such as **Python, SQL, Power BI, and Streamlit**, which are cost-effective and widely supported.
- The project follows an **agile development approach**, ensuring completion within given time and budget constraints.

4.4.3 Can the system be integrated with other systems which are already in place?

Yes, this dashboard can be integrated with other systems which are already in place.

- The dashboard can seamlessly integrate with existing databases, CRM systems, and business intelligence tools to fetch and analyze data.
- It supports API connections and SQL queries to ensure smooth data flow across different platforms.

4.5 PROPOSED SYSTEM & FEATURES:

- **Interactive Sales Dashboard :** Provides real-time, dynamic visualizations of sales trends using Power BI, Python (Matplotlib, Seaborn, Plotly), and Streamlit.
- **Automated Data Processing** : Eliminates manual data entry by integrating with databases, CRM systems, and APIs for seamless data retrieval and processing.
- **Advanced Data Visualization** : Includes bar charts, line graphs, heatmaps, and KPIs to help users identify sales patterns, performance trends, and key business insights.
- **Region & Product-wise Analysis :** Allows users to filter and analyze sales performance based on region, product category, and salesperson, enabling targeted decision-making.

- **Predictive Analytics & Forecasting :** Uses statistical models and machine learning techniques to predict future sales trends and optimize strategies.
- **User-friendly & Customizable Interface** : Designed for ease of use, allowing users to customize reports, apply filters, and generate insights effortlessly.
- **Integration with Existing Systems** : Seamlessly connects with SQL databases, CRM platforms, and external data sources, ensuring smooth data flow.
- **Mobile & Web Accessibility :** Provides access to the dashboard on multiple devices, enabling decision-makers to monitor sales performance anytime, anywhere.

4.6 LIST OF MODULES:

4.6.1 Data Integration Module:

- Connects with external data sources such as databases, APIs, and CRM systems.
- Gathers, cleans, and preprocesses data for accurate analysis.
- Ensures the system always has up-to-date and reliable data for visualization.

4.6.2 Analytics Engine:

- Processes sales data and applies various analytical techniques.
- Performs descriptive analytics (e.g., sales trends over time).
- Implements predictive analytics (e.g., forecasting future sales performance).
- Generates actionable insights for strategic decision-making.

4.6.3 User Interface (UI):

- Provides an interactive and user-friendly platform for data exploration.
- Allows users to view reports, filter data, and analyze trends through visualizations.
- Ensures seamless navigation, making it easy for decision-makers to extract insights.

CHAPTER 5: SYSTEM DESIGN

5.1 Dataset Design :

Walmart Sales Data Table

Field	Datatype	Description
Invoice_id	Integer	Unique identifier for each sales transaction.
Branch	String	Date of the sales transaction.
City	String	Unique identifier for the customer.
category	String	Name of the customer.
Unit_price	Integer	Unique identifier for the product sold.
quantity	Integer	Name of the product.
date	date	Product category
time	time	Number of units sold in the transaction.
Payment_method	String	Price per unit of the product.
ratings	Float	Total revenue generated (Quantity_Sold × Unit_Price).
Profit_margin	Float	Discount applied on the transaction (in percentage).
Revenue	Float	Final price after discount.
Profit	String	Unique identifier for the salesperson handling the sale.

5.1.1 Walmart Sales Table

5.2 SYSTEM ACTIVITY DIAGRAM:

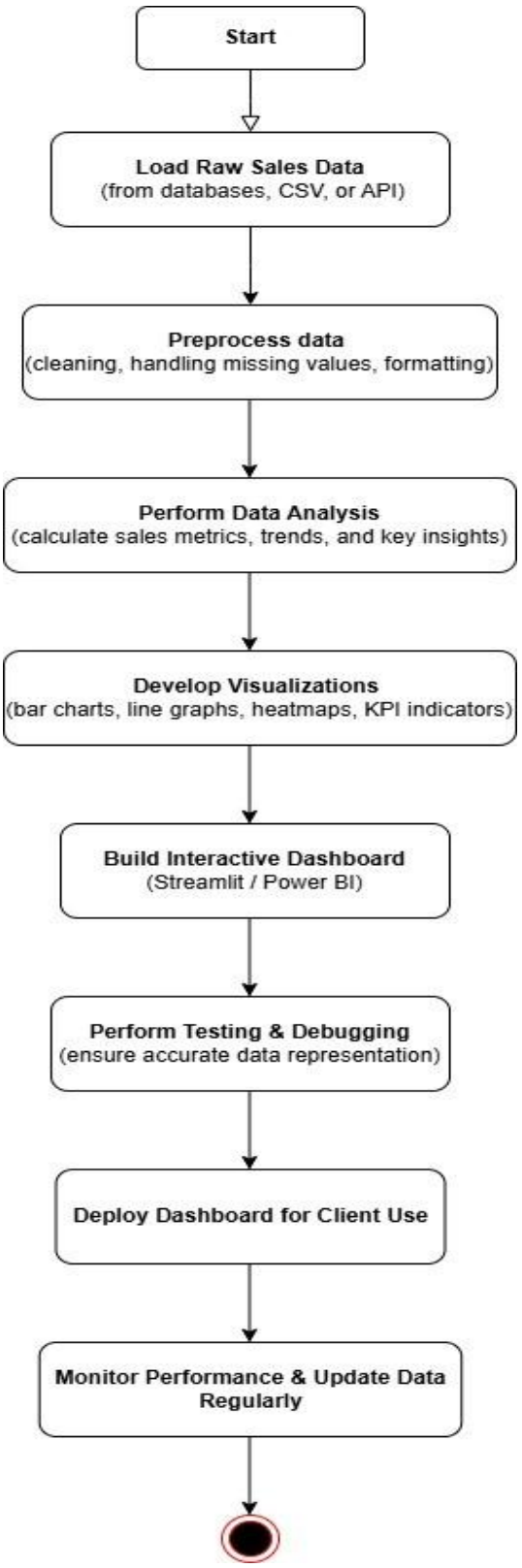
The System Activity Diagram for the **Intelligent Sales Analytics Dashboard** illustrates the workflow from both the **Analyst's Side** and **Client's Side**.

Analysts Side:

