

# **E-Commerce Sales Analytics System**

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**Abstract:** *The rapid growth of e-commerce platforms has generated large amounts of sales data, making manual analysis inefficient and time consuming. The SalesIQ Analytics Platform is a web-based dashboard designed to analyse and visualize sales performance using interactive charts and real-time analytics. The System allows users to upload CSV sales datasets and automatically generate insights, related to revenue, order, products and forecasting trends. The platform integrates modern visualization tools to transform raw transactional data into meaningful business intelligence. By providing graphical insights and performance indicators, SalesIQ supports data-driven decision-making for business managers and analysts. The project demonstrates how analytics dashboards can improve operational efficiency and strategic planning in e-commerce environments.*

**Keywords:** E-Commerce, SalesIQ Analytics Platform, CSV sales datasets, Interactive Dashboards

## **I. INTRODUCTION**

In the digital era, e-commerce businesses rely heavily on data to understand market performance and customer preferences. Every transaction produces valuable information such as revenue, order quantity, customer activity, and product demand. Despite having large datasets, many businesses fail to use this information effectively due to lack of analytical tools. The SalesIQ dashboard is designed as a simple and interactive solution for analysing e-commerce sales data. Instead of manually working with spreadsheets, users can upload their dataset and instantly view graphical insights. The system focuses on improving data understanding through visualization techniques such as charts and performance indicators. It provides a clear overview of business performance and helps users monitor growth trends, customer behaviour, and product success. The project highlights the importance of Management Information Systems (MIS) in transforming raw data into useful business knowledge .

## **II. PROBLEM STATEMENT**

E-commerce organizations face several challenges while managing sales data:

- Large datasets are difficult to analyse manually.
- Spreadsheet analysis consumes time and effort.
- Business managers cannot easily identify trends or performance issues.
- Lack of visualization makes decision-making slower.
- Non-technical users struggle to interpret raw data.

Therefore, there is a need for a system that can automatically analyse sales data and present insights in a simple and understandable format.

## **III. LITERATURE REVIEW**

Various research studies have been conducted in this domain. Many researchers have developed systems that use data visualization and analytics to improve business decision-making.



**1. J. Smith et al. (2019) – E-Commerce Sales Analytics Using Data Visualization**

This study focuses on the use of data visualization techniques to analyse e-commerce sales performance. The system converts transactional data into graphical dashboards that help businesses understand revenue trends and customer behaviour. The research shows that visualization tools improve decision-making by presenting complex datasets in a simplified format. However, the system mainly focuses on visualization and lacks automated data uploading features for dynamic analysis.

**2. R. Kumar and P. Sharma (2020) – Business Intelligence Dashboard for Retail Analysis**

This research presents a business intelligence dashboard designed for retail organizations to monitor sales and inventory performance. The system uses analytical tools to generate performance indicators and summary reports. The study highlights that dashboards reduce manual reporting work and improve operational efficiency. However, the proposed solution requires technical expertise, making it less accessible for non-technical users.

**3. L. Chen et al. (2021) – Interactive Data Analytics Platforms for Decision Support**

The paper introduces an interactive analytics platform that supports decision-making through real-time data visualization. The system allows users to explore datasets using charts and graphical interfaces. The study concludes that interactive dashboards help managers quickly identify patterns and trends. However, the system does not include forecasting capabilities for predicting future sales performance.

**4. M. Patel and S. Desai (2022) – Sales Forecasting Using Analytical Dashboards**

This research discusses the integration of forecasting techniques into analytics dashboards for predicting sales growth. The system analyses historical sales data to generate future projections. The results show improved planning and resource management for businesses. Despite its advantages, the system depends heavily on complex backend processing, increasing implementation cost.

#### **IV. PROPOSED SYSTEM**

The proposed system, SalesIQ, is designed as a web-based analytics dashboard that enables users to analyse e-commerce sales data efficiently through visualization and automated processing. The system follows a modular architecture and provides an interactive interface for transforming raw datasets into meaningful business insights.

