

Customer Behaviour Analysis

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Abstract—

Customer Behaviour Analysis is a smart web-based analytical system designed to monitor customer activities, purchasing patterns, and business trends. The system provides centralized dashboards, customer segmentation, data visualization, feedback analysis, and reporting features to help organizations understand customer preferences effectively. The proposed system uses React.js, Node.js, MongoDB, and modern visualization techniques to generate business insights and improve decision-making. The platform reduces manual work, improves transparency, and supports future AI-based recommendation systems for better customer engagement.

Keywords— Customer Behaviour Analysis, Business Intelligence, Data Analytics, Visualization Dashboard, Customer Segmentation, Web Application.

I. INTRODUCTION

Customer behaviour analysis plays an important role in understanding consumer interests, purchasing behaviour, and market trends. Modern organizations depend heavily on analytical systems to improve customer satisfaction and business performance. Traditional systems often lack proper analytical dashboards and centralized monitoring facilities, creating challenges in customer understanding and decision-making. The proposed Customer Behaviour Analysis system integrates visualization dashboards, feedback analysis, customer tracking, and reporting into a single web-based platform. The system helps businesses monitor customer interactions, identify buying patterns, and improve operational transparency through centralized analytics.

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II. EXISTING SYSTEM CHALLENGES

Existing customer management systems face several limitations such as manual record handling, poor visualization, delayed reporting, and lack of customer segmentation. Organizations often depend on spreadsheets and static reports that fail to provide real-time customer insights. Communication between customers and businesses also becomes inefficient due to the absence of centralized feedback systems. The lack of proper analytics reduces business intelligence and affects strategic decision-making. These limitations create the need for a modern analytical system that supports automated reporting and centralized customer management.

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III. PROPOSED SYSTEM

The proposed Customer Behaviour Analysis platform provides customer tracking, purchase analysis, report generation, recommendation systems, and centralized administration. The frontend is developed using React.js and Tailwind CSS, while Node.js and MongoDB are used for backend and database management. The system collects customer activities, processes behavioural data, and generates analytical reports through graphical dashboards. Customers can submit reviews and feedback, while analysts and administrators monitor trends and generate reports for business intelligence.

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IV. METHODOLOGY

The project follows Agile software development methodology. The system was developed in multiple modules including customer analysis, dashboard visualization, report generation, feedback management, and recommendation systems. Requirement analysis was performed to identify business needs and customer analysis challenges. REST APIs were developed for communication between frontend and backend modules. MongoDB was used for storing customer records, transactions, and behavioural analytics. Continuous testing and iterative development helped improve the system reliability and user experience.

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V. SYSTEM DESIGN AND IMPLEMENTATION

The system architecture follows a client-server model. The frontend communicates with backend APIs to fetch customer insights and reports dynamically. MongoDB stores customer records, transactions, and feedback details. Visualization dashboards display customer trends, purchase frequency, product demand, and behavioural analytics through charts and graphs. The admin dashboard acts as the centralized control panel for monitoring customer activities, reports, and recommendations. The modular structure improves scalability and maintainability of the application.

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VI. RESULTS AND DISCUSSION

The implementation results demonstrate improved customer understanding, faster report generation, and better business intelligence compared to traditional manual systems. The analytics dashboard successfully displayed customer trends and behavioural patterns through interactive charts and reports. The centralized platform reduced paperwork and simplified customer data management. Testing showed that the system maintained stable performance while processing customer records and generating analytical reports.

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VII. FUTURE ENHANCEMENTS

Future improvements may include AI-based recommendation systems, machine learning for predictive analytics, real-time customer behaviour prediction, and mobile application integration. The system can also be integrated with e-commerce platforms and cloud-based business intelligence tools for advanced customer analytics.

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VIII. CONCLUSION

The Customer Behaviour Analysis system provides an efficient and centralized solution for understanding customer preferences, purchasing patterns, and market trends. The integration of dashboards, reporting systems, customer segmentation, and feedback analysis improves business intelligence and decision-making. The proposed platform reduces manual work, improves operational transparency,

and offers a scalable solution for modern customer analytics and business management.

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IX. PERFORMANCE ANALYSIS

The performance of the Customer Behaviour Analysis system was evaluated based on response time, dashboard rendering, customer data processing, and report generation. The frontend interface remained responsive during continuous customer activity analysis. The backend APIs processed customer transactions and generated reports efficiently. MongoDB supported quick retrieval and storage of customer records, which improved overall system performance. The testing results demonstrated stable communication between frontend, backend, and database modules under multiple analytical operations.

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X. ADVANTAGES OF THE SYSTEM

The Customer Behaviour Analysis system provides several advantages over traditional manual customer management systems. The platform improves customer understanding through analytical dashboards and graphical reports. It reduces paperwork, improves transparency, and supports centralized management of customer data. Businesses can identify trends, analyze customer interests, and improve decision-making through data visualization and reporting features. The system also improves communication through feedback and review management facilities.

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XI. APPLICATIONS

The Customer Behaviour Analysis platform can be used in multiple business sectors including e-commerce, healthcare, banking, retail, education, and service industries. Retail organizations can use the system to monitor product demand and purchasing patterns. E-commerce companies can use behavioural insights for recommendation systems and targeted marketing. Banking institutions can analyze customer transaction behaviour, while healthcare organizations can monitor patient feedback and service quality. The flexibility of the system makes it suitable for modern business intelligence applications.

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