

Intelligent Multi Lingual AI Product Search Engine Chatbot

M Sasikala¹, S S Dharshan², K R Aakash³, R G Kobilesh Kannan⁴

M Dinesh Kumar⁵,

¹Assistant Professor, Department of Computer Science and Engineering, K.L.N. College of Engineering

^{2,3,4,5} Final Year Students, Department of Computer Science and Engineering, K.L.N. College of Engineering

Abstract - The AI chatbot-based search engine is designed to simplify online shopping through a smart, interactive platform. Developed using React, it ensures smooth and intuitive user interaction. At its core, the system leverages Natural Language Processing (NLP) to accurately understand and process user queries in natural language, supporting multiple languages for wider reach. It connects to major e-commerce platforms like Amazon, eBay, and Walmart to fetch real-time pricing and product availability, helping users compare options and make informed decisions. Users are provided with clickable links to complete purchases directly on those platforms. Future upgrades will introduce machine learning for personalized recommendations and voice recognition features to enhance usability and accessibility.

Key Words: AI Chatbot , Natural Language processing, Real-time product data, E-commerce integration, Smart shopping assistant, Feature Engineering, Clickable purchase links, Multilingual support.

1. INTRODUCTION

Artificial Intelligence (AI) is revolutionizing contemporary computing by empowering machines to learn from data, adapt to changing environments, and perform tasks that typically demand human intelligence. This project presents the Intelligent Shopping Assistant, a system powered by machine learning techniques that enhances the retail experience through smart recommendations and predictive insights. By analyzing user behavior, preferences, and product data, the assistant offers personalized suggestions to support efficient and informed purchasing decisions. This AI-driven assistant aims to bridge the gap between consumers and the vast digital marketplace by simplifying decision-making and improving satisfaction. Future enhancements may include integrating natural language processing for conversational interactions, deep learning for more nuanced recommendations, and expanding to multi-

platform support, further aligning with the evolving landscape of intelligent digital services.

2. OBJECTIVE

The search for products using natural, conversational language. This eliminates the need for complex navigation or traditional keyword-based search methods. The platform aims to provide accurate, real-time product comparisons and personalized recommendations through machine learning algorithms, adapting to individual user preferences over time. Furthermore, with multilingual support and a voice-enabled interface, the system promotes greater inclusivity and ease of use, catering to a diverse, global user base. Ultimately, the project seeks to create a smart, scalable shopping assistant that evolves with emerging technologies and consumer needs. The primary objective of this project is to design and implement an AI-powered chatbot-based search engine that enhances the online shopping experience by making it more intuitive, efficient, and accessible. By integrating advanced technologies such as Natural Language Processing (NLP), React, and real-time data fetching, the system allows users to

3. LITERATURE SURVEY

3.1. Chatbots in E-Commerce and User Interaction Enhancement:

Traditional e-commerce search methods rely heavily on keyword matching, which often results in irrelevant or incomplete product listings, especially when user queries are vague or unstructured. To overcome these limitations, chatbot-based systems have been adopted to streamline the shopping experience through natural language interaction. These AI-driven tools simulate human conversation to guide users effectively in product discovery. By integrating pattern matching techniques and rule-based scripting languages like Rivescript, chatbots can interpret user intent and deliver

context-aware responses without relying on complex NLP models. Additionally, real-time integration with databases such as MySQL through backend systems like PHP ensures dynamic and up-to-date recommendations. Studies have shown that chatbots not only simplify the search process but also reduce customer service load, enhance engagement, and improve satisfaction by offering a more conversational and personalized shopping journey.

3.2. Personalized Recommendations and Data Adaptability:

Delivering tailored product recommendations is a core component of modern e-commerce platforms. Machine learning techniques, even in lightweight implementations, play a key role in analyzing user preferences and generating relevant suggestions. The chatbot's ability to ask follow-up questions about brand, budget, or features increases the precision of search results and enriches the customer experience. Importantly, these systems are designed to adapt automatically to changes in product data, ensuring the information delivered to users is always current without requiring manual updates to predefined responses. Literature highlights the value of such adaptability in maintaining accuracy and relevance in dynamic environments like online retail. Furthermore, the integration of chatbot systems into user interfaces promotes real-time responsiveness, allowing e-commerce platforms to provide scalable, efficient, and intelligent product search solutions that evolve with both consumer behavior and inventory changes.