##### **4.1 Frontend Layer:**

User Interface The frontend layer acts as the client-side interface through which users interact with the system. It is developed using HTML, CSS, and JavaScript to create a responsive and user-friendly dashboard. The interface allows users to upload datasets, view analytics, and navigate between different dashboard modules. Interactive components and dynamic updates improve user experience by displaying results instantly after data processing. The design focuses on clarity and ease of understanding through visual elements such as charts and summary cards.

##### **4.2 Data Processing Layer**

The data processing layer is responsible for reading and interpreting uploaded CSV files. The system utilizes a CSV parsing library to extract structured information such as revenue, orders, product categories, and customer details. Once the data is uploaded, the system performs pre-processing operations including data validation, aggregation, and calculation of performance metrics. This automated processing eliminates manual analysis and ensures accurate results.

##### **4.3 Visualization and Analytics Module**

The visualization module converts processed data into graphical representations using charting libraries. Various charts such as bar graphs, line charts, and pie charts are generated to display sales trends, product performance, and customer insights. Key Performance Indicators (KPIs) such as total revenue, number of orders, and growth trends are calculated and displayed on the dashboard. These visual analytics help users quickly understand business performance and identify patterns.

##### **4.4 System Workflow and Data Logic**

The system follows a structured workflow to ensure efficient processing of data:

- Data Upload: The user uploads a CSV dataset through the dashboard interface.



- Data Parsing: The system reads and organizes the uploaded data.
- Processing: Metrics and analytical values are calculated automatically.
- Visualization: Charts and performance indicators are generated.
- Display: Results are updated dynamically on the dashboard.

#### 4.5 Technology Stack

The system is implemented using modern web technologies:

- HTML & CSS – Interface design and layout
- JavaScript – Application logic and dynamic interaction
- Chart.js – Data visualization and graphical analytics



Fig. 1. System Workflow

## V. WORKING METHODOLOGY

The working of the E-Commerce Sales Analytics System is based on the automated processing of sales data and visualization of meaningful insights through an interactive dashboard. The system begins with the user uploading a CSV file containing e-commerce sales data such as revenue, orders, product categories, and customer details.

Once the dataset is uploaded, the system uses a CSV parsing library to read and extract the data in a structured format. The extracted data is then sent to the processing module, where it undergoes validation and cleaning to ensure accuracy. After this, the system performs calculations such as total revenue, number of orders, and product-wise performance.

The processed data is then analysed to generate key performance indicators (KPIs) and identify trends in sales, customer behavior, and product demand. These calculated metrics help in understanding business performance effectively.

After analysis, the system sends the processed data to the visualization module. Here, different types of charts such as bar graphs, line charts, and pie charts are generated using charting libraries. These visual representations make it easier for users to interpret complex data quickly.

The dashboard interface then dynamically displays all the results, including charts and summary indicators. Users can interact with the dashboard to explore different aspects of the data without needing technical knowledge.

This entire process is automatic and repeats every time a new dataset is uploaded. As a result, the system reduces manual effort, improves accuracy, and helps users make faster and better data-driven decisions.



### **Algorithm**

1. Start the system
2. Initialize all components (frontend, data parser, visualization engine)
3. Load the CSV dataset uploaded by the user
4. Parse and validate the data fields (revenue, orders, products, customers)
5. If data is valid: Perform metric calculations and aggregations
6. Else: Display error message and prompt re-upload
7. Generate KPIs and chart data
8. Render charts and summary cards on the dashboard
9. Repeat the process for each new dataset upload

### **VI. ADVANTAGES**

- **Reduces Manual Analysis:** The system automatically processes large datasets, eliminating the need for manual calculations and spreadsheet work.
- **Saves Time:** Instant data processing and visualization allow users to quickly understand sales performance without delay.
- **Improves Decision Making:** Provides clear insights and trends that help managers take faster and better business decisions.
- **User-Friendly Interface:** The dashboard is simple and easy to use, even for non-technical users.
- **Data Visualization:** Converts complex sales data into charts and graphs, making it easy to understand.
- **Accurate Results:** Automated processing reduces human errors and ensures reliable analysis.
- **Handles Large Data Efficiently:** Can process and analyse large volumes of e-commerce data quickly.
- **Supports Business Growth:** Helps identify trends, customer behavior, and product performance for better planning.