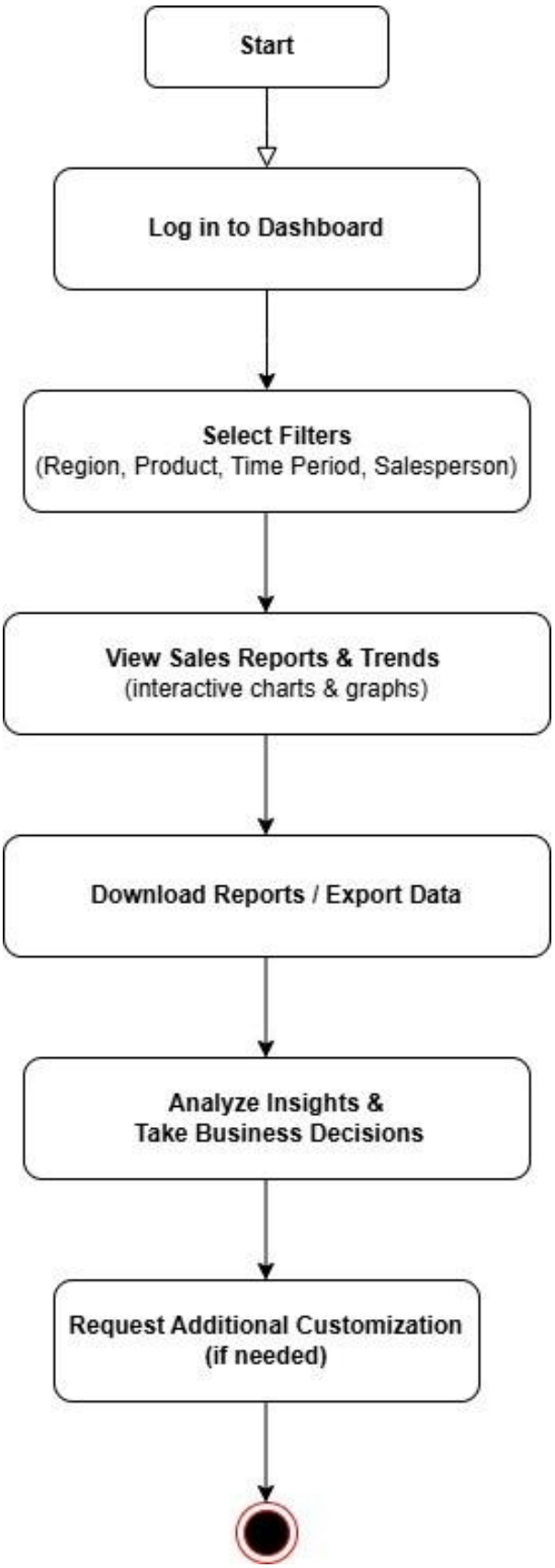
The process begins by gathering raw sales data from multiple sources such as databases, CSV files, or APIs. This data often comes in different formats and may contain inconsistencies, so it first undergoes **preprocessing**. This includes steps like cleaning the data, removing or imputing missing values, standardizing formats (e.g., dates, currencies), and creating calculated fields to support analysis. Once the data is prepared, analysts identify and compute **key sales metrics** such as total revenue, average order value, sales by region or product, and monthly growth. To make the analysis more accessible and insightful, they create **visualizations** including bar charts, line graphs, pie charts, and heatmaps using tools like Excel, Power BI, or Tableau. These visuals help highlight trends, comparisons, and patterns in the sales data. Finally, the dashboard is **deployed** in a user-friendly format—often through a web-based portal or shared Excel file—so that stakeholders can easily access and use it.

Clients Side:

Users interact with the dashboard through an intuitive interface that allows them to apply **filters** such as region, product category, time period, or individual salesperson. This dynamic filtering enables clients to explore the data relevant to their specific interests or business needs. They can **generate reports**, **export or download** key insights, and review performance metrics in real time. This empowers clients to make **informed, data-driven decisions** about their strategies, operations, and resource allocation. The overall workflow ensures that raw data is transformed into actionable intelligence, bridging the gap between data collection and strategic business impact.



5.2.1 Admin Activity Diagram / Analyst Activity Diagram



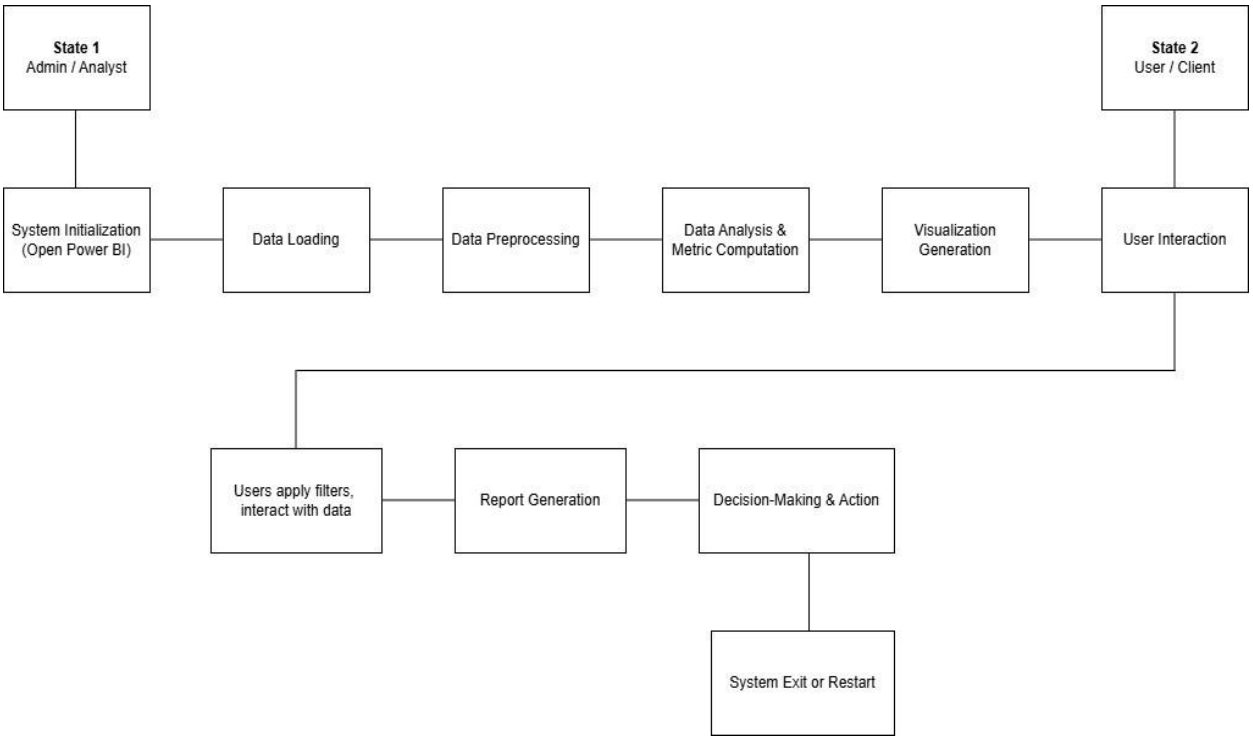
5.2.2 Client / User Activity Diagra

5.3 STATE TRANSITION DIAGRAM:

The purpose of use case diagram is t capture the dynamic aspect of a system. But this definition is too generic to describe the The **State Transition Diagram** for the **Intelligent Sales Analytics Dashboard** represents the different states the system undergoes during its operation, along with the transitions triggered by various events.

