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Role of Artificial Intelligence in E-commerce

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Abstract

Artificial Intelligence (AI) is fundamentally transforming e-commerce by enhancing operational efficiency and personalizing customer experiences. Key applications include machine learning for product recommendations, natural language processing for chat bots, and predictive analytics for inventory management. AI enables dynamic pricing, fraud detection, and visual search, driving higher conversion rates and revenue growth.

Keywords: Artificial intelligence, Machine learning, E-commerce. Digital

Introduction

E-commerce and Artificial Intelligence

The modern information age brings along new possibilities, software, and technological innovations usable in marketing and shopping. New technologies force companies to be more creative. Technologies help increase the efficiency, quality, and cost-effectiveness of services provided by businesses. Contemporary creativity is based primarily on the development of the so-called information and communication technologies, which have a major impact on the development of the business environment. The effectiveness of information and communication technologies depends on several factors, such as investment in human capital and an appropriate combination of e-commerce solutions. One sector where the digital transition and importance of e-commerce are particularly pronounced is retail, where digital tools, such as Websites, replace (to a certain extent), or complement physical commerce.

Role of Artificial Intelligence in E-commerce

Artificial Intelligence (AI) acts as the backbone of modern e-commerce, driving hyper-personalization, operational efficiency, and enhanced user experiences. By leveraging machine learning, AI enables real-time demand forecasting, dynamic pricing, and automated customer service via chat bots, allowing retailers to predict consumer behavior and optimize supply chains, increasing sales and reducing costs.

Hyper-Personalization & Customer Experience:

AI analyses browsing history, purchasing behavior, and demographics to offer tailored product recommendations. This creates a personalized shopping journey, increasing engagement and loyalty.

Intelligent Search & Visual Commerce:

AI improves search functionality through Natural Language Processing (NLP) to understand intent and supports visual search, allowing users to find products by uploading images.

Dynamic Pricing & Competitive Intelligence:

AI algorithms monitor market demand, competitor pricing, and inventory levels in real-time to adjust prices automatically, ensuring maximum profit margins.

Supply Chain & Inventory Management:

AI predicts future demand trends to optimize stock levels, preventing overstocking or stock outs. It enhances logistics by optimizing delivery routes and warehouse efficiency.

Automated Customer Support (Chat bots):

AI-powered, 24/7 chat bots handle routine inquiries, returns, and order tracking, providing immediate responses and improving customer satisfaction.

Content Generation & Marketing:

Generative AI automates the creation of product descriptions, marketing emails, and social media content.

Fraud Detection & Security:

Machine learning models detect anomalies and patterns in real-time to identify fraudulent payments, fake reviews, and account breaches.

Using Artificial Intelligence in Ecommerce Companies

Artificial Intelligence (AI) in ecommerce enhances online shopping by delivering personalized experiences, optimizing logistics, and automating customer service. Key applications include personalized product recommendations, AI-powered chat bots, dynamic pricing, and inventory management, which boost conversion rates, improve efficiency, and reduce operational costs.

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1. **Personalization & Recommendation Engines:**

AI analyses browsing history, purchase patterns, and demographics to provide tailored recommendations, increasing Average Order Value (AOV) and conversion rates.

2. **AI-Powered Customer Service (Chat bots):**

Intelligent bots handle complex, 24/7 customer queries, provide tracking updates, and manage returns, reducing the load on human support teams.

3. **Dynamic Pricing Optimization:**

AI algorithms adjust prices in real-time by analyzing demand, competitor pricing, and inventory levels to maximize margins.

4. **Inventory and Supply