

## Ecommerce Chatbots

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### ABSTRACT

An ecommerce chatbot is a tool that uses either pre-programmed rules or artificial intelligence (AI) to interact with customers in real time. It is a digital solution driven by AI that online retailers may implement on their websites and social applications to interact with customers at every stage of the buying process. A chatbot is a perfect tool because it does not require training and can assist with sales and customer care. Ecommerce chatbots help online retailers and brands provide instant support, answer questions, recommend products, and guide customers to complete a purchase. This chatbot's capabilities are ideal for driving sales, managing pipeline activities, and providing personalized communication. This paper analyzes the impact of chatbots on ecommerce.

**KEYWORDS:** chatbots, ecommerce, automation.

### INTRODUCTION

Ecommerce is now something we use every day and it never sleeps. In the rapidly evolving world of ecommerce, chatbots have emerged as a crucial tool for businesses to enhance customer experience and improve their online presence. Chatbots have gained popularity in ecommerce because they bring benefits for both shoppers and online store owners. An ecommerce chatbot is virtual assistant that simulate contact with a person and responds to customer needs, enhancing customer experience and promoting engagement. It is an automated software application that simulates conversations with users and manages basic tasks in online retail environments. It has gone from being a trend and a luxury to a real advantage.

Chatbots are primarily communication interfaces. Their core function is conversational. They often serve as the initial interaction between ecommerce stores and their customers. They are typically designed to answer frequently asked questions (FAQs). They also provide real-time support for customer queries and give product recommendations [1].

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### CONCEPT OF CHATBOTS

Chatbots are also known as conversational agents, interactive agents, virtual agents, virtual humans, or virtual assistants. Chatbots, as part of AI devices, are computer programs designed to carry on a dialogue with users using natural languages. Healthcare has become an attractive market for chatbot applications. The main purpose of healthcare chatbots is to help patients in less time and for less money than it would take to visit a medical professional. Healthcare chatbots have great potential, but they still have a long way to go to win over consumers.

The first chatbot (Eliza) was developed in 1966 by Joseph Weizenbaum for psychiatric patients. Since then, Chatbots have gained popularity in all the domains such as banking, e-commerce, healthcare, education, and smart homes [2]. A chatbot describes a computer system or the situation in which human is chatting with the robot (computer).

Chatbots may be regarded as mimic systems which imitate the conversations between two individuals. They employ different degrees of human-like appearance and behavior, such as facial expressions, compassion, humor, and tone of voice. Thus,

chatbots are computer programs with a conversational user interface capable of emulating natural, conversational interpersonal exchange. Fueled by artificial intelligence (AI), chatbots are becoming a viable option for human-machine interaction.

Chatbots can be integrated into various messaging platforms, websites or mobile apps to interact with customers and prospects in real time. For example, healthcare chatbot can diagnose the disease and provide basic details about the disease before consulting a doctor. It is designed to reduce the healthcare costs and improve accessibility to medical knowledge. Healthcare chatbots depend on natural language processing (NLP) that helps users to submit their health problem [3]. Figure 1 illustrates a chatbot based on three key structures in AI [5].

There are essentially two types of chatbots: (1) Fixed chatbots: These are programs with fixed information and hence offer limited help; (2) AI-based: These chatbots thrive on dynamic learning and constantly update themselves using various customer interactions. An AI-based chatbot has three domains: databases, natural language processing (NLP), and machine learning (ML). Mostly chatbots are some kind of computer programs that use natural language processing (NLP) for interpreting the user input and generating the corresponding response. In other words, NLP helps users to submit their problem about the health. The aim of the system is to replicate a person's discussion. Chatbots interact with users using natural languages. Chatbot may ask a review of symptoms and relevant information such as past medical or surgical history. It provides response by use of an efficient Graphical User Interface (GUI). The GUI is an artificial creation invented to enable interactions between human and computers. The chatbot system helps users to freely submit their complaints and queries regarding health by voice since customer satisfaction is the major concern for developing this system [4,5].