Key States in the System

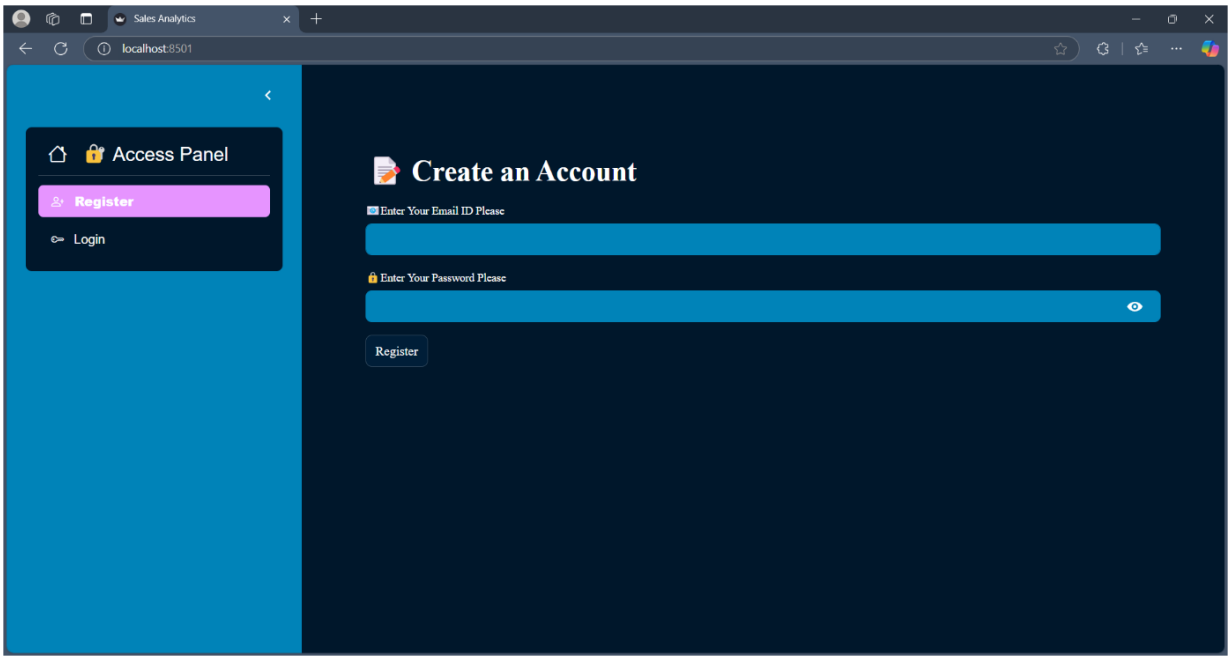
1. **System Initialization** → The dashboard loads, and connections to the database or API are established.
2. **Data Loading** → Raw sales data is imported from various sources.
3. **Data Preprocessing** → Data cleaning, missing value handling, and formatting take place.
4. **Data Analysis & Metric Computation** → Key sales metrics are computed, such as total revenue, product performance, and regional trends.
5. **Visualization Generation** → Interactive charts, graphs, and heatmaps are created.
6. **User Interaction (Client Side)** → Users apply filters, view reports, and interact with data.
7. **Report Generation** → Users generate and download sales reports.
8. **Decision-Making & Action** → Insights from the dashboard are used to make business decisions.
9. **System Exit or Restart** → Users log out, or the system resets for new data processing.



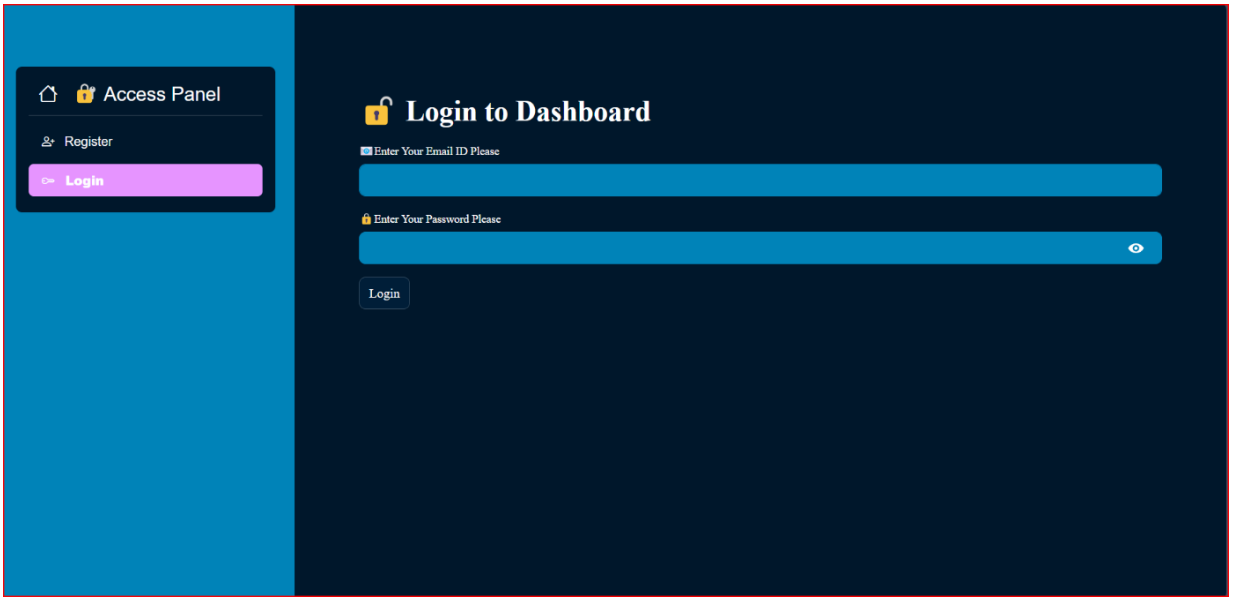
5.3.1 State Transition Diagram

CHAPTER 6: IMPLEMENTATION

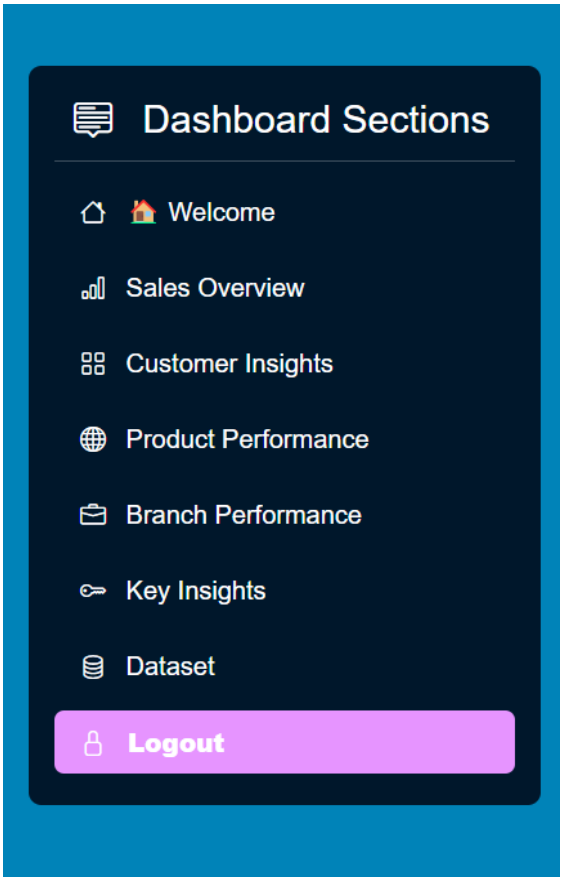
6.1 Web User Screen:



6.1.1 Registration Page

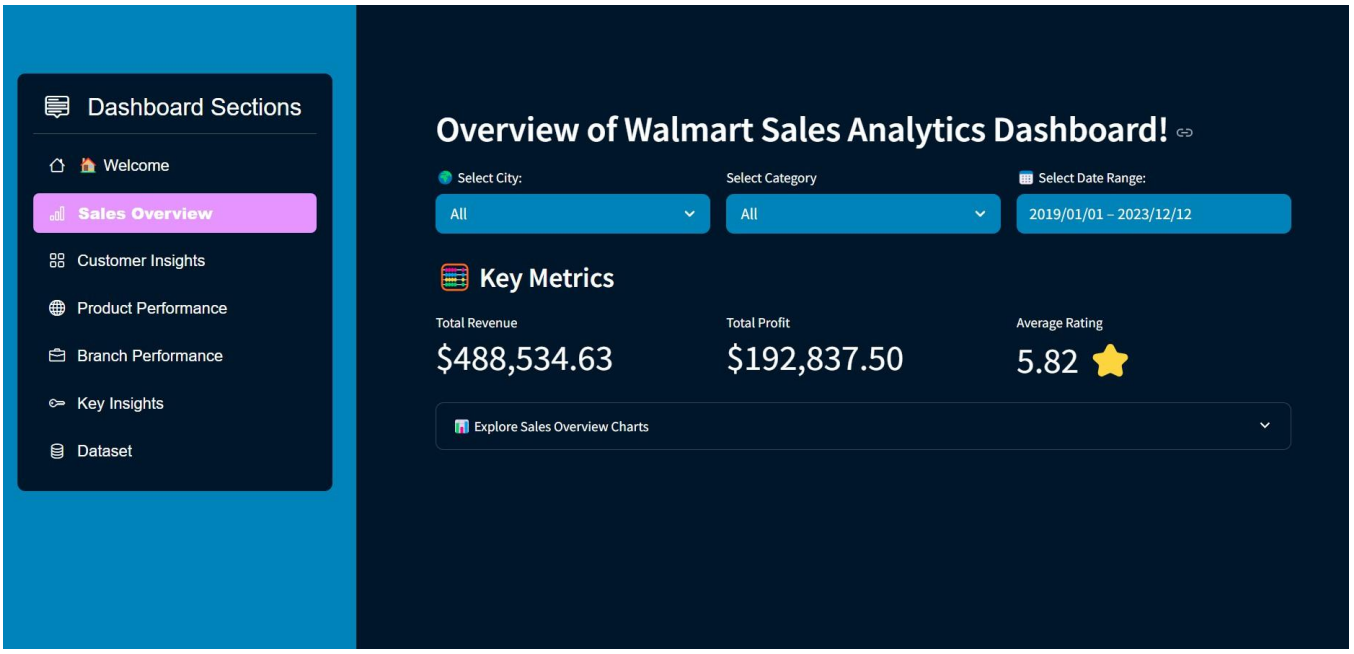


6.1.1 Login Page

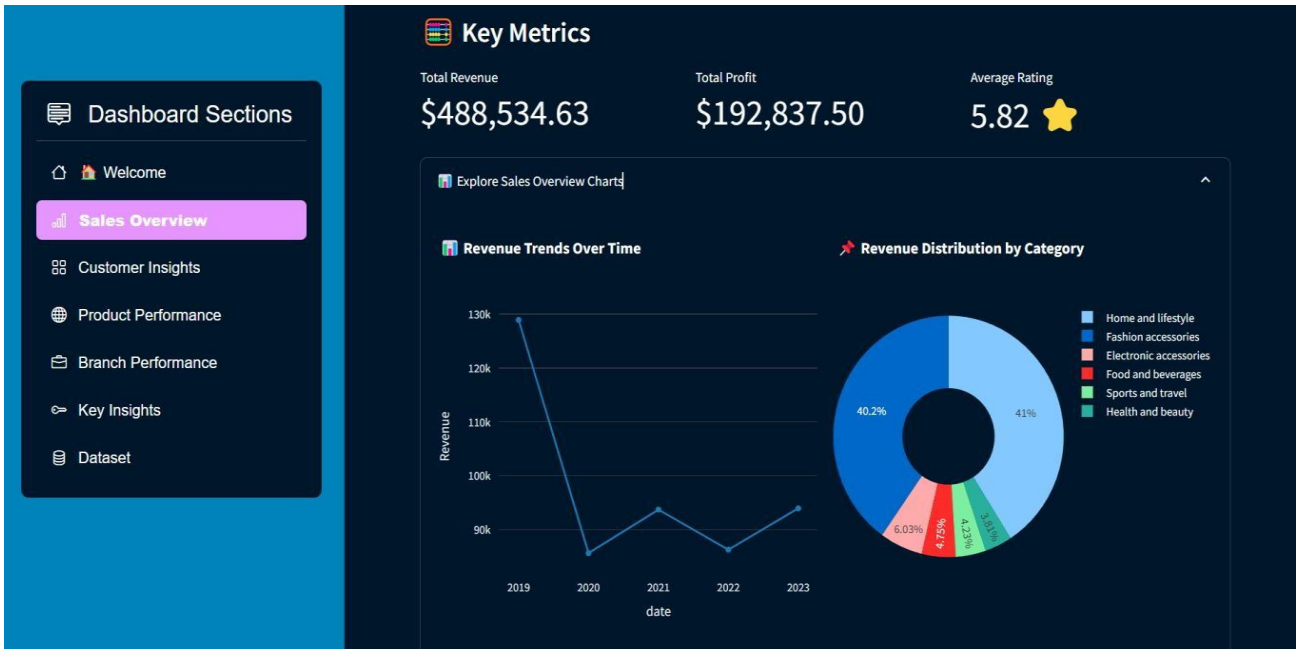


6.1.1 Streamlit Side bar

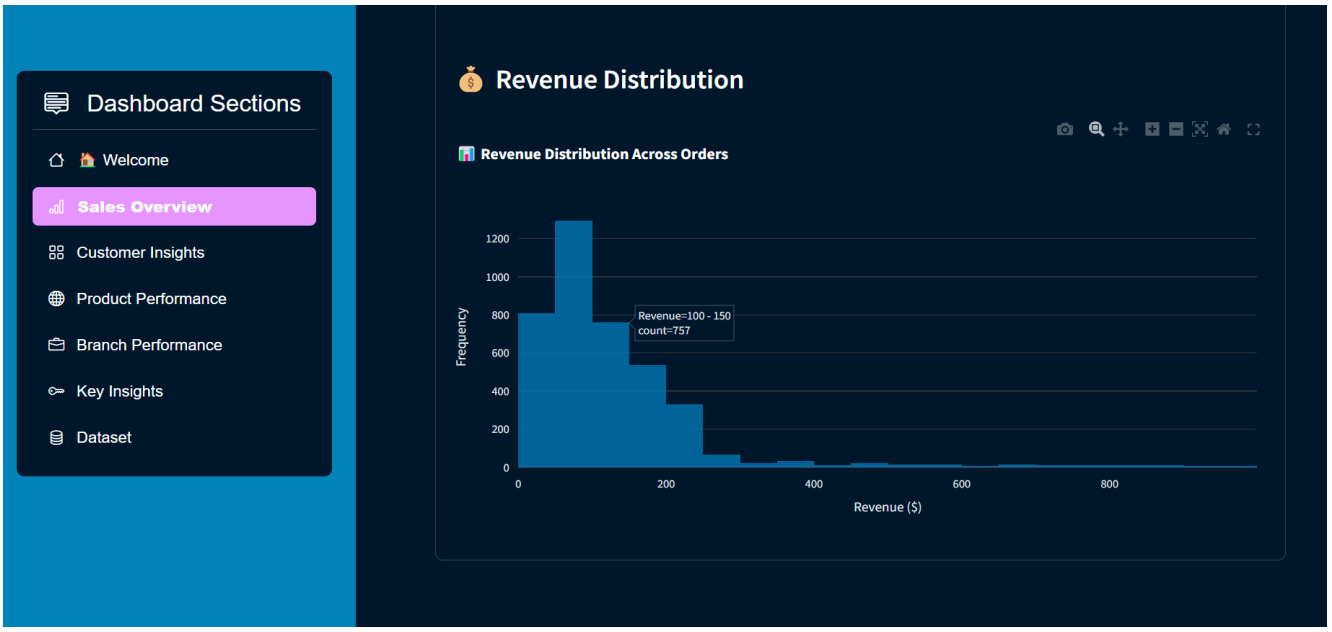
