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New Age E-Commerce Platform with AI Chatbot Assistant

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Abstract: *The fast growth of online shopping has changed how people buy things, so there's a big need for smarter and more engaging e-commerce websites.*

This project introduces "New Age E-Commerce with AI Chatbot Assistant," a smart web app that uses an AI chatbot to make shopping easier and more enjoyable. The chatbot acts as a digital helper, helps users find products quickly, get personalized suggestions, and answer questions right away, just like talking to a real person. Using advanced AI tools like large language models, the system makes it easier to find products, solves common problems found in traditional online stores, and keeps customers interested with fast support. The chatbot is always available, day or night, so users can get help anytime, no matter where they are or what time it is.

In addition to improving customer service, the platform helps businesses work more efficiently by handling basic questions automatically and giving useful information about customers' behavior and choices.

This helps improve the shopping experience and increase the number of customers who make purchases. The platform is built to work well with many devices, making it easy for users to shop anytime and anywhere, meeting modern needs for smooth and tailored online shopping. The platform is scalable, user-friendly, and accessible across multiple devices, ensuring a seamless shopping experience for modern users. Overall, this project shows a major step forward in the digital change of retail, connecting technology with friendly, human-like service..

Keywords: AI Chatbot, Conversational AI, Digital Commerce, E-Commerce Platform, Personalized Recommendations, User Engagement, Virtual Sales Assistant

I. INTRODUCTION

Online shopping's rapid expansion has significantly altered how consumers search, consider, and purchase goods. With the convenience of buying at any time and from any location, online stores have emerged as important means for businesses to engage with a large number of consumers. However, consumers today demand more intelligent, interesting, and customer-focused websites that offer prompt, individualized assistance. Due to their poor customer service and lack of strong interaction features, many traditional online retailers fall short of these requirements.

Using AI in e-commerce has become a significant change to address this. In particular, AI chatbots are gaining popularity as helpful virtual assistants that enhance consumer connection by providing real-time, conversational support. These chatbots improve the shopping experience by making it easier for customers to identify products, providing recommendations based on their preferences and past behaviour, and swiftly resolving issues. AI chatbots operate around the clock, offering continuous and scalable support, in contrast to traditional customer care, which is constrained by staff and time.

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The goal of this project, "New Age E-Commerce Webapp with AI Chatbot Assistant," is to develop an intelligent e-commerce website with a sophisticated AI chatbot. The chatbot's ability to comprehend user inquiries and deliver precise, pertinent responses is made possible by the usage of contemporary AI tools like natural language processing and large language models. The chatbot streamlines and expedites the purchasing experience by responding to frequently asked consumer inquiries and assisting users in exploring product possibilities.

In order to satisfy the diverse needs of today's online buyers, the system is made to be user-friendly, safe, and compatible with a variety of platforms and devices. By eliminating the need for manual support, using an AI chatbot not only increases customer satisfaction but also boosts business efficiency. This clever integration gives the company an advantage in the rapidly evolving e-commerce industry and helps retain clients. The research is motivated by the growing demand for intelligent conversational interfaces capable of delivering personalized shopping experiences.

By concentrating on the AI chatbot's function in assisting clients, locating goods, and resolving issues, this project provides a cutting-edge solution that satisfies client demands and current technological trends. In conclusion, the "New Age E-Commerce Webapp with AI Chatbot Assistant" demonstrates how conversational AI may transform e-commerce. It makes it easier for businesses to operate while giving customers a seamless, interesting, and customized experience.

Enhancing E-Commerce Accessibility with AI-Powered Chatbots

Aditi M. Jain investigates how AI-powered chatbots can be used to improve accessibility in e-commerce platforms. The study highlights the barriers faced by users with disabilities, such as difficulty in interpreting visual content like product images and videos, and the lack of structured, textual descriptions. Jain proposes integrating AI chatbots with accessibility tools to provide context-aware, conversational support during the shopping process. The chatbot can verbally describe product features, navigation options, and policy information in simple language, thereby reducing cognitive and physical load for users. The work demonstrates that AI chatbots can not only enhance inclusiveness but also help e-commerce businesses comply with accessibility standards such as WCAG and ADA-like guidelines. This study supports the idea that an AI-driven interface can make e-commerce platforms more user-friendly and accessible to a wider population.