One may also regard a chatbot as a software system that allows you to simulate real conversations between devices and users by means of a conversational interface [6]. Chatbots use three types of conversation styles [7]: static, semi-automated, and fully-automated conversation dialogue. The static conversation style is rule-based and it is easy to build. Automated refers to the generative-based model, which uses deep learning models to build interaction. This is very complex and requires a lot of training data. The semi-automated automates some parts while the rest is handled by a human. Figure 2 shows that a chatbot is designed to answers questions with proper answers [8], while

Figure 3 provides some examples of what chatbots can do [9].

## ECOMMERCE CHATBOTS

Employing legions of customer service agents to communicate with every buyer drains businesses resources. In the past decade, ecommerce merchants and ecommerce platform providers have realized that chatbots could compensate for the lack of personal assistance in online shopping. An ecommerce chatbot is a tool capable of simulating human chats to automatically interact with customers within an online store. It is a utility designed to simulate human conversation, often powered by artificial intelligence or pre-programmed rules. These chatbots interact with customers on ecommerce websites or messaging platforms, assisting them with tasks such as finding products, answering questions, guiding through the checkout process, or even handling post-purchase support. They are designed to improve customer engagement by offering automated support. Their ease of integration and no-code setup make it a popular choice for businesses looking to get started with chatbots quickly. Figure 4 shows a representation of ecommerce chatbot [10].

Internet shopping is one of the numerous companies affected by artificial intelligence. The rapid advancement of artificial intelligence (AI) has significantly transformed the ecommerce sector, particularly through the integration of AI-powered chatbots. AI chatbots are now a necessary tool to optimize customer satisfaction, automate processes, and drive returns. The primary goal is to enhance the overall customer experience in addition to automating customer interactions. Chatbots align with the eight foundational features of ecommerce technology: ubiquity, global reach, universal standards, interactivity, information richness, information density, personalization/customization, and social technology [11]. Chatbots predominantly enhance interactivity, information richness, and personalization by employing advanced technologies such as natural language processing (NLP), transfer learning, knowledge graphs, domain ontologies, and prompting strategies.

## TYPES OF ECOMMERCE CHATBOTS

Not all chatbots work the same, nor are they suitable for every type of business or company. As shown in Figure 5 [10], there are two types of ecommerce chatbots: rule-based (or scripted) and AI-powered [10]:

1. *Rule-based chatbots*: These chatbots follow a scripted decision tree to guide users through specific questions and answers. These are the simplest models, as they operate based on

predefined conversation flows. These have a predefined set of replies that are triggered by user queries containing a keyword or key phrase. You can use a simple, script-based chatbot to handle frequently asked questions directed at generic intents, or you can integrate a sophisticated, natural language processing (NLP)-driven ecommerce chatbot into every step of the purchasing process.

2. *AI-based chatbots*: Instead of following a predefined script, artificial intelligence (AI) chatbots understand natural language, interpreting the customer's intent and generating contextually appropriate responses. This kind of chatbot looks for the context behind the user's query and ties it to an intent using machine learning and artificial intelligence. The ecommerce chatbot implements artificial intelligence to understand the context of each conversation, personalize responses, and make decisions based on the end user's behavior.

AI-powered chatbots have become more common due to their flexibility, scalability, and ability to constantly learn and improve. There are also hybrid chatbots, which combine the precision of rule-based buttons with the flexibility of AI-driven understanding. Regardless of the type, chatbots are typically designed as fictional human beings to appear human and minimize the feeling that the user is talking to a machine. Before choosing a chatbot, you need to clearly understand the problem you want to solve. The right chatbot depends on your business size, tech stack, and customer goals.

## APPLICATIONS OF ECOMMERCE CHATBOTS

An ecommerce chatbot is an AI-powered software that simulates a human assistant to engage shoppers throughout their buying journey. With ecommerce chatbots, you will improve lead generation, help customers reach their goals faster, and make your online store more accessible. Chatbots can process payments, provide instant confirmation, and even help with real-time order status tracking. Common applications of ecommerce chatbots include the following [12-14]:

- *Product Recommendations*: Connecting your customers with the right products is the goal of any ecommerce experience, and ecommerce chatbots can help streamline that process. By asking a series of targeted questions, a chatbot can narrow down product options, make personalized recommendations, and guide shoppers on an individualized customer journey that caters to their unique needs. Chatbots can use users' past actions on an ecommerce website to

provide product recommendations. Using this data, your chatbot can suggest follow-up actions and complementary products. In this approach, chatbots can boost revenue by guiding clients to products that fit them well. Ecommerce chatbots can learn from your conversations to tailor your experience to your preferences. Chatbots can offer personalized recommendations based on a customer's browsing and purchase history, enhancing the relevancy of suggestions while also increasing user engagement.