### **VII. LIMITATIONS**

- **Dependent on Data Quality:** The accuracy of results depends on the correctness of the uploaded CSV data. Incorrect or incomplete data may lead to wrong insights.
- **Limited to CSV Files:** The system only supports CSV file uploads and cannot directly connect to live databases or other file formats.
- **No Real-Time Integration:** It does not fetch real-time data from e-commerce platforms, so analysis is limited to uploaded datasets.
- **Basic Forecasting Capabilities:** Advanced prediction techniques like machine learning are not included in the current system.
- **Requires Internet and Browser:** Being a web-based system, it needs a browser environment and may not work offline efficiently.
- **Limited Advanced Analytics:** The system mainly focuses on visualization and basic analysis, lacking deep analytical features.
- **Scalability Issues:** Handling extremely large datasets may affect performance and speed.
- **No User Authentication:** The system does not include login or security features for user data protection

### **VIII. APPLICATIONS**

- **E-Commerce Businesses:** Helps online stores analyse sales data, revenue, and customer behavior for better decision-making.
- **Business Management:** Assists managers in monitoring performance and identifying trends to improve strategies.
- **Sales Analysis:** Used to track product performance, order trends, and overall sales growth.
- **Marketing Analysis:** Helps in understanding customer preferences and planning effective marketing campaigns.
- **Retail Industry:** Can be used by retail businesses to analyse product demand and inventory performance.
- **Data-Driven Decision Making:** Supports organizations in making informed decisions based on analytical insights.
- **Educational Purpose:** Useful for students and researchers to understand data analytics and MIS concepts.
- **Small and Medium Enterprises (SMEs):** Helps small businesses analyse their data without needing complex tools.



**IX. TESTING AND RESULTS**

The SalesIQ Analytics Platform was tested to evaluate its performance, usability, and accuracy in analysing e-commerce sales datasets. The testing process focused on verifying whether the system correctly processes uploaded data and generates meaningful analytical insights through visualization.

The application was tested using multiple CSV datasets containing sales information such as revenue, order quantity, product category, and customer details. Different test cases were performed to ensure that the system functions properly under various conditions, including valid data uploads, incorrect file formats, and large datasets.



