

Use of Chatbot in Improving Customer Services in E-commerce

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Abstract — In today's world of e-commerce, customers are looking for efficient, fast, and economical support mechanisms. The present research paper discusses how artificial intelligence chatbots based on natural language processing help improve service experiences. In particular, it is shown that such bots greatly improve customer satisfaction through real-time interaction and can lower median waiting time by about 60% when answering basic queries. However, despite all their benefits, the analysis revealed that chatbots struggle with complicated problem solving and lack emotional intelligence that humans have. It can be stated that although chatbots dramatically change digital interaction, a mixed approach seems to be the best practice.

Keywords: Artificial Intelligence Chatbots; Natural Language Processing (NLP); E-Commerce Customer Support; Customer Satisfaction; Human-Computer Interaction; Intelligent Virtual Assistants;

I. INTRODUCTION

Consumer and business interactions in the current economy have undergone radical changes through the use of various technologies. E-commerce is one such technology whose growth is being impeded significantly due to its numerous challenges, especially that of ensuring that companies provide excellent customer services at affordable costs. Today's customers expect instant and personalized services all day long, something which cannot be achieved using conventional communication media such as telephone calls and emails because of inherent delays and inability to handle huge numbers of customer requests concurrently. In response, many businesses are now turning to chatbots: computer programs designed to simulate human conversations. Chatbots automate customer services operations such as product search, orders tracking, and payments, thereby making customer services operations simpler and easier. Moreover, thanks to the evolution of advanced NLP and ML models, chatbots are now able to understand users' intentions better than ever before. Nevertheless, certain challenges continue to persist. In many cases, chatbots have difficulties understanding complicated queries, fail to possess emotional intelligence, and create numerous worries related to users' privacy and sovereignty. This implies that the issue of mistrust on the part of users emerges, acting as an impediment to the extensive implementation of chatbots. The current research aims at evaluating the efficiency of chatbots in e-commerce and their impact on customer satisfaction and throughput.

II. LITERATURE SURVEY

Chatbots are often thought to help e-commerce firms give prompt customer services by answering common queries,

tracking orders, and other forms of support available all year round, 24/7.

As a result, they create happy customers and provide some relief to human employees who have large amounts of work placed on their heads. However, chatbots are still limited in many ways, including complications related to complex questions, limitations relative to emotions, and privacy problems.

A. Existing Platform

Innumerable online stores are using the capabilities of chatbots today in order to enhance their customer service processes. Popular tools like Tidio, Chatfuel, ManyChat, and Ada are being used extensively to develop e-commerce chatbots by the merchants. With the help of automation of customer service processes, answering FAQs, and providing instant replies, they are offering an unmatched level of assistance to the merchants.

Some more sophisticated platforms, like OChatbot and Chatbot, were specifically built for the e-commerce industry. Along with facilitating timely order tracking and providing personalized product recommendations, they have also been shown to enhance the retailer's ability to drive additional revenue via upselling and/or cross-selling.

The best-known e-commerce companies have created their unique chatbot systems, such as Amazon with its voice-assisted shopping bots, whereas companies such as Flipkart and Myntra rely on artificial intelligence chatbots to help customers with their queries regarding products

B. Existing Research

- Gnewuch et al. (2017) - Chatbot ability to multitask with multiple clients simultaneously
- Følstad & Brandtzaeg (2017) - Chatbot ability to provide prompt responses but inability to provide human-like emotional responses
- Hill et al. (2015) - Chatbot ability to be suitable for simple but not complex tasks
- Adamopoulou & Moussiades (2020) – Advances in AI and Natural Language Processing techniques improve Chatbot performance.
- Xu et al. (2017) - Proper design of Chatbot leads to a better user experience
- Purington et al. (2019) - Personalization fosters more trust among clients
- Brandtzaeg & Følstad (2018) and Luger & Sellen (2016) – Too much dependence on Chatbot can reduce service quality.
- Sheehan et al. (2020) - Privacy and ethical considerations matter greatly.
- Jain et al. (2018) - Chatbot are capable of lowering costs of customer service.

- Bittner et al. (2019) - The lack of emotions is the primary weakness of Chatbot.
- Luger & Sellen (2016): Excessive dependency on Chatbot could lead to poor-quality services.
- Zamora (2017): Chatbot may misinterpret difficult questions.
- Chung et al. (2020): Multilingual Chatbots serve more customers.
- Ren et al. (2021): Chatbot supported by human intervention is more efficient.
- McTear (2020) - Contextual capabilities and memory boost Chatbot effectiveness.