- *Personalized Shopping*: Depending on customer behavior, product recommendations are provided by AI chatbots. Recommendations are offered based on user input, history of browsing, and previous purchases, thereby enhancing the shopping experience. Personalized shopping assistance can significantly boost levels of customer engagement and retention. Personalization capability of chatbots will also be complemented by AI-powered chatbots through adaptive learning.
- *Customer Service*: Most inquiries an online business are always the same. On the one hand, the customer can receive an immediate response, instead of having to wait hours for an email. On the other, the human support team does not waste time with repetitive requests and can focus on cases that require more personalized attention. After checkout, chatbots can support customers with real-time order tracking, delivery notifications, post-purchase FAQs, returns or exchanges.
- *Customer FAQ*: One of the primary uses of ecommerce chatbots is to handle frequently asked questions (FAQs). Instead of having customers wait for a human agent, chatbots provide instant responses to common queries, such as shipping details, return policies, or product availability. Chatbots streamline customer support by answering inquiries about product sizes, return policies, and store locations. For example, if a customer asks, "What's the return window for online purchases?" the chatbot instantly provides the answer, ensuring a smooth and convenient experience.
- *Customer Feedback*: Chatbots are uniquely positioned to collect valuable customer feedback. They can do this through chat surveys, polls, or simple rating systems to gather customers' opinions post-purchase, or even during their shopping journey. Collecting this data enables businesses to uncover insights about clients'

experiences, product satisfaction, and potential areas for improvement.

## BENEFITS

With their advanced capabilities, chatbots offer many benefits to provide valuable assistance and enhance user experiences. Customers can use chatbots to rate their satisfaction with the shopping experience and the chatbot's functionality. Chatbots help customers find the right products, recover abandoned carts, and provide instant answers without waiting for a human agent. Other benefits of ecommerce chatbots include the following [1,12,15,16]:

- *Automation:* Chatbot plays a vital role in enhancing customer service by automating repetitive tasks such as query handling, order tracking, and delivery updates on social media. Chatbots automate mundane conversations, allowing ecommerce companies to handle more customers in parallel, keep overheads low, and maintain consistent communication. As part of digital marketing strategies, chatbots serve as an automated yet interactive tool to enhance customer satisfaction and foster long-term customer loyalty. By providing instant, automated responses, ecommerce chatbots help businesses enhance client engagement, streamline support service, and improve the shopping experience for users. A chatbot may automate the process, but the interaction should still feel human-like. With the right strategy, chatbots move beyond simple automation — they become scalable customer experience tools that strengthen retention, streamline operations, and support long-term growth. By automating routine queries, chatbots reduce overall support costs.
- *Cost Efficiency:* Cost efficiency heavily favors AI chatbots, which can handle thousands of simultaneous conversations without additional staffing costs. By automating routine tasks such as answering common questions, processing orders, and managing simple inquiries, chatbots save businesses time and resources. This allows customer support teams to focus on more complex issues, leading to a more efficient overall operation with lower labor costs.
- *24/7 Support:* 24/7 availability represents a significant advantage for AI chatbots. Ecommerce chatbots provide customer support whenever your shoppers need it. Implementing a chatbot in your online store guarantees 24/7 support, ensuring your customers receive continuous support regardless of the time, day, or geographic location. This translates into increased revenue and less effort for your teams. Chatbots offer
- always-on availability, making them valuable for global ecommerce businesses serving customers across time zones.
- *Convenience:* Customer requests can be fulfilled within 24 hours, even without immediate access to a human representative through phone or live chat widget. The customer's time is also significantly reduced. The average time to respond via live chat is 2 minutes, but it takes 10 hours via social media and 17 hours via email. You can utilize a chatbot whenever you like, eliminating the need to pay for human agents to work overnights. Customers can be guided through sales funnels and automated processes sent through a chatbot.
- *Improved Customer Experience:* There are several ways a brand can leverage chatbots to improve customer experience and drive sales. Customers now want quick answers and a chatbot is always available to provide that. A well-implemented chatbot can improve the user experience, even on a beautifully designed and straightforward website, by helping visitors quickly get the information they need. Most consumers not only require assistance but also anticipate receiving it promptly. Since human help representatives are not always available, a chatbot can fill in and deliver the same quick response. Chatbots can be present throughout the entire sales process, increasing sales and customer satisfaction by driving user engagement and providing helpful support at every stage.
- *Increased Sales:* In general, when you reduce response times and expand the range of support offered to all users, you also increase sales and interactions. You also need human support to represent the company, respond to more complex requests, and resolve issues quickly and effectively. Chatbots can analyze customer data and browsing behavior to offer personalized product recommendations. By suggesting items based on preferences and past purchases, chatbots enhance the shopping experience and encourage customers to make additional purchases, ultimately boosting sales and average order value.
- *Scalability:* Scalability advantages of AI solutions become apparent during peak shopping periods. Black Friday, holiday seasons, and flash sales can overwhelm human support teams, but AI chatbots maintain consistent response times regardless of volume. During peak demand, chatbots can handle thousands of simultaneous conversations without a decrease in the quality of their work.