Fig. 2. Dashboard

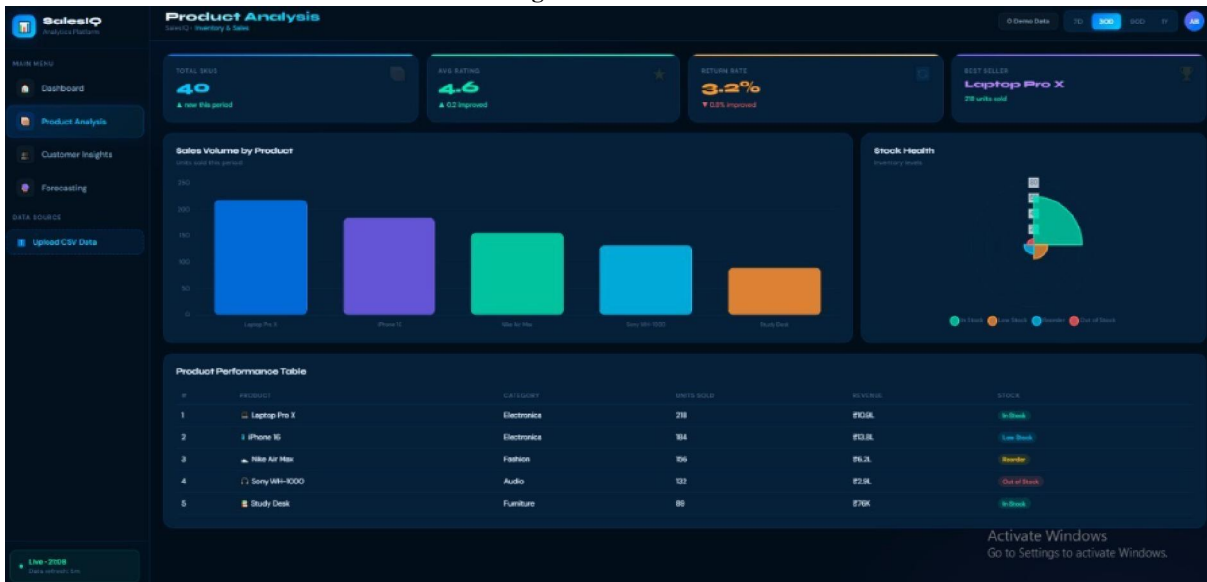


Fig. 2. Product Analysis



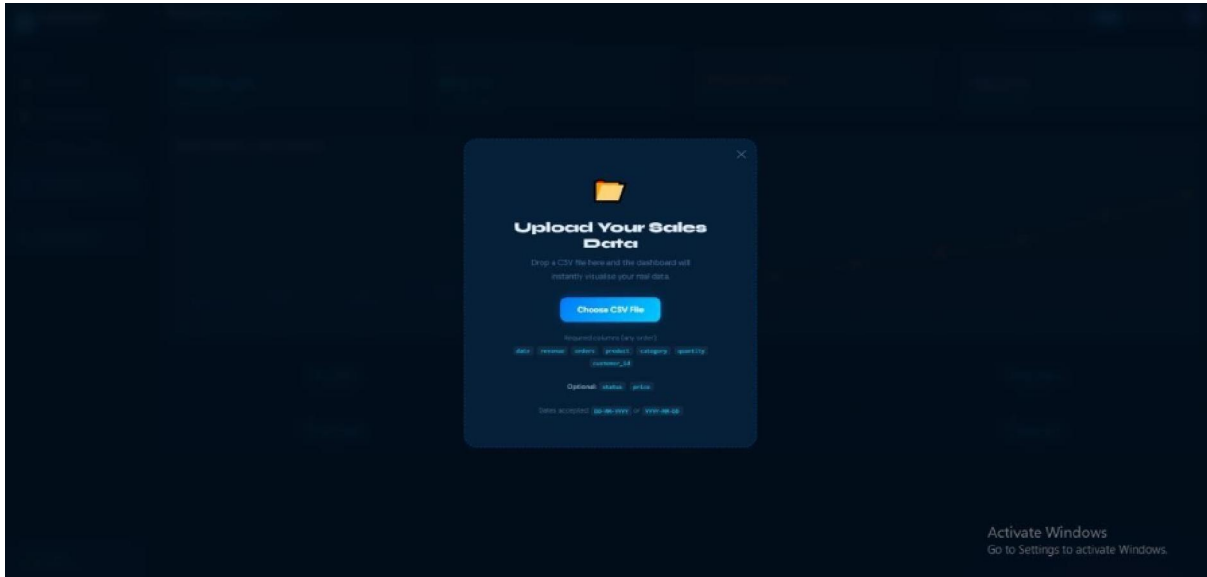


Fig. 3. Customer Insights



Fig. 4. Forecasting





**Fig. 5. CSV Data**

## X. CONCLUSION

The E-Commerce Sales Analytics case study highlights the importance of Management Information Systems in converting raw sales data into meaningful business insights. The proposed system helps analyze customer behavior, product performance, and sales trends to support better managerial decision-making. By using data analytics and visualization tools, the system improves reporting accuracy and reduces manual effort. The results show that analytics-based MIS enables faster and more informed strategic planning [1]. It also enhances operational efficiency and minimizes errors in data handling.

Overall, the study demonstrates how integrating analytics with MIS improves business performance and supports data-driven growth in the e-commerce sector. Future enhancements may include advanced predictive analytics and automation for smarter decision support [8].

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