6.1.1 Home Page



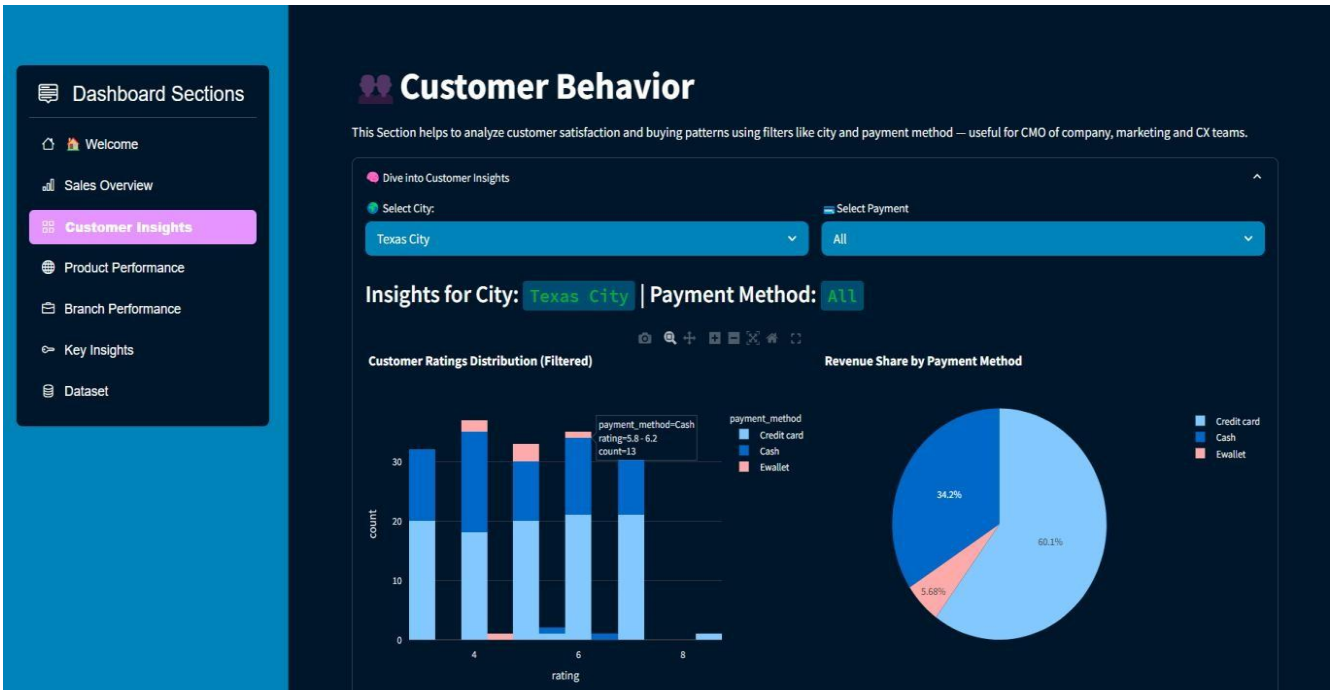
6.1.2 Overview and Key Metrics



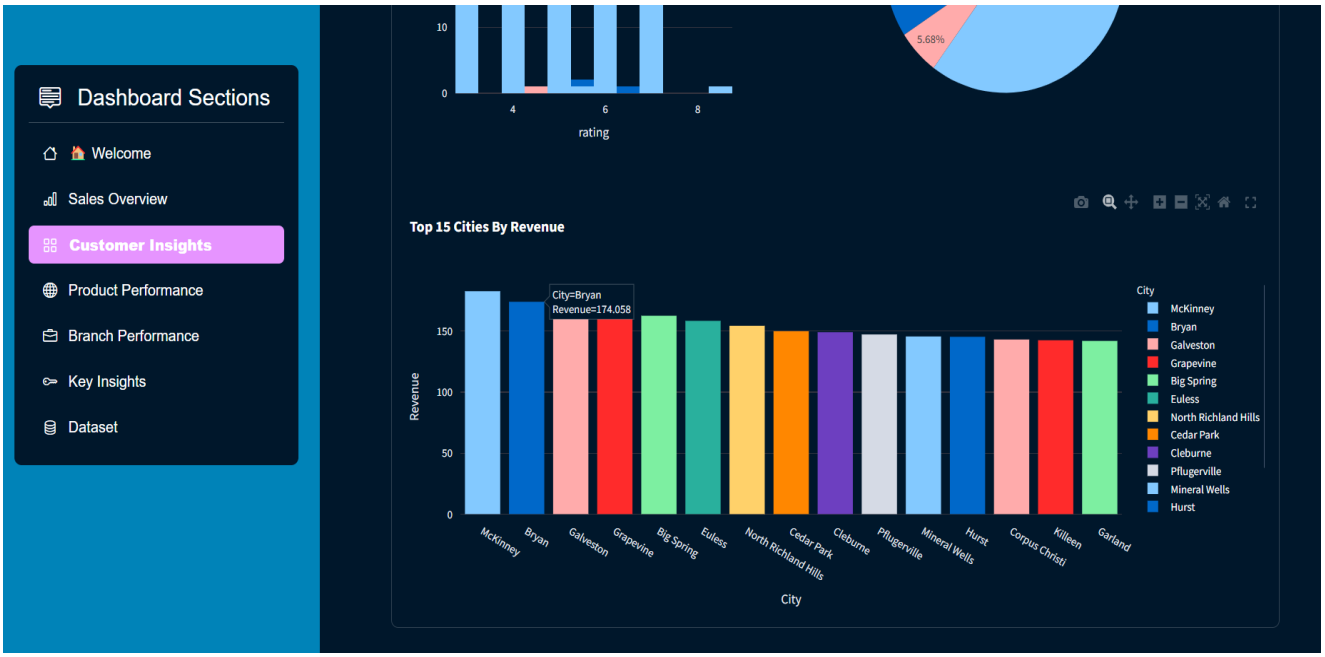
6.1.2 Revenue Trends and distribution by category