Figure 6 shows some of the benefits of using ecommerce chatbots [17].

## CHALLENGES

In spite of the numerous benefits of online shopping, ecommerce lacks one key aspect of traditional brick-and-mortar retail - personalized human service. Chatbots are susceptible to security breaches if poorly integrated and are prone to misunderstanding user intent. Handling emotionally charged or sensitive questions is a problem. Chatbot interactions often feel rigid and lack empathy, making them unsuitable for sensitive situations. Other challenges of ecommerce chatbots include the following [1,18]:

- *Privacy Concern:* Chatbots collect customer data, making privacy regulations like GDPR (General Data Protection Regulation) and CCPA (California Consumer Privacy Act) critical. Ensure your chatbot respects user privacy and complies with data protection regulations. The data your chatbot needs to answer your customers' questions requires gathering and analyzing their information, which means your business becomes responsible for the privacy and security of that user data.
- *Data Quality:* Chatbots are only as effective as the information they are built on. Outdated product data, incorrect policies or incomplete APIs can cause the chatbot to deliver wrong or misleading answers. Safe data handling procedures are crucial since chatbots handle and process sensitive user data.
- *Emotional Intelligence:* AI chatbots are generally not capable of understanding and reacting to profound human emotions in the right manner. While they may be able to process sentiment, they will come back with answers that are non-empathetic and sophisticated as human agents. Their inability to understand emotions using emotional intelligence leads to conversations that are robotic and detached. Although sentiment detection is improving, but chatbots still struggle with difficult situations such as complaints, disputes or refunds. They struggle to interpret user intent and emotion, especially with ambiguous input, unlike human agents who can clarify misunderstandings through conversation. Their limited adaptability further reduces social presence, making interactions feel less meaningful. Excessively fast responses can make chatbots feel robotic, lacking sympathy and emotion.
- *Complexity:* Implementation complexity and support options determine how quickly you can

deploy and optimize your chatbot. Advanced chatbots require integration with product catalogs, CRM tools, and other logistics. If done incorrectly, it can lead to broken experiences or inaccurate responses.

- *Trust and transparency:* Some customers remain skeptical of AI-driven responses. Most respondents in one survey said that they would prefer help from a human agent over automated support. And as chatbot capabilities expand, organizations must manage risks around hallucinations, bias, and compliance.
- *Reliability:* Accuracy and reliability are essential in building trust, making it critical for companies to ensure chatbots deliver precise and up-to-date responses. Outdated or incorrect information can frustrate users and reduce satisfaction. To prevent this, regular data updates are essential, ensuring chatbots provide accurate, timely, and relevant information.
- *Integration Compatibility:* Seamless integration into existing business systems is a prerequisite for chatbot success. Poor integration can cause inefficiencies and limited chatbot functionality. A common error is selecting a chatbot that does not seamlessly integrate with your existing ecommerce platform (Shopify, BigCommerce, WooCommerce). This leads to data silos, manual data transfer, and a fragmented customer experience. Always ensure your chosen platform aligns perfectly with your ecommerce ecosystem to prevent this.

