

# Chapter 2

## Artificial Intelligence and Machine Learning in eCommerce

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### ABSTRACT

*This chapter examines the transformative implications of artificial intelligence (AI) and machine learning (ML) on eCommerce security and operations. AI and ML technologies are transforming the eCommerce sector by streamlining supply chains, enhancing inventory management, and providing better customer experiences through personalized recommendations. Using real-time data and predictive algorithms,*

DOI: 10.4018/979-8-3693-5718-7.ch002

*businesses can efficiently manage stock levels and forecast demand. In terms of security, machine learning (ML) and artificial intelligence (AI) provide effective means of detecting and mitigating fraud, protecting personal data, and ensuring secure transactions. This chapter delves into the numerous applications and benefits of artificial intelligence (AI) and machine learning (ML) in eCommerce, highlighting their critical roles in increasing efficiency, improving consumer satisfaction, and protecting operations in a fast-paced online market.*

## **INTRODUCTION**

In the rapidly changing e-commerce industry, the incorporation of Artificial Intelligence (AI) has emerged as a disruptive force, transforming online shopping experiences in fundamental ways (Akinsola et al., 2022). This investigation digs into the multidimensional influence of AI on the dynamics between customers and online merchants, shedding light on its role in improving numerous parts of the shopping experience (Ravi, G et al., 2023). It motivated the researchers to investigate the impact of AI on online shopping experiences. AI technologies, which include machine learning algorithms, natural language processing, and computer vision, have transformed how online platforms interact with and serve their users (Castro.D. & New. J, 2016). At the vanguard of this shift is the notion of customization, in which AI algorithms evaluate massive amounts of user data to provide individualized product suggestions, promotions, and content (Allioui, H et al.,2024). By analyzing individual tastes and habits, e-commerce platforms can provide personalized purchasing experiences for each consumer, increasing engagement and loyalty (Liao, S. H et al., 2021).

Furthermore, AI-powered automation improves backend operations by streamlining inventory management, supply chain logistics, and customer support (Shobhana. N,2024). Predictive analytics allows merchants to anticipate demand variations, reduce stockouts, and improve order fulfillment efficiency, resulting in higher customer happiness and retention (Sardar et al.,2024). In addition, AI-powered chatbots and virtual assistants have transformed customer service paradigms, provided real-time assistance and quickly answering issues (Ali, 2024). Natural language processing capabilities allow these AI assistants to understand and respond to client requests 24 hours a day, seven days a week, delivering tailored suggestions, troubleshooting advice, and order tracking updates (Canbek & Mutlu, 2016).

In parallel, computer vision technologies enable customers to engage with items in immersive ways, such as virtual try-ons, visual search features, and augmented reality simulations (Wedel et al.,2020). By linking the digital and physical worlds, AI improves the online shopping experience with dynamic and engaging features,

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