The Application of Chatbot for Customer Service in E-Commerce

Billy Wibowo et al. explore the role of chatbots in replacing or augmenting traditional customer service channels in e-commerce. The authors explain that chatbots, powered by natural language processing (NLP), can simultaneously handle multiple user queries, significantly reducing response time and improving service availability. The paper analyses performance metrics such as query resolution time, customer satisfaction scores, and escalation rates to human agents, showing that chatbots can successfully manage a large share of routine inquiries. The study also highlights generational differences in chatbot adoption, noting that younger users, particularly millennials, show higher acceptance and preference for chatbot-based support due to its instant, digital, and non-intrusive nature. These findings establish a strong theoretical baseline for integrating chatbots into e-commerce platforms, emphasizing their potential to improve efficiency, scalability, and perceived service quality.

Web-Based E-Commerce System Integrated with Chatbot

Another notable contribution is a project that introduces a web-based e-commerce system integrated with an embedded chatbot to simplify customer interactions. The research focuses on millennials and Generation Z users, who increasingly prefer conversational interfaces over traditional forms and menus. The authors identify key social and experiential factors—such as perceived convenience, social interaction, and perceived usefulness—that influence chatbot acceptance in e-commerce. The system is implemented using modern web technologies such as Python and the Flask framework, which provide a secure and scalable backend architecture. While the project includes payment processing and order management, the primary emphasis is on enhancing discoverability and support through the

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chatbot; users can ask natural-language questions about products, offers, and order status directly within the interface. The results indicate that integrating a chatbot improves task completion time, reduces navigation effort, and increases overall user satisfaction. This work serves as a practical reference for building AI-augmented e-commerce platforms oriented toward younger, tech-savvy users.

AI Chatbots in E-Commerce: Transforming Customer Experience and Service Efficiency

Recent studies by Siddiqui and others highlight how AI chatbots are transforming customer experience and service efficiency in e-commerce. These works emphasize that chatbots can provide 24×7 support, personalize product suggestions, and guide users through complex workflows such as returns and refunds. The research demonstrates that AI-powered assistants improve interactivity, information richness, and perceived responsiveness, which are critical factors in customer retention and conversion rates. Moreover, systematic literature reviews show that chatbots in e-commerce primarily enhance personalization, automation of routine tasks, and real-time engagement, making them a strategic component of modern digital marketplaces.

Conversational AI and Hybrid Architectures in E-Commerce

Several recent projects propose hybrid architectures that combine rule-based logic with transformer-based language models to build robust chatbots for e-commerce. In these systems, simple queries are handled by predefined rules and templates, while complex or open-ended questions are processed by large language models fine-tuned on domain-specific data. The use of retrieval-augmented generation (RAG) is also explored, where the chatbot first retrieves relevant product or order information from the backend before generating a response. This approach reduces hallucination and improves factual accuracy. These studies collectively show that embedding an AI chatbot into a web-based e-commerce application is a viable and scalable way to enhance user experience while maintaining reliability and alignment with business rules.

III. METHODOLOGY

In order to create and assess a cutting-edge e-commerce web application that is integrated with an AI chatbot helper, this project uses a system-design and experimental methodology. From requirement modelling to architectural definition, behavioural modelling, and performance evaluation, the theoretical framework proceeds in an organized manner.

To determine the system's functional and non-functional demands, a requirement analysis step is first carried out. User registration and authentication, product catalogue management, order tracking, cart and checkout procedures, and conversational customer service are examples of functional needs. Measurable attributes including reaction time, scalability, usability, dependability, and security that act as benchmarks throughout implementation and assessment are referred to as non-functional requirements.

Second, the system is thought of as a multi-tiered information system with layers for data storage, AI processing, application logic, and user interaction. Each component of the architecture exposes well defined interfaces and has the freedom to change on its own thanks to the application of service-oriented and modular design concepts. Contractual specifications are used to codify API-based communication across layers, guaranteeing loose coupling and encapsulation.