## CONCLUSION

An ecommerce chatbot is an AI-powered assistant that helps online shoppers find products, get order updates, and resolve queries instantly. It is a computer program that communicates with customers via an online platform. It serves as the primary point of contact across your website, mobile app, and messaging channels. The ultimate goal of ecommerce chatbots is to stand in as a virtual agent, assisting customers with a variety of online shopping tasks and answering any questions they might have. Ecommerce chatbots can revolutionize the way your customers interact with your brand. When used thoughtfully, ecommerce chatbots can enhance the customer experience and give busy support teams more time to handle complex, empathy-driven conversations.

Ecommerce chatbots play a growing role in customer support, sales automation, and post-purchase engagement. Integrating a chatbot into your online store has several benefits. Chatbots make it simple to

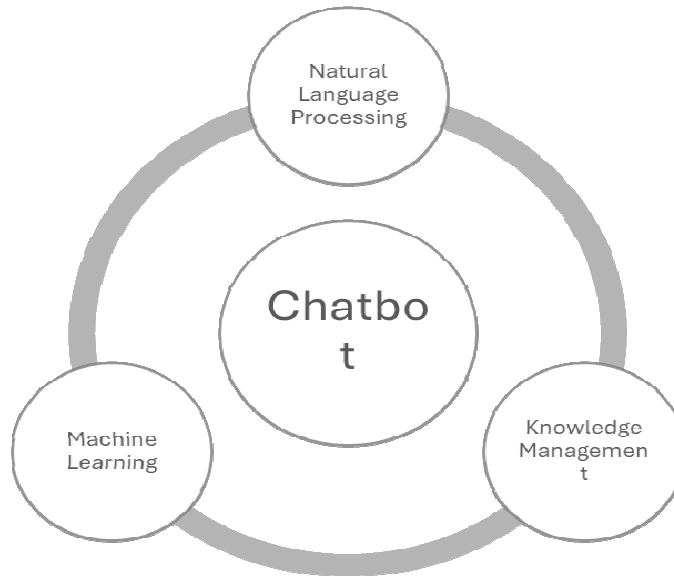
meet the requirements and expectations of modern consumers in the digital age. With recent developments in AI and the evolving ecommerce landscape, the role of chatbots is being reexamined, and online retailers are renewing their approach to incorporating these tools into their online experience. By leveraging the right chatbot technology, businesses can not only meet but exceed customer expectations, creating a competitive edge in an increasingly digital marketplace. More information about chatbots in ecommerce can be found in the books [19-23].

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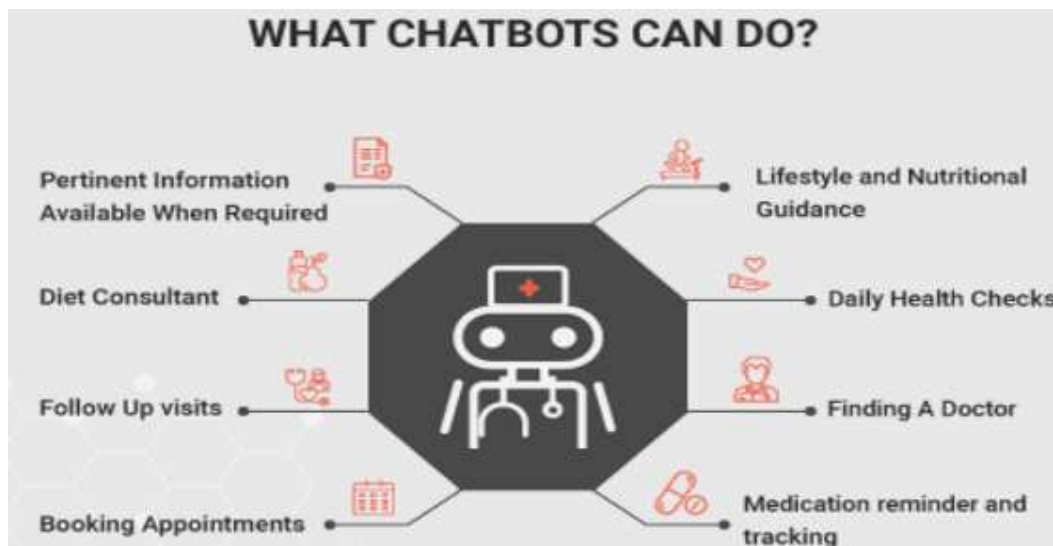
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**Figure 1 A chatbot based on three key structures in AI [5].**