C. Research Gap

- Emotions / Human Connection: The majority of research today focuses on speed and technical efficiencies; however, they rarely consider the emotions that are associated with a customer experience during the interaction.
- Benchmarking Performance: The amount of research comparing the performance of chatbots vs. human support agents in order to understand what is "best" for different situations is severely lacking.
- Managing Complex Scenario: There is minimal data available on how automated systems process complex, difficult or unexpected inquiries from customers beyond the standard basic FAQs.
- Personalizing Deeply: As chatbots become increasingly sophisticated, the body of work available to determine how effectively chatbots can provide personalized service in terms of customer preference/needs per transaction is small.
- Regionally / Industry Specific: The number of studies done on industries that are specific to regional conditions is severely lacking, especially in regard to the unique issues facing e-commerce within a country such as India.

III. METHODOLOGY

A. Research Design Descriptive Design:

Descriptive Design is intended to demonstrate how Chatbot are being implemented in Online Shopping and if they are effective. It primarily provides a basis to collect feedback from users regarding their use, perception, and satisfaction level with Chatbot applications in a Non-Live Setting to determine if Chatbot are beneficial to consumers, that is, to evaluate the level of assistance provided to customers via the use of Chatbot in the Online Shopping Environment.

1) Quantitative Approach:

Quantitative Approach employs Numbers and Data in order to determine results. This includes factors such as how satisfied customers were after using the Chatbot as well as how frequently they utilized the Chatbot and how quickly the Chatbot responded back to the customer. All of this data is collected in numerical form and then analyzed to produce definitive results and conclusions.

B. Data Collection

1) Primary Data Collection

For collecting our data, we apply multiple online approaches that help us to obtain relevant information by addressing the customer or product/user directly.

- Google Form Survey:

Through designing a questionnaire via Google Forms, including mainly simple answer questions as well as few opinion ones aimed at gaining detailed information about the experiences with chatbots of the respondents during their online shopping with such websites as Amazon, Flipkart, and Mynta.

Distribution of this Google Form took place across email, WhatsApp, as well as social media, enabling us to obtain responses from a wider range of customers who belonged to the placement area, regardless of their ages.

Sample size (number of individuals who participated in the questionnaire) varied between 50-100 according to the.

2) Secondary Data Collection

Secondary data is collected from reliable online and academic sources to support the findings of the survey.

- Sources Include:

- Research papers and articles can be found in resources such as Google Scholar, IEEE Xplore, and
- Industry reports on AI and Chatbot usage are referred from platforms such as Statista, McKinsey, and Forbes.
- Relevant articles and blogs are taken from trusted AI and e-commerce websites Existing case studies on Chatbot implementation and performance are also reviewed.

- Purpose of Secondary Data:

- To understand what other researchers have already found about Chatbot and how they improve customer service.
- To compare past research with the results of the current survey.
- To find out what problems and challenges still exist in real-life use of Chatbot.

C. Analysis Methods

Data analysis consists of analyzing the collected data to understand and to find information that is useful for decision-making. The data that are examined in this process is from the Google Forms and other sources on the web. These two methods of analysis will be carried out through quantitative and qualitative techniques.

1) Quantitative Data Analysis

A majority of the survey data collected from the Google Forms has been collected in a numerical format (e.g., rating or yes/no answers), and also how often someone uses something. Therefore, quantitative analyses are performed using simple statistical methods.

- Steps in Quantitative Analysis:

1) Data Cleaning and Organization

- After all the responses have been obtained via the survey, you can then input them into Microsoft Excel or Google Sheets for analysis. The very first procedure of conducting quantitative analysis

involves going through the data to check for any mistakes (either missing data or duplicate entries).

- 2) Response Coding
 - For ease of analysis, the next thing you need to do is code the responses into numbers, whereby each code will refer to the actual answer obtained, such as 1 or 5 for strongly disagree or strongly agree, respectively.
- 3) Descriptive Statistics
 - The percentage method is used to calculate the number of people who agree or disagree with any particular statement. Example: 70% of people found Chatbot useful.
 - Mean and median are used to determine the average level of user satisfaction.
 - The frequency distribution method is used to calculate the frequency of occurrence of different responses.
- 4) Graphical Analysis
 - The data is represented graphically through bar charts, pie charts, and histograms.
 - Charts are useful in comparing user satisfaction, performance of Chatbot, and user preference levels.

2) Qualitative Data Analysis

Some data is collected in the form of open-ended answers where users share their opinions and experiences. This type of data gives detailed insights about how people feel about Chatbot.

- Steps in Qualitative Analysis:
 - The responses are grouped into common themes like “fast response,” “lack of human touch,” “technical issues,” and “24/7 support”.
 - These themes help to understand common user opinions and problems faced while using Chatbot.
 - Content analysis is used to summarize the main ideas and understand customer feelings, expectations, and experiences.

IV. RESULTS AND DISCUSSION

A. Findings

1) Chatbots Improve the Speed of Assistance

- Many studies indicate that Chatbots increase customer service response times. They reduce waiting time for customers and provide immediate answers to FAQs.
 - Finding: Chatbots speed up customer service processes which contributes positively to the user experience.