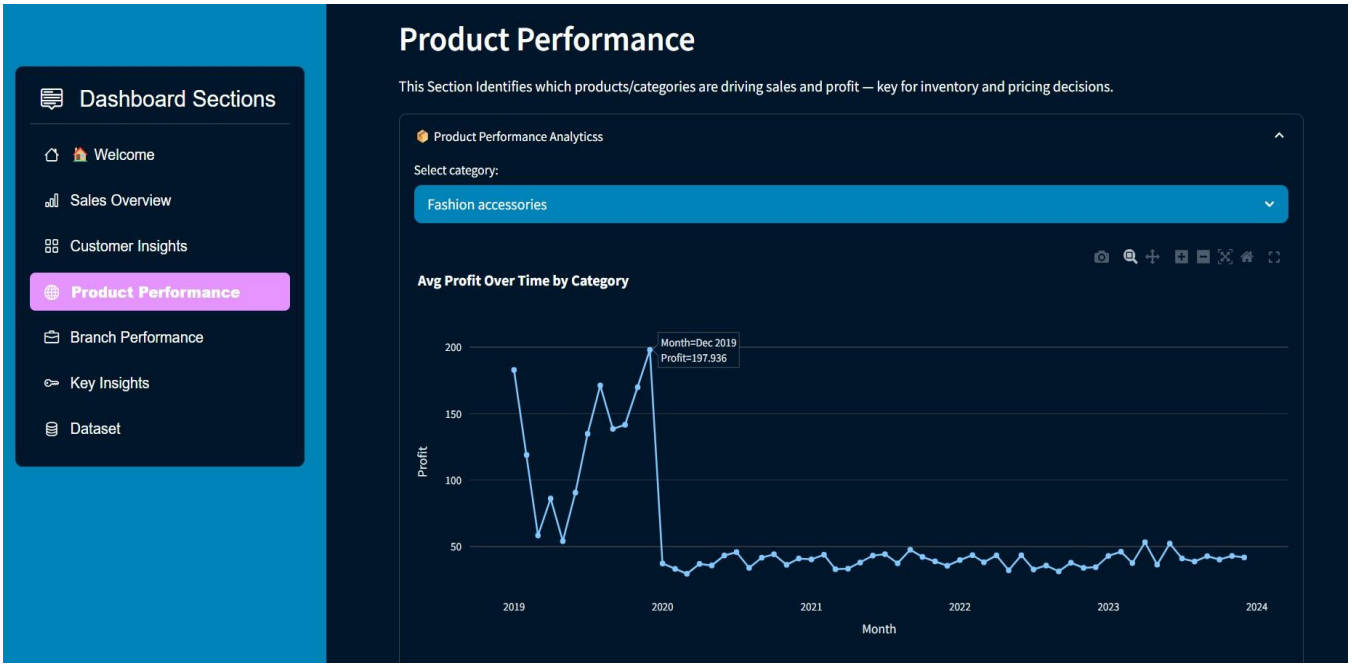
6.1.3 Revenue Distribution Chart



6.1.4 Customer Behavior by ratings and Payment method

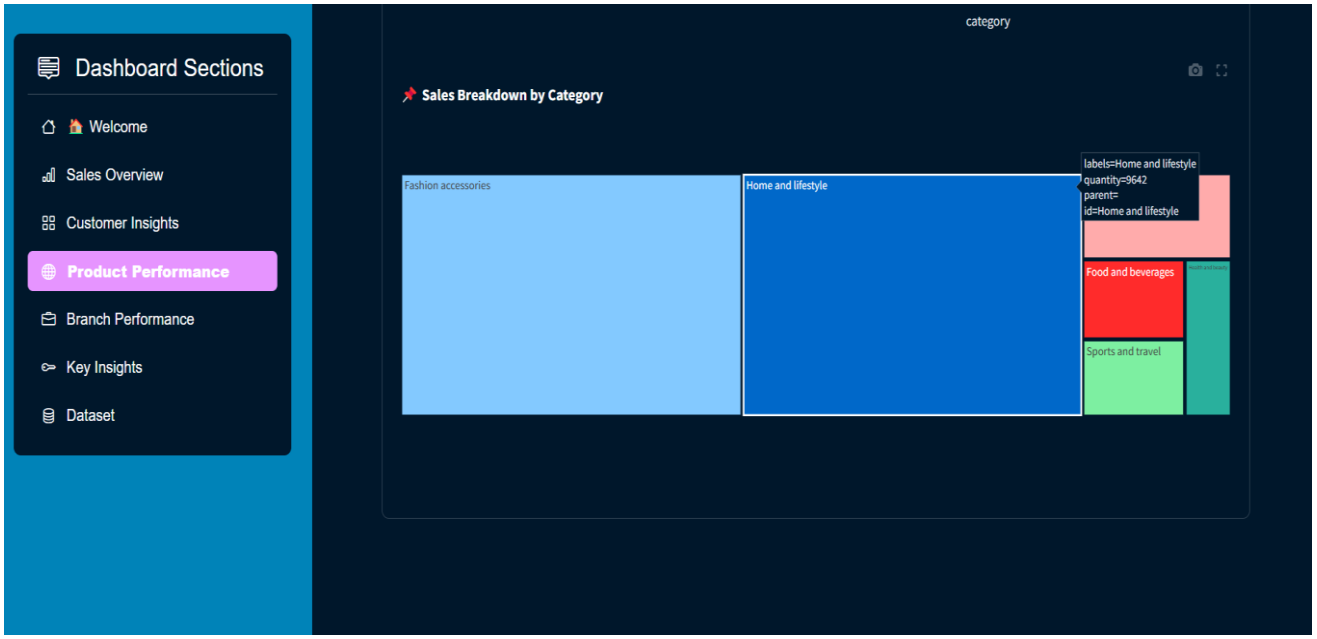


6.1.5 Top 15 Cities by Revenue

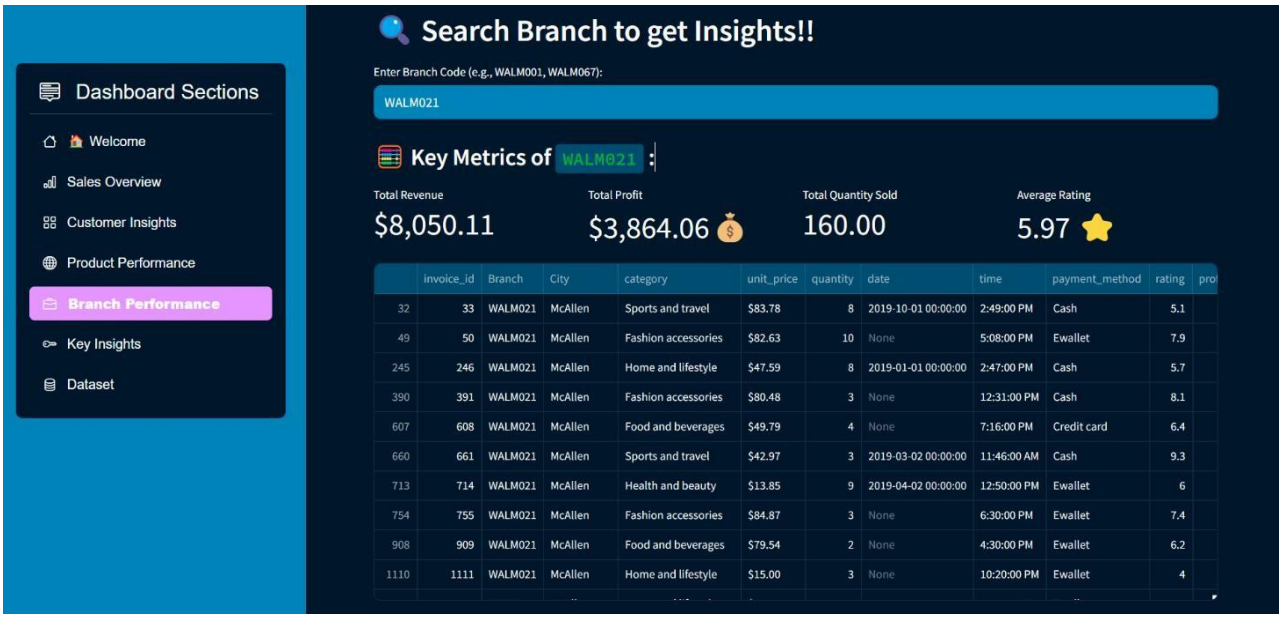


6.1.6 Product Performance Analysis

6.1.7 Product Performance by Quantity and Total Revenue



6.1.8 Sales Breakdown by Category

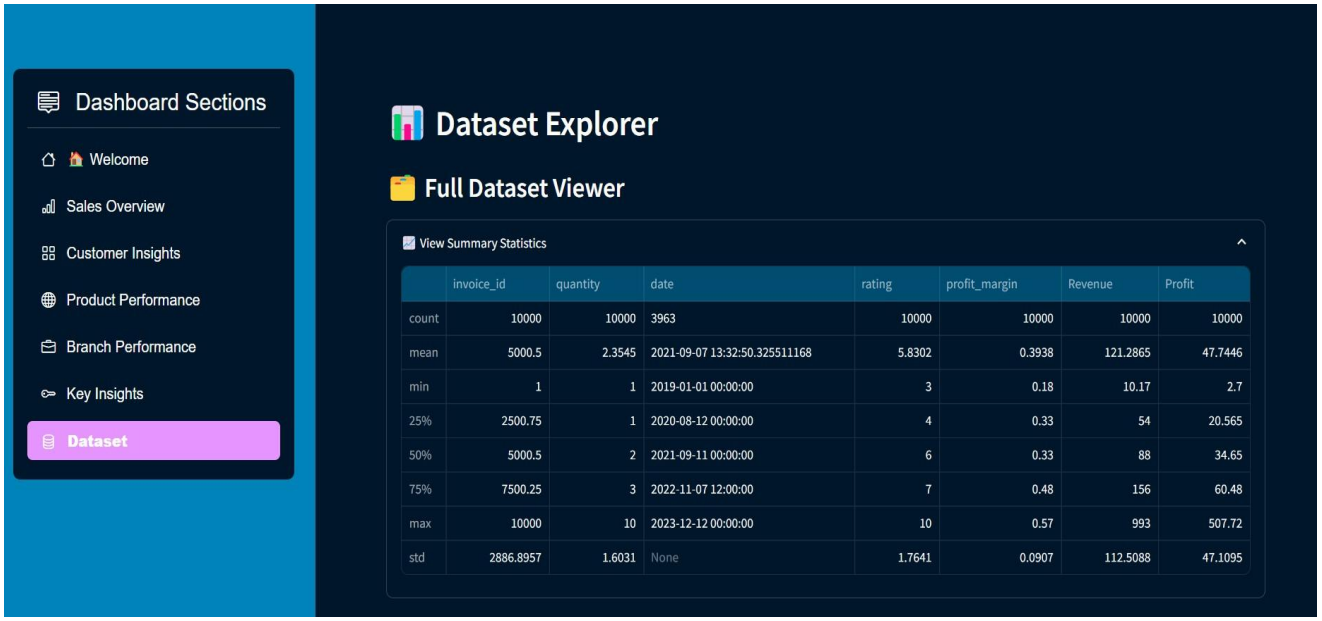


6.1.9 Search Query for Branch Insights

6.1.10 Top 15 branch By Average profit

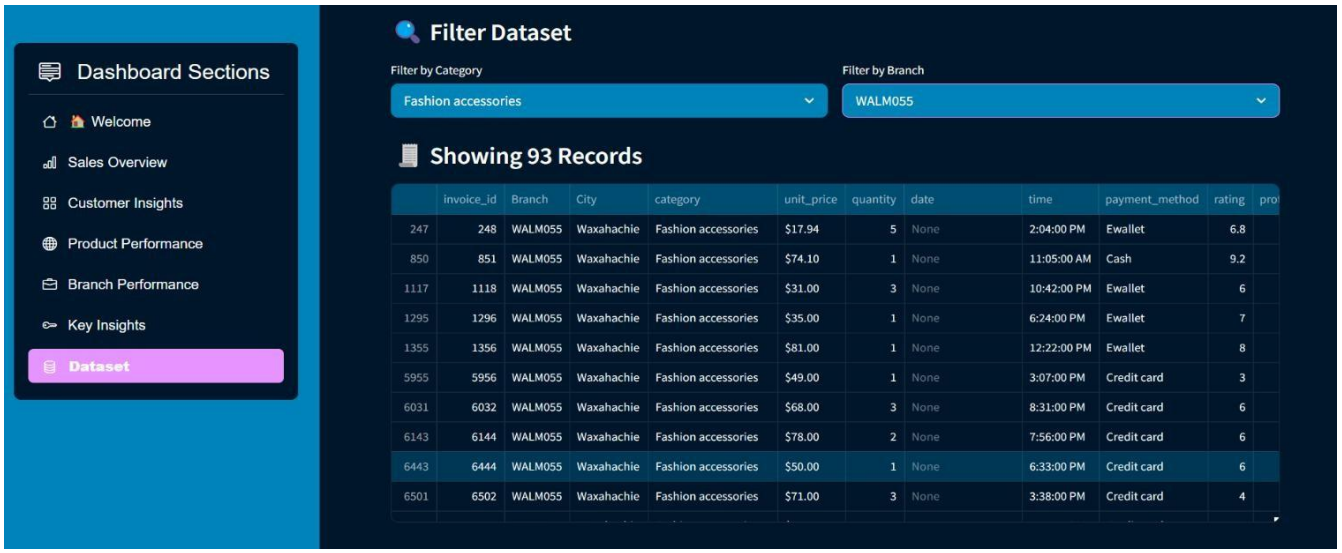
6.1.11 Key Business Insights(a)

