

# AI in E-commerce: Applications, Benefits, and Challenges

DEEPA M

*Assistant Professor, Department of Commerce & Management, Vidyavardhaka First Grade College, Mysore, India*

**Abstract—** Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy. Using AI can help to create a more efficient sales process by gathering data about the customers, automate follow-up abandoned cart inquiries, and more. Today E-commerce businesses use AI across various functions to optimize operations and improve the customer experience, as AI applications include expert systems, natural language processing (NLP), speech recognition and machine vision, but there are challenges to keep in mind too for achieving for targets through AI.

**Index Terms-** Artificial Intelligence, Applications of AI, Benefits of AI, Challenges of AI

## I. INTRODUCTION

Artificial Intelligence (AI) technology is now a part of our daily lives. We use it to write emails, check the weather, and even diagnose diseases. AI is especially impactful in ecommerce.

In the past, businesses viewed advanced technologies like AI as “nice to have,” primarily using them to delight customers and encourage repeat visits. Now, ecommerce businesses rely on AI to grow their company, maintain global operations, and meet customer demands across multiple channels.

E-commerce businesses have implemented AI across various business functions and will continue to find new and innovative applications for AI in ecommerce as adoption increases and the technology advances.

## II. TYPES OF AI TECHNOLOGY USED IN E-COMMERCE

1. Natural language processing (NLP): Natural language processing focuses on enabling computers to interpret and generate natural human language.
2. Machine learning (ML): Machine learning uses statistical techniques, including algorithms, to enable computers to learn from data and make predictions or decisions without being explicitly programmed.
3. Computer vision (CV): Computer vision is a field of artificial intelligence that enables computers to interpret information from images and videos.
4. Data mining: Data mining is the process of discovering data to inform AI algorithms and systems.

## III. BENEFITS OF USING AI IN E-COMMERCE

1. Searching Products Made Easy: Most of the online purchases start with the search. The search results should be relevant and according to the keywords. Else the user will look somewhere else for the products. The text-based searches return a list of items that include those keywords in the title name and the description. This may not be the best technique to find the accurate results. Artificial intelligence techniques allow users to upload the images and discover the most relevant or exact search result. This saves a lot of time for the consumer as a consumer no longer have to linger for hours.
2. Recommendation Systems: AI and machine learning algorithms can predict the behavior of buyer from its past searches, likings, frequently bought products. By predicting the behavior of the user, E-commerce websites are able to recommend the

products that user is highly interested in. This improves the user experience as the user no longer have to spend hours searching the product. It also helps the E-commerce websites to improve their sales. So, small E-commerce websites have to build own recommendation system.

3. Inventory Management: The predictive analysis of data science services is making a huge impact in the inventory management. Inventory management is a nightmare when it comes to keeping the inventory up to date, shelves filled and everything available in the supply chain. Machine learning algorithm can predict the future demand for the product based on the history data. The more and more usage of predictive analytics in the E-commerce improves the efficiency of inventory management data. Artificial intelligence applications have enabled the retailers to predict the real-time inventory needs of the business.

4. Systematic Sales Process: Prior to artificial intelligence, sales strategies were relying on cold calling, email marketing, ad placements etc. Artificial intelligence applications are used by the E-commerce retailers to gather data patterns and to generate powerful insight from the data. Businesses can improve the sales by using the history data and data-driven feedback. Nowadays, people are more inclined towards social media platforms for shopping inspirations. Deep learning techniques can be used to identify the choices and interests of the customers. Artificial intelligence can scan millions of data and develop the correlation between the buying patterns and user data.

5. Better Customer Understanding: For the rapid growth of any business, it is very important to understand the target customers better. There are many ways to achieve this E-commerce websites can send online surveys to the users, get feedback using feedback forms, and ask for rating and review for the better customer understanding. Artificial intelligence and natural language processing have also made it possible to get to know the perception of the customer about the brand. NLP can understand the phrases used by the user about the brand in a comment, reviews, complaints, and feedback. It can understand all the feedbacks whether positive, negative or neutral. E-commerce businesses can learn more about the customer expectations and respond according to the situation.