2) Customers Can Access Help Anytime

- Chatbots are available 24/7 whereas human support agents have a limited schedule. This means businesses can provide customer service 24/7 - around the clock - even when they are experiencing high volume, such as during a sale.
 - Finding: Being able to access assistance at any time 24/7 builds trust and keeps customers engaged.

3) Chatbots Offer Cost Savings to Companies

- Chatbots can perform many of the same tasks that would require human agents (e.g., provide a list of frequently asked questions, allow customers to track orders), which

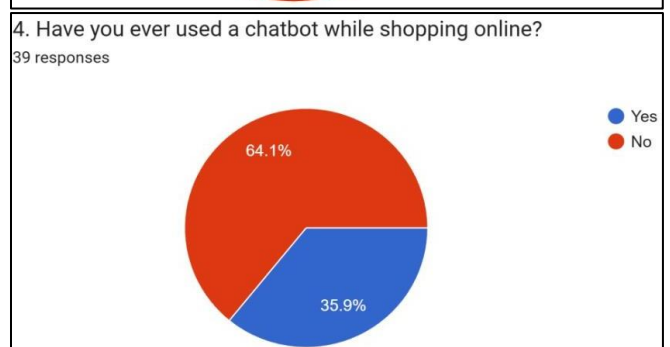
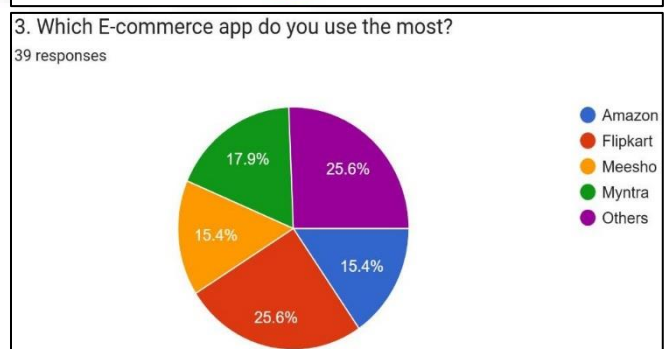
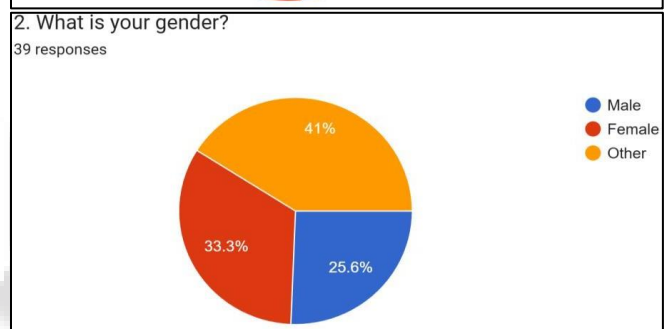
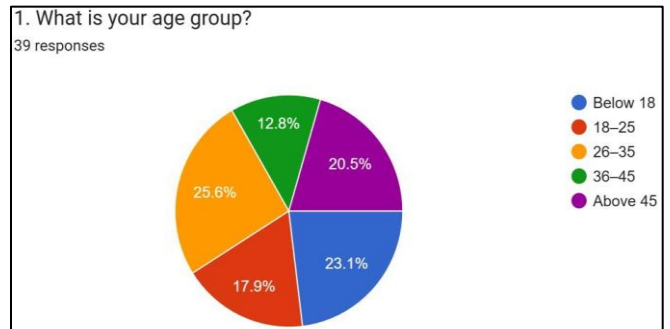
decreases the total number of human agents needed to provide customer service. This provides cost savings to the business.