4. EXISTING SYSTEM

The existing chatbot system integrated within the e-commerce website enhances product discovery through a conversational interface, replacing traditional search bars and static category menus. Built using Rivescript, the chatbot leverages a rule-based pattern matching approach, eliminating the need for complex NLP models. It responds to user queries using predefined templates while dynamically retrieving up-to-date product information from a MySQL database through a PHP backend.

This system addresses the limitations of conventional keyword-based searches by enabling users to interact in natural language and receive personalized recommendations. For example, when a user inquires about a smartphone, the chatbot prompts follow-up

questions regarding brand preference and budget, refining its suggestions accordingly. The embedded chat window offers real-time assistance and directs users to relevant product pages, reducing browsing time and improving purchase efficiency.

By combining rule-based scripting with live database integration, the chatbot ensures consistent accuracy and relevance in its responses. It adapts automatically to changes in inventory without requiring manual updates, enhancing scalability and long-term usability. The system significantly improves user experience by minimizing search friction and fostering engagement through intuitive, guided interactions. Future improvements may involve voice support, multilingual capabilities, and integration with machine learning algorithms for even more adaptive recommendations.

5. PROPOSED SYSTEM

The proposed AI-based chatbot search engine aims to revolutionize online shopping by delivering an interactive and intelligent platform that simplifies product discovery. Developed using React for a responsive front-end and integrated with Natural Language Processing (NLP) capabilities, the system enables users to engage in natural conversations to find products, eliminating the need for conventional keyword filters or category-based navigation. This intuitive approach not only enhances accessibility but also ensures that users of varied technical backgrounds can effortlessly locate items tailored to their needs.

The chatbot supports multi-language inputs and real-time data fetching from prominent e-commerce platforms, including Amazon, eBay, and Walmart. By comparing product details such as pricing and availability across these platforms, the assistant provides users with the most accurate and competitive information. Direct links to product pages streamline the purchase process, offering a seamless transition from inquiry to checkout.

To refine personalization, upcoming developments will incorporate machine learning algorithms that analyze user interactions and preferences to generate more accurate recommendations. The system is designed for continuous improvement, learning from user behavior to adapt its responses and enhance the quality of search results over time.

Future upgrades will integrate voice recognition, enabling hands-free interaction for enhanced convenience and inclusivity—especially beneficial for users with disabilities or those seeking on-the-go

functionality. Enhanced conversational AI will also be employed to better interpret context and manage complex queries. Integration with smart home assistants is planned to allow voice-activated shopping through devices like Alexa or Google Assistant. These advancements will position the chatbot as a cutting-edge solution in digital commerce, setting new standards for intelligent, efficient, and user-friendly shopping experiences.

6. ARCHITECTURE DIAGRAM

The architecture illustrated in Figure 6.1 represents an intelligent and automated system designed to enhance the online shopping experience by enabling efficient product search and comparison. This system combines natural language processing (NLP), data retrieval techniques, filtering algorithms, and a response generation mechanism to provide users with accurate, real-time product recommendations.

When a user submits a query, such as "best headphones under ₹2000," the system first processes this input using advanced NLP techniques. These techniques include tokenization, part-of-speech tagging, named entity recognition (NER), and intent detection. This step helps the system break down the query into understandable components, identify key entities like product type, brand, and price range, and determine what the user is specifically looking for. The aim is to transform an unstructured query into a structured format that the system can work with efficiently. Once the query is refined, it undergoes enrichment by incorporating synonyms, related terms, and inferred preferences. This step ensures broader coverage during data retrieval and enhances the relevance of results. For example, a query for "cheap smartphones" might also include terms like "budget smartphones" or "affordable phones."

The structured and enriched query is then passed to the data retrieval module, which fetches product data from multiple e-commerce platforms. This is achieved through two primary methods: using APIs offered by the platforms or deploying web scraping techniques when APIs are unavailable. The system collects comprehensive product information including names, descriptions, prices, availability, ratings, seller details, and specifications. After data collection, a filtering mechanism is applied to eliminate irrelevant or duplicate entries and rank the most suitable products. Decision tree-based classification helps categorize products based on user-defined preferences, while ranking algorithms score products on criteria like relevance, price, and

popularity. The goal is to present a curated list of the best-matching products in a logical order.

Finally, the system generates a well-structured response containing ranked product listings, key features, and direct purchase links. This output is displayed through a user-friendly interface, allowing users to easily compare options and make informed decisions. The AI-driven design ensures that recommendations are accurate, relevant, and reflective of the latest data across platforms, ultimately offering a seamless and intelligent product search experience.