6.1.12 Key Business Insights(b)



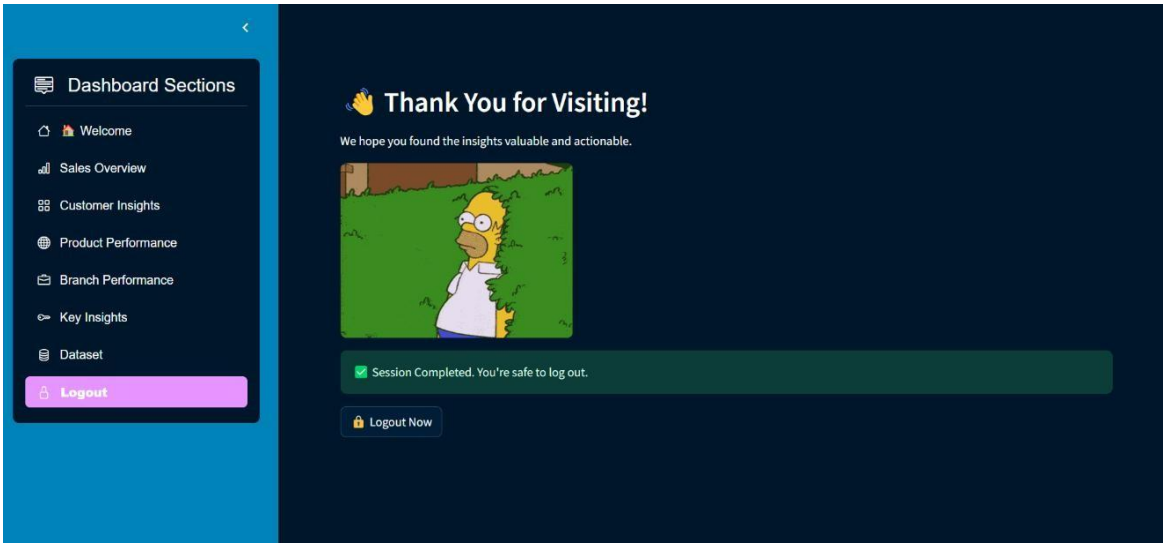
	invoice_id	quantity	date	rating	profit_margin	Revenue	Profit
count	10000	10000	3963	10000	10000	10000	10000
mean	5000.5	2.3545	2021-09-07 13:32:50.325511168	5.8302	0.3938	121.2865	47.7446
min	1	1	2019-01-01 00:00:00	3	0.18	10.17	2.7
25%	2500.75	1	2020-08-12 00:00:00	4	0.33	54	20.565
50%	5000.5	2	2021-09-11 00:00:00	6	0.33	88	34.65
75%	7500.25	3	2022-11-07 12:00:00	7	0.48	156	60.48
max	10000	10	2023-12-12 00:00:00	10	0.57	993	507.72
std	2886.8957	1.6031	None	1.7641	0.0907	112.5088	47.1095