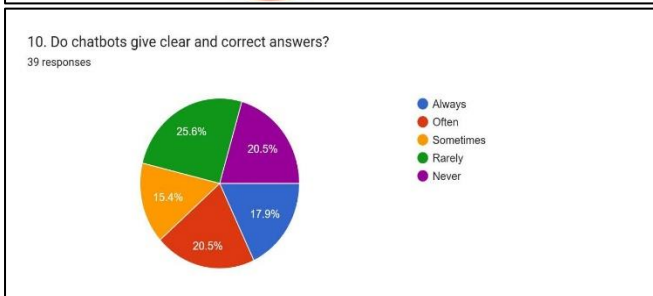
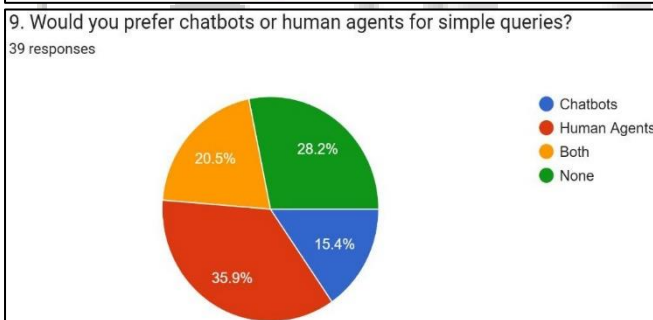
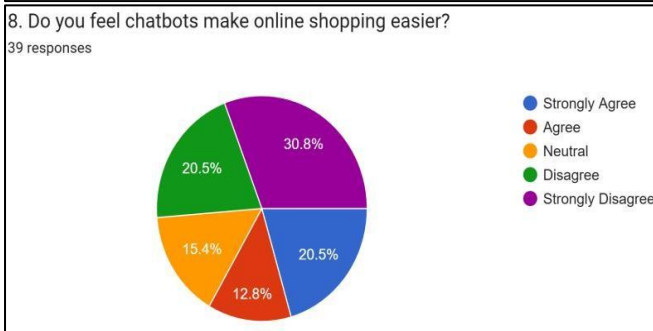
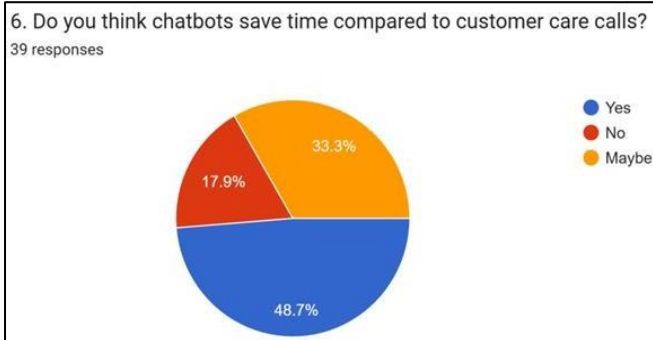
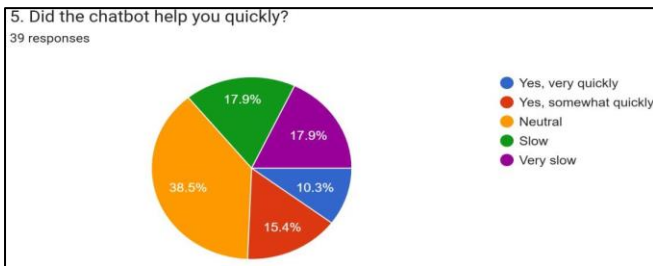
- Finding: Chatbots are a cost-effective means of providing customer service.

4) Personalized Chatbot Products by Using AI

- The most recent version of Chatbots involves AI technology that is able to recognize what customers like and recommend products according to their past purchases (or even online surfing). This leads to greater profits and satisfaction from customers.

- Finding: Personalization creates better experience for customers.





B. Implications

1) Improved Customer Experience:

Chatbot make customers happy because they give quick replies anytime (24/7). This helps companies provide a smooth and better experience to users.

2) Cost-Effective Customer Support:

Businesses can save money because they don't need a large support team. Chatbot handle simple questions, so human staff can focus on more difficult problems.

3) Data-Driven Decision Making:

Chatbot collect customer data like preferences and behaviour. Companies can use this information to improve marketing and suggest better products.

4) Increased Accessibility:

People from different countries and time zones can get instant help anytime. This improves global reach and builds a good brand image.

5) Integration with CRM Systems:

When Chatbot are connected with CRM systems, they remember past conversations. This helps provide more personalized and accurate responses to customers.

V. FUTURE SCOPE

- The future scope of Chatbot will be to be more intelligent with advanced AI and machine learning techniques.
- Chatbot will be able to interpret complicated and ambiguous questions by customers.
- Chatbot will also be able to predict what customers need based on previous behavior and preference.
- Chatbot will have the ability to sense human emotions and will give a response accordingly.
- Chatbot will also be available in multiple languages such as Hindi, Marathi, Tamil, etc.
- Chatbot will give personalized recommendations and will enhance the shopping experience.
- Human touch combined with the chatbot will make things easier and more efficient.
- Hence, chatbots will simplify the process of online shopping in the future.

VI. CONCLUSION

The results prove that the use of chatbots is an effective solution for e-commerce customer relationships. These systems can automate primary functions like order tracking and FAQs. This allows chatbots to be available round-the-clock and cut down expenses for companies. The findings indicate that with the help of Machine Learning, the effectiveness of chatbots will keep improving based on past experiences. Still, there are some limitations in terms of context awareness and empathy towards people. Companies need to emphasize using chatbots within CRM to deliver a tailored experience to customers with the possibility of transferring complex cases to humans. Finally, it seems that the development of chatbots will lead to better customer satisfaction in the international market.

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