**Figure 2 A chatbot is designed to answers questions with proper answers [8].**



**Figure 3 Typical examples of what chatbots can do [9].**



Figure 4 A representation of ecommerce chatbot [10].

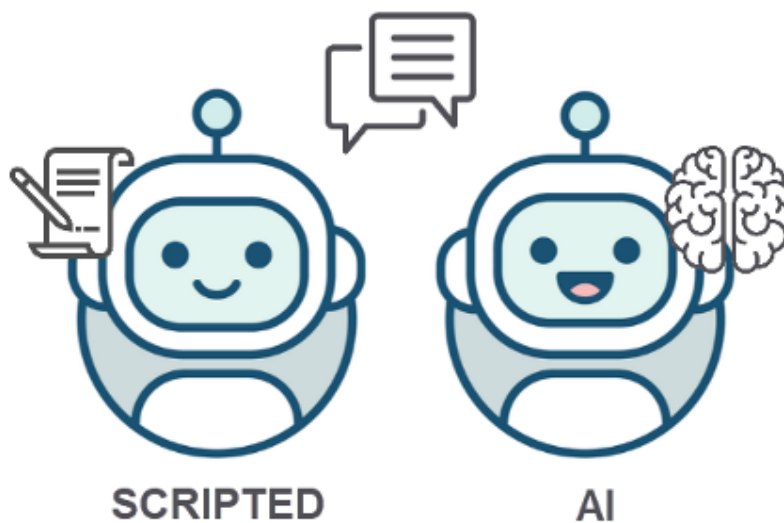


Figure 5 Two types of ecommerce chatbots [10].

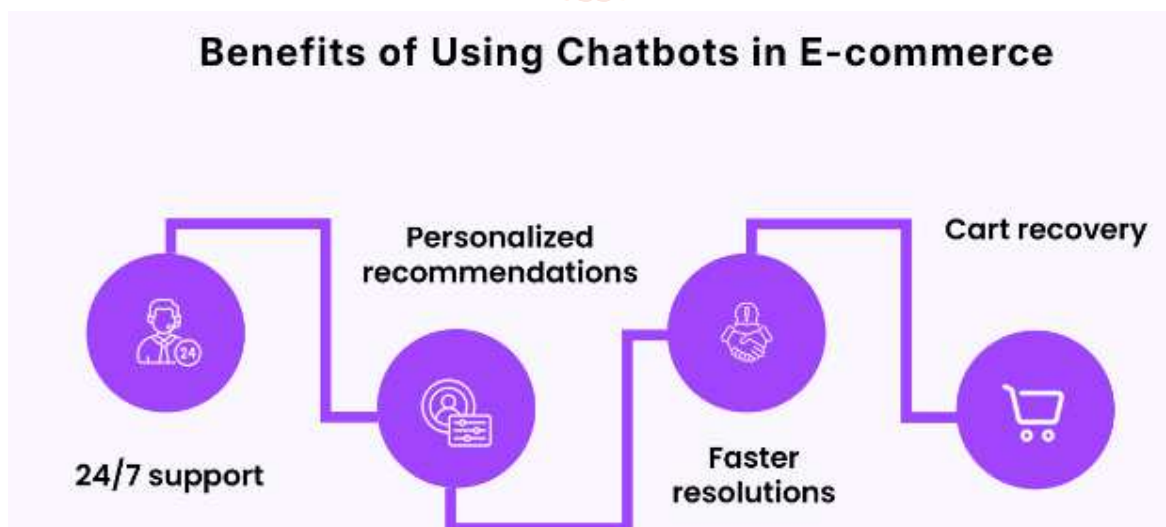


Figure 6 Some benefits of using ecommerce chatbots [17].