6.1.13 Dataset Summary Statistics



	invoice_id	Branch	City	category	unit_price	quantity	date	time	payment_method	rating
247	248	WALM055	Waxahachie	Fashion accessories	$17.94	5	None	2:04:00 PM	Ewallet	6.8
850	851	WALM055	Waxahachie	Fashion accessories	$74.10	1	None	11:05:00 AM	Cash	9.2
1117	1118	WALM055	Waxahachie	Fashion accessories	$31.00	3	None	10:42:00 PM	Ewallet	6
1295	1296	WALM055	Waxahachie	Fashion accessories	$35.00	1	None	6:24:00 PM	Ewallet	7
1355	1356	WALM055	Waxahachie	Fashion accessories	$81.00	1	None	12:22:00 PM	Ewallet	8
5955	5956	WALM055	Waxahachie	Fashion accessories	$49.00	1	None	3:07:00 PM	Credit card	3
6031	6032	WALM055	Waxahachie	Fashion accessories	$68.00	3	None	8:31:00 PM	Credit card	6
6143	6144	WALM055	Waxahachie	Fashion accessories	$78.00	2	None	7:56:00 PM	Credit card	6
6443	6444	WALM055	Waxahachie	Fashion accessories	$50.00	1	None	6:33:00 PM	Credit card	6
6501	6502	WALM055	Waxahachie	Fashion accessories	$71.00	3	None	3:38:00 PM	Credit card	4

6.1.14 Filter Dataset By Category and Branch



6.1.15 Log out Page

CHAPTER 7: TESTING

7.1 TESTING PLAN/STRATEGY

A test plan is a systematic approach to testing a system such as a machine or software.

Depending on the product and the responsibility of the organization to which the test plan applies, a test plan may include one or more of the following:

1. **Unit Testing :** Each module of the Intelligent Sales Analytics Dashboard was tested independently to ensure that functions such as data fetching, processing, and visualization work correctly.
2. **Data Validation Testing -** Since data accuracy is critical, test cases were designed to check for missing values, incorrect data types, and inconsistencies in the dataset. Data cleaning steps were validated to ensure that all preprocessing operations, such as handling null values and removing duplicates, were correctly implemented.
3. **Performance Testing -** The dashboard's performance was tested by evaluating data loading speed, query execution time, and visualization rendering. Different dataset sizes were used to check how the system performs under high data volume conditions, ensuring smooth user experience.
4. **User Interface (UI) Testing -** The Stream Lit-based UI was tested for usability, responsiveness, and navigation. Interactive filters, dropdowns, and input fields were checked to ensure smooth functionality and ease of use. User feedback was incorporated to improve UI/UX design.
5. **Integration Testing -** The dashboard was tested as a whole to verify that all components—data sources, backend processing, and visualizations—integrated correctly. Any compatibility issues between different libraries, APIs, and databases were resolved.

7.2 Test Results and Analysis

7.2.1 Test Cases

Test ID	Test Condition	Expected Output	Actual Output	Remark
1	Data is successfully loaded into the dashboard.	Data should be displayed without errors.	✅ Data loads correctly.	Pass
2	Handling of missing or null values in the dataset.	Missing values should be replaced or removed.	✅ Missing values handled.	Pass
3	Filters (Region, Salesperson) work correctly.	Data updates dynamically based on filters.	✅ Filters function properly.	Pass
4	Calculating total sales revenue is accurate.	Correct revenue is displayed.	✅ Matches manual calculations.	Pass
5	Interactive charts update with new data selection.	Charts refresh with selected criteria.	✅ Charts update dynamically.	Pass
6	Dashboard loads within acceptable response time.	Page loads in under 5 seconds.	⚠ Slight delay with large datasets.	Needs Optimization
7	User login authentication (if applicable).	Only authorized users can access.	✅ Access control works.	Pass
8	System handles large dataset without crashing.	No performance issues.	⚠ Minor lag with extremely large data.	Requires Scaling
9	User login authentication (if applicable).	UI should adjust to different screen sizes.	✅ Access control works.	Pass

CHAPTER 8: CONCLUSION AND DISCUSSION

8.1 Overall Analysis of Internship

The Data Analytics Internship at Infolabz IT Services Pvt. Ltd. provided hands-on experience in data collection, preprocessing, analysis, and visualization using industry-standard tools like Python, Power BI, and Streamlit. Interns worked on real- world datasets, gaining insights into sales trends, customer behavior, and performance metrics. The internship emphasized data-driven decision-making, fostering problem- solving skills and analytical thinking. By the end of the program, interns successfully developed an Intelligent Sales Analytics Dashboard, enhancing their technical expertise and business acumen. This experience laid a strong foundation for future careers in data science and business analytics.

8.2 Dates of Continuous Evaluation (CE-I and CE-II)

CE-1: 30/03/2025

CE-2: 15/04/2025

8.3 Problem Encountered and Possible Solutions

During the Data Analytics Internship, several challenges were encountered, including data inconsistencies, missing values, and integration issues while collecting sales data from multiple sources. To address these, data cleaning techniques such as handling null values, removing duplicates, and standardizing formats were applied.

Another major challenge was optimizing dashboard performance due to large datasets, which was resolved by data aggregation, caching, and query optimization. Additionally, ensuring user-friendly dashboard navigation required iterative UI/UX improvements based on feedback. By implementing best practices in data processing, visualization, and software optimization, these issues were effectively managed, ensuring a seamless analytical experience.

8.4 Summary of Internship

The Data Analytics Internship at Infolabz IT Services Pvt. Ltd. provided a comprehensive learning experience in data processing, analysis, and visualization. Interns gained hands-on experience in working with real-world sales data, implementing interactive dashboards, and generating data-driven insights to support business decisions. The project focused on identifying trends, key performance indicators (KPIs), and sales forecasting, utilizing tools like Python, Power BI, and Streamlit. Despite challenges such as data inconsistencies and performance optimization, the internship successfully enhanced problem-solving, analytical, and technical skills, preparing interns for future roles in data science and business analytics.

8.5 Limitation and Future Enhancement

Limitations:

- **Scalability Constraints:** Handling large datasets in real-time posed performance challenges.
- **Data Quality Issues:** Inconsistencies and missing values in sales data required extensive cleaning.

  Limited Predictive Capabilities: Basic sales forecasting was implemented but lacked advanced AI-driven insights.
- **User Experience Improvements:** The dashboard UI could be further optimized for better accessibility.

Future Enhancement:

- **AI-Powered Predictions:** Implement machine learning models for more accurate sales forecasting.
- **Real-Time Data Integration:** Improve dashboard responsiveness with live data updates.
- **Advanced Analytics Features:** Include customer segmentation, sentiment analysis, and anomaly detection.
- **Cloud Deployment:** Host the dashboard on cloud platforms for better scalability and accessibility.

REFERENCES:

1. https://www.kaggle.com/
2. https://pandas.pydata.org/
3. https://matplotlib.org/
4. https://chatgpt.com/
5. https://www.jetbrains.com/pycharm/
6. https://learn.microsoft.com/en-us/power-bi/
7. https://docs.streamlit.io/