6. Improved Customer Service: Every business wants to provide the best service to their customers. Chatbots and virtual shopping assistants allow users to automate the customer service. AI-powered chatbots have the capability to interact with clients, answer their queries and resolve issues in real time. Natural processing algorithm in the chatbots allows them to understand the context of the customer's message. Shopping chatbots can assist in finding the products. Users have to just enter their requirements and chatbot will find the most relevant products for them. Chatbots can also schedule deliveries, book complaints and handle returns for the customers. Chatbots are available 24/7 at the service and have a high response rate.

7. Better Decision Making: E-commerce can make better decisions with the application of Artificial intelligence. Data analytics have to handle a lot of data every day. This data is too huge for them to handle. Moreover, analyzing the data also becomes a difficult task. Artificial intelligence has fastened the decision-making process of E-commerce. AI algorithms can easily identify the complex patterns in the data by predicting user behavior and their purchasing pattern.

8. After Sales Service: Selling the product is not enough. Businesses have to aid the customer in the complete buying cycle. After sales service is an integral part of E-commerce business. Artificial intelligence can automate the feedback form, replacements and handling any other ambiguity in the product. By solving the buyer's issues, the brand value of the website gets improved.

9. Cybersecurity: Artificial intelligence has also improved the cybersecurity of the E-commerce websites. It can prevent or detect any fraudulent activities. E-commerce has to deal with a lot of transactions on daily basis. Cybercriminals and hackers can hack the user account to gain unauthenticated access. This can lead to the exposure of private data and online fraud. The reputation of the business also gets a big blow. To prevent this, Artificial intelligence and machine learning algorithms are developed that can mitigate the chances of fraud activities over the website.

#### IV. CHALLENGES OF USING AI IN E-COMMERCE

1. Data Privacy: AI algorithms rely on consumer data to make personalized recommendations and

predictions. Collecting this data raises concerns about privacy and data protection. AI also presents a security risk for companies around proprietary intellectual property, leading to accidental leaks and breaches.

2. **High Initial Investment:** Implementing AI can be costly. It involves an investment in infrastructure, talent, and maintenance. Additionally, AI solutions might not always yield a positive return on investment (ROI).
3. **Potential for Poor-Quality Customer Service:** Because AI customer service relies on chatbots, you may fail to offer the same support and empathy as a human customer service representative. Done poorly, AI customer service can cause friction, customer dissatisfaction, and a poor reputation.
4. **Ethical and Regulatory Compliance:** E-commerce companies must navigate a complex landscape of AI ethics and regulations. Compliance with various regional and industry-specific laws is essential to avoid legal and reputational risks.
5. **Competition:** As more E-commerce businesses adopt AI, competition intensifies. Staying ahead in the AI game requires continuous innovation and adaptation.
6. **ROI Uncertainty:** Measuring the return on investment (ROI) of AI implementations can be challenging. It may take time to see tangible results, and some AI projects may not deliver the expected benefits. On the other hand, some AI solutions hit the ground running, and early adopters never look back.

## CONCLUSION

It's always tempting to jump into new, exciting technologies. But it's better to have a roadmap before jumping into implementing a new program, to make sure that it don't lose a lot of time and money on false starts. Where of course the huge competition in the E-commerce business has pushed the E-commerce businesses to make use of artificial intelligence technology to get ahead of the competition.

Artificial intelligence has marked its presence in every field of concern. Almost industry is taking advantage of the artificial intelligence applications. Artificial intelligence is going to personalize the shopping

experience for the user and improve the shopping experience. For retailers, it is a medium to improve sales, deliver better engagement and improve the customer's service.

Artificial intelligence is becoming an integral in the way how many consumers interact with the digital platforms. Digital Platform has made life easier for the retailers as well as buyers. E-commerce websites are witnessing an exponential hike in their sales. Artificial intelligence companies have helped E-Commerce websites in providing the better user experience.

Despite the challenges, the adoption of AI in E-commerce offers substantial opportunities for businesses to enhance customer experiences, optimise operations, and gain a competitive edge... Ultimately, Artificial intelligence research in the field of E-commerce is leveraging the sales of E-commerce too.

## REFERENCES

- [1] Artificial Intelligence in E-commerce - by Leadsupreme Solutions
- [2] Role of Explainable Artificial Intelligence in E-Commerce- Springer Link
- [3] <https://www.bigcommerce.com/articles/ecommerce/ecommerce-ai/>
- [4] <https://www.salesforce.com/in/commerce/ai/ecommerce/>
- [5] <https://www.ibm.com/blog/ai-in-ecommerce/>