Third, formal structures from dialog-management theory and natural language processing are used to model the AI chatbot's behaviour. Within a state-transition architecture, the chatbot is regarded as a conversational agent that carries out intent categorization, entity recognition, dialog-state tracking, and response production.

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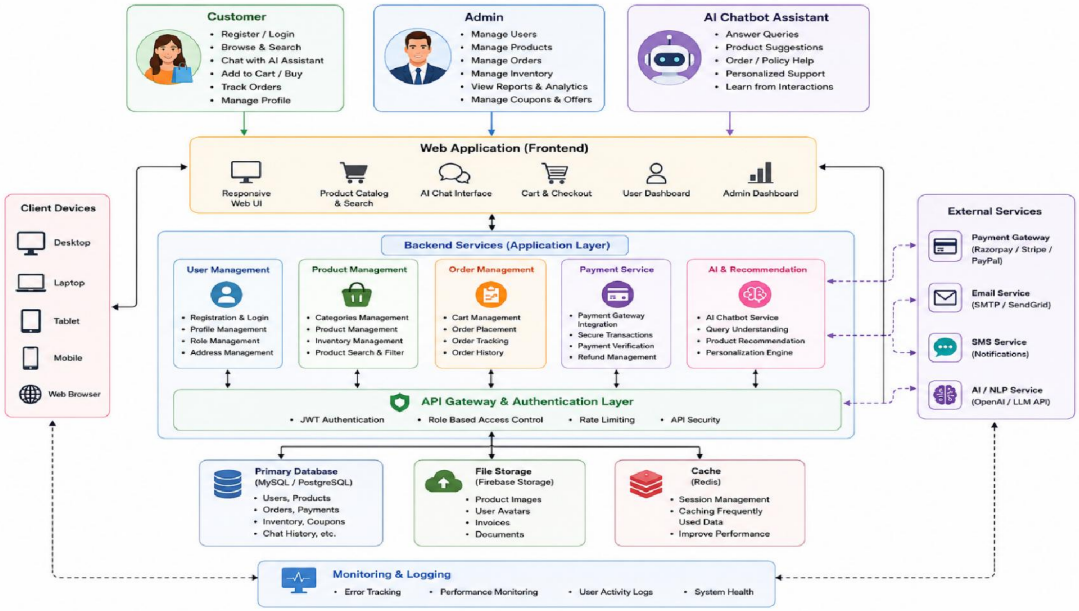

Figure: System Architecture

System Architecture

The proposed e-commerce system features a microservices architecture supported by an AI and knowledge layer. This design ensures scalability, modularity, and straightforward maintenance. Each service is responsible for a specific function and communicates with others through well-defined interfaces. The backend services handle business logic, data storage, chatbot capabilities, and connections to external services, while the frontend acts as the user's gateway.

1. Frontend Layer

The client layer is designed as a React application that acts as the interface for users. It enables users to explore products, handle their shopping carts, submit orders, check wishlists, and engage with the chatbot The frontend communicates with backend services using secure HTTP/HTTPS protocols Feign Clients streamline inter-service communication.. This layer is tasked with delivering a dynamic and engaging shopping experience.

2. Gateway and Discovery Layer

Requests originating from the frontend go through the Gateway & Discovery Layer, which comprises Spring Cloud Gateway, Service Discovery, Load Balancer, and Circuit Breaker. This layer serves as a primary routing hub that channels user requests to the appropriate microservice. Service discovery enables the system to dynamically identify available services, while load balancing ensures efficient distribution of traffic. The circuit breaker enhances fault tolerance by stopping failures in one service from impacting the entire system.

3. Microservices Layer

The application's primary business operations are divided into distinct microservices:

Registration, login, authentication, and profile data are all handled by User Service. It stores user-related data in MongoDB.

Product Service manages search, filtering, categories, and product details. MySQL serves as its database. Cart Service uses PostgreSQL to handle cart items, changes, and transient shopping activity.

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Order Service handles order placement, order tracking, and order history. It has a MySQL connection.
Wishlist Service keeps user-saved items for later use. PostgreSQL is used.
Chatbot Service is in charge of intelligent support, natural language questions, and conversational assistance. MySQL is also used for structured chatbot-related data.

4. Communication between Services

Feign Clients between microservices are depicted in the diagram, indicating that services interact with one another via internal API calls. For instance, the Chatbot Service may communicate with other services to respond to customer inquiries, while the Order Service may contact the Product Service to confirm product details. By enabling remote calls to look as local method calls, Feign Clients simplify communication between microservices by enabling declarative REST API calls.

5. Knowledge Layer and AI

The system's intelligent core is the AI & Knowledge Layer. There are two main parts to it:
Conversational answers are generated using the Ollama LLM (Phi3 Model).
Semantic embeddings are stored and searched for pertinent information by the Embedding Service When a user asks a question, the chatbot can forward it to the Ollama LLM for language comprehension and response production. The system uses the embedding service to conduct vector search for knowledge-based queries in order to locate information that is semantically comparable. This facilitates a retrieval-augmented generation style process, in which the chatbot generates accurate responses by combining language creation with retrieved knowledge.

6. Layer of External Services

Additionally, the system supports business activities by integrating with outside services:
Razor pay uses REST APIs to process payments.
Notifications including order confirmations, registration emails, and updates are sent using Gmail SMTP. These services increase the e-commerce platform's capability without needing the system to create email or payment infrastructure from the ground up.
Throughout the entire process, the user communicates with the React frontend, which submits requests to the gateway. Requests are routed to the relevant microservice by the gateway. When a chatbot is involved, the Chatbot Service communicates with the AI & Knowledge Layer in order to produce answers or obtain pertinent information. The system connects to Gmail SMTP for alerts and Razor pay for payment during order placing and checkout. As a result, a comprehensive, intelligent e-commerce ecosystem is created.

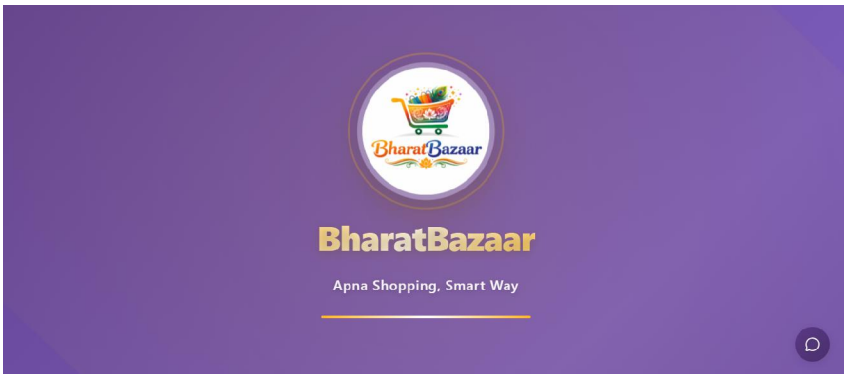

Figure 1: Launch Page

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Experience the future of online shopping with our AI-powered eCommerce platform smarter recommendations, instant assistance, and a seamless shopping journey all in one place.