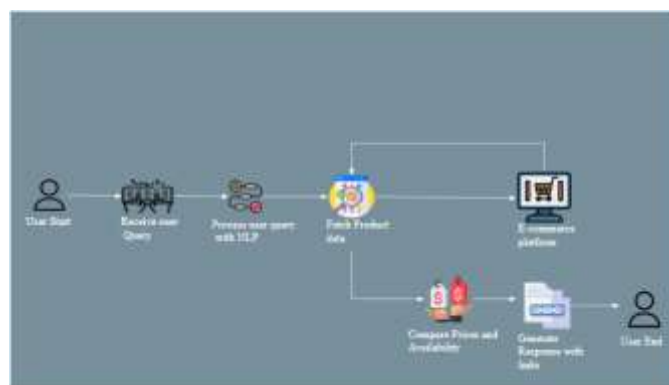


Figure 6.1: Architecture Diagram

7. RESULT



Figure 7.1 User Interface

The Figure 7.1 represents the user interface of an "Intelligent Product Search AI" system. It allows users to search for products using either Tamil or English. The interface features a chatbot-style input box for users to type queries. It supports multilingual and smart product search functionality. The design is clean and user-friendly, encouraging interactive product searches.

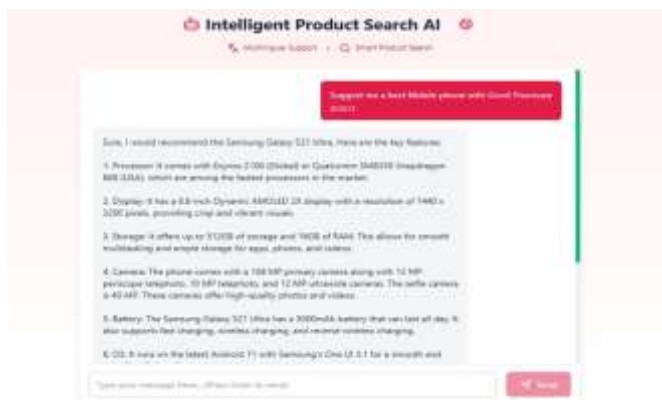


Figure 7.2 : Product Description

The **Figure 7.2** represents the system that recommends the best mobile phone based on user input. When a user types a query like “Suggest me a best Mobile phone with Good Processor”, the AI assistant analyzes the request and provides a detailed recommendation. In this case, it suggests the Samsung Galaxy S21 Ultra, listing key features such as processor type, display quality, storage capacity, camera specifications, battery life, and OS version. The interface is designed to provide an intelligent format.

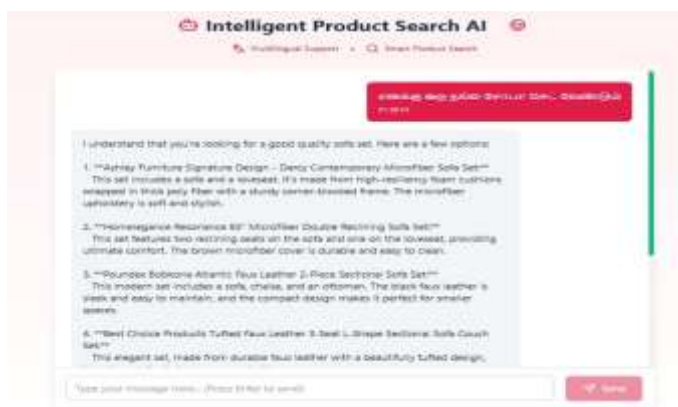


Figure 7. 3 Multilingual query search

The **Figure 7. 3** represents that when a user enters a request in Tamil, such as "எனக்கு ஒரு நல்ல சோஃபா செட் வேண்டும்" (meaning "I want a good sofa set"), the system intelligently interprets the query and provides a list of suitable sofa set options. It displays detailed product recommendations including design, material, and features for each item. This shows the system's multilingual support capabilities and how it delivers personalized suggestions in a conversational format.



Figure 7.4 Smart Redirection to E-Commerce Listings

The **Figure 7.4** represents that after receiving a query for a good sofa set in Tamil, the system not only provides text-based recommendations but also displays real-time results from Amazon. The search results page shows multiple sofa set options, including price, brand, customer ratings, and product variations. This integration demonstrates the AI's ability to fetch accurate, multilingual product results from third-party sources, enhancing user convenience and decision-making.

8. FUTURE ENHANCEMENT

To enhance the AI chatbot-based search engine, one potential area of improvement is expanding its ability to understand and process more complex queries. By incorporating deeper machine learning models, the chatbot could handle multi-step or context-driven queries more effectively, improving its overall accuracy and responsiveness.

This would enable users to ask more detailed and nuanced questions, such as requesting specific product features or comparing multiple items at once, without having to break their inquiries into simpler segments. Improving the system's comprehension of context would create a more intuitive and sophisticated user experience, offering users the ability to ask questions in a more natural, conversational manner. Additionally, integrating augmented reality (AR) technology could be a groundbreaking enhancement. This feature would allow users to visualize products in their real-world environment before making a purchase. For example, customers could view how a piece of furniture would look in their living room or how a gadget fits into their workspace by using their smartphone camera. By adding AR capabilities, the chatbot could provide an interactive and immersive shopping experience, helping users make more informed purchasing decisions. This enhancement

would bridge the gap between online shopping and physical retail experiences, offering a unique and innovative way to engage with products.

9. CONCLUSION

The AI chatbot-based search engine integrates several advanced technologies to create a seamless and efficient shopping experience for users. Built using React, the system offers an interactive and user-friendly interface, enabling users to easily communicate with the assistant. The chatbot employs Natural Language Processing (NLP) to interpret and process queries in natural language, allowing users to search for products by simply typing their requests. This feature ensures that users can interact with the chatbot in a conversational way, making the process feel intuitive and easy. Additionally, it supports multiple languages, making it accessible to a wider audience across different regions and backgrounds, and ensuring that language barriers do not hinder the user experience.

The system pulls real-time product data from major e-commerce platforms like Amazon, eBay, and Walmart, ensuring the accuracy of product prices, availability, and other key details. By comparing prices across these platforms, the chatbot provides the most up-to-date and relevant information, enabling users to make informed purchasing decisions.

The assistant doesn't just fetch data; it intelligently evaluates and filters through the results to present the best options available. Moreover, it generates clickable links that direct users to the specific product pages on these platforms, allowing them to finalize their purchases with ease. This integration of multiple technologies enhances the overall user experience, streamlining the shopping process and making it more efficient and convenient for online shoppers.

REFERENCES

- [1]. A. R. Asadi and R. Hemadi, "Design and implementation of a chatbot for e-commerce," *Information Communication Technology and Doing Business*, pp. 1–10, 2018.
- [2]. B.A.Abu Shawar, "A corpus based approach to generalising a chatbot system," Ph. D, University of Leeds, Leeds UK, 2005.

- [3]. D.A.Ferrucci, "Introduction to 'this is watson'" *IBM Journal of Research and Development*, vol. 56, no. 3.4, pp. 1–15, 2012.
- [4]. D. Carlander Reuterfelt, A. Carrera, C. A. Iglesias, O. Araque, J. F. Sánchez Rada and S. Muñoz, "JAICOB: A Data Science Chatbot," in *IEEE Access*, vol. 8, pp., 2020
- [5]. E. H. Wu, C. Lin, Y. Ou, C. Liu, W. Wang and C. Chao, "Advantages and Constraints of a Hybrid Model K-12 E-LearningAssistant Chatbot," in *IEEE Access*, vol. 8, pp., 2020.
- [6]. G. Daniel, J. Cabot, L. Deruelle and M. Derrass, "Xatkit: A Multimodal Low-Code Chatbot Development Framework," in *IEEEAccess*, vol. 8, pp., 2020.
- [7]. H. Chung, M. Iorga, J. Voas, and S. Lee, "Alexa, can i trust you?" *Computer*, vol. 50, no. 9, pp. 100–104, 2017
- [8]. H. Joshi, V. Agarwal, A. Ghodke, D. Gupta, and S. Gaikwad, "Proposal of chat based automated system for online shopping," *American Journal of Neural Networks and Applications*, vol. 3, no. 1, pp. 1–4, 2017.
- [9]. J. Ni, X. Zhao and L. Zhu, "A Semantic Web Service-Oriented Model for E-Commerce," 2007 *International Conference on ServiceSystems and Service Management*, 2007.
- [10]. Lei Cui, Shaohan Huang, Furu Wei, Chuanqi Tan, Chaoqun Duan, and Ming Zhou "SuperAgent: A Customer Service Chatbot for E-commerce Websites", *Association for Computational Linguistics*, 2017.