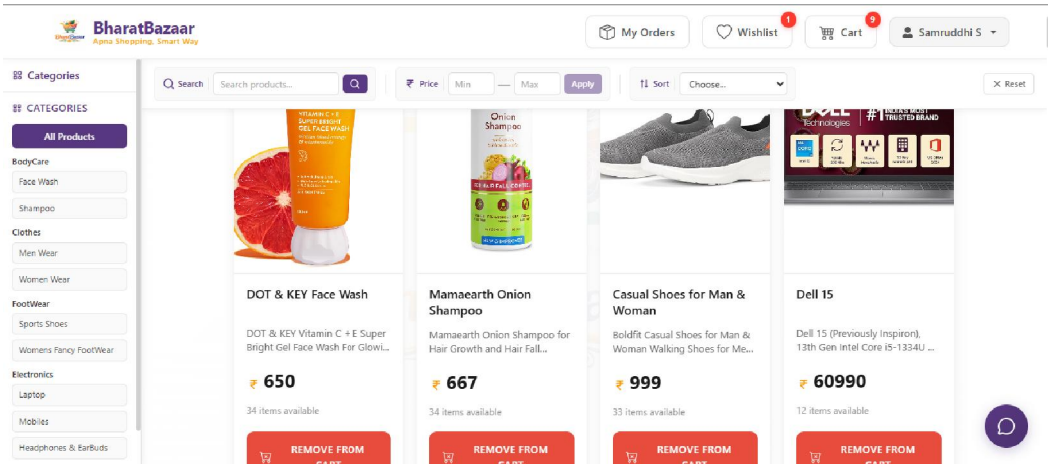

Figure 2: Product Browsing Interface

Browse Products

After signing in, the user views products available on the website. Product browsing is part of the normal shopping flow before cart and checkout

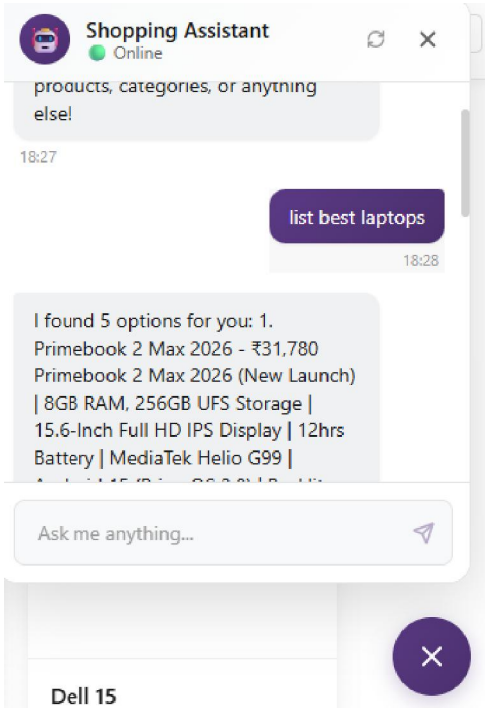

Figure 3: AI Chatbot Assistant

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Chatbot service gives instant replies to customer questions.
It works 24/7 on websites, apps, and messaging platforms.
It helps solve problems quickly and improves customer support.

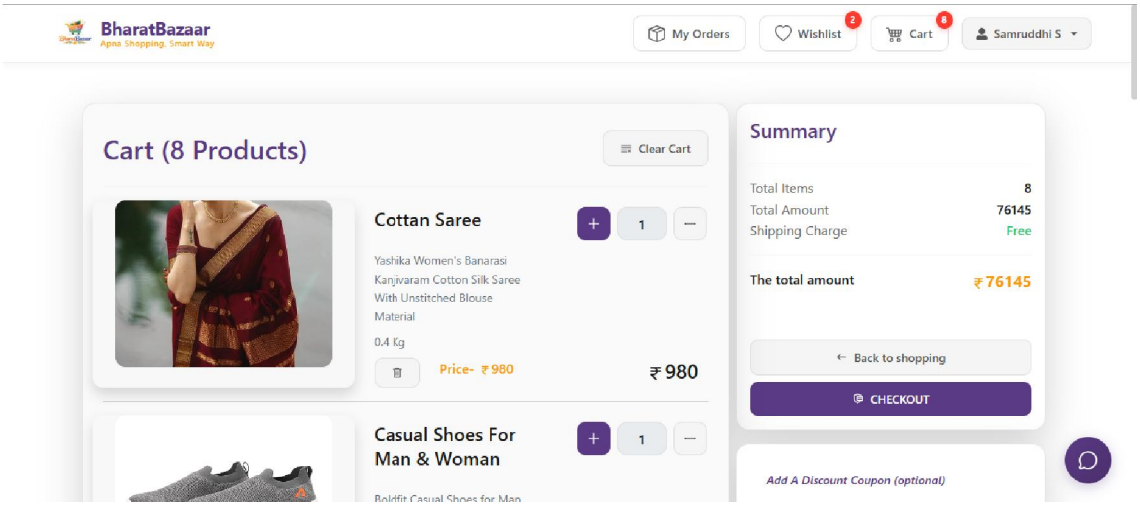

Figure 4: Shopping Cart Page

Shopping Cart

The user reviews cart items, quantity, price, and total amount before checkout.

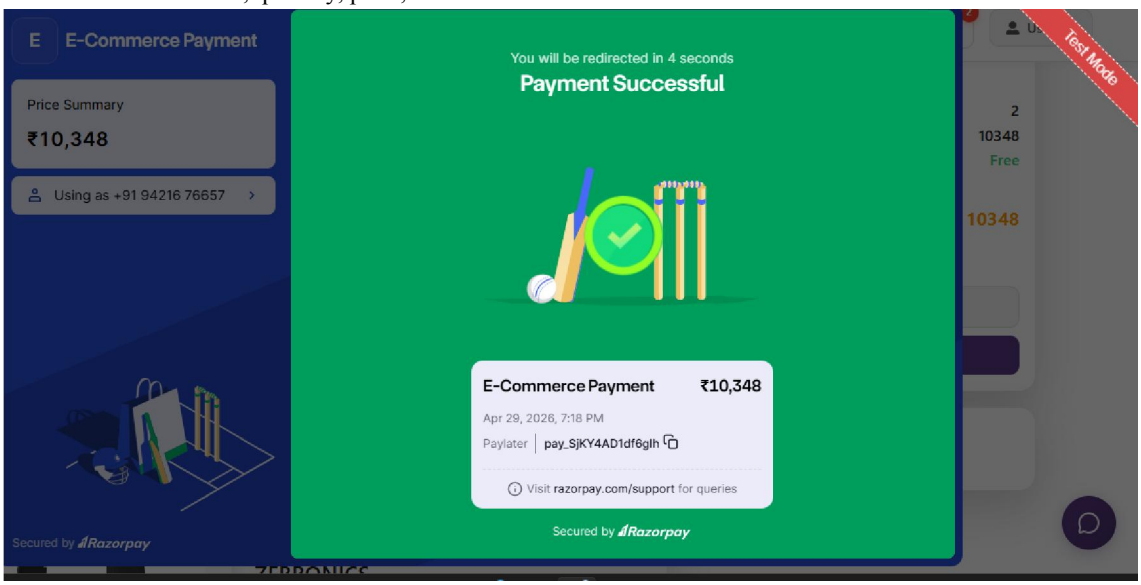

Figure 5: Payment Gateway Integration

Payment Gateway

Payment gateway in test mode allows safe payment testing without real money.
It helps developers check transactions, errors, and integration setup.
It is useful for project development before going live.

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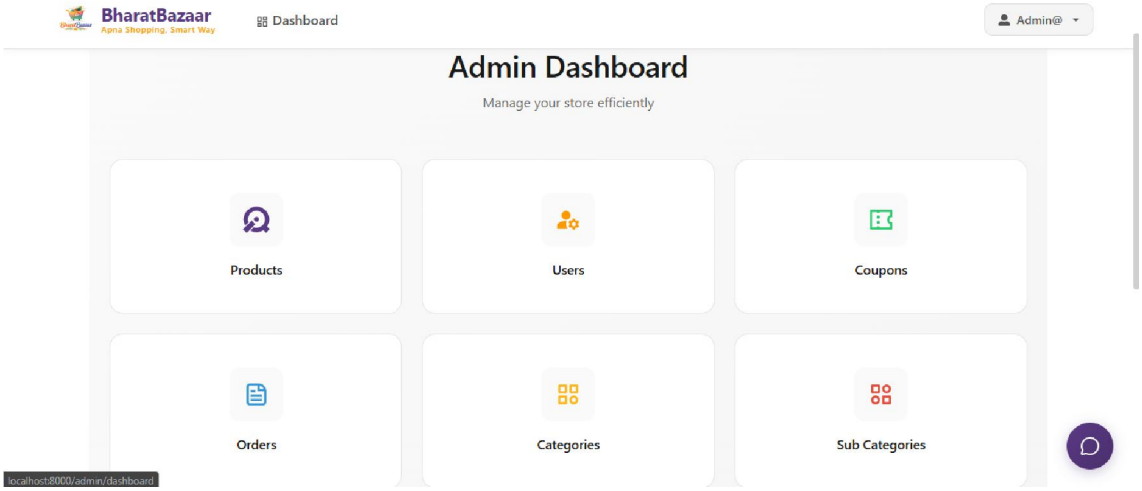

Figure 6: Admin Dashboard

Admin Login & Dashboard

The admin logs in with dedicated credentials to access the centralized dashboard displaying total products, users, orders, sales analytics, and pending activities for complete store management.

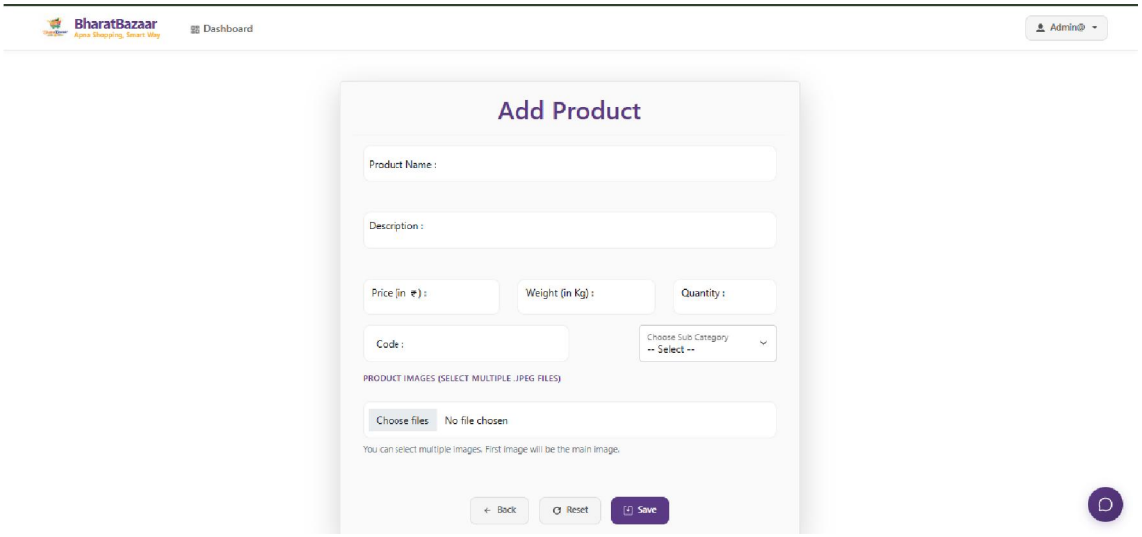

Figure 7: Add Product Module

Add Product

Add and manage products easily with detailed information, pricing, images, and inventory updates.

IV. CONCLUSION

This study shows that an AI chatbot helper can greatly improve the entire buying experience when integrated into an e-commerce web platform. The frontend, backend microservices, AI knowledge layer, and external services collaborate to enable intelligent, conversational, and effective user engagement in the suggested system's structured and scalable design. From a research standpoint, this strategy demonstrates how conversational AI might advance beyond basic customer service and become a crucial component of the e-commerce process.

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The paper also emphasizes how a microservices-based design can enhance scalability, maintainability, and modularity. The system is made easier to expand and administer by dividing essential features like user administration, product handling, cart operations, order processing, Wishlist management, and chatbot support into separate services. The system's capacity to provide context-aware and pertinent responses is further strengthened by the addition of an AI and knowledge layer, which is backed by retrieval-based search and language production.

The premise that AI-driven e-commerce systems can enhance usability, lessen the effort required for navigation, and automate a significant percentage of common consumer inquiries is supported by this work in terms of research contribution. Additionally, it demonstrates that, in contrast to solely generative chatbots, mixing language models with organized backend data can increase reliability. Future research may concentrate on more sophisticated conversational intelligence, better personalization, and enhanced recommendation systems because the system is still unable to handle extremely complicated or unclear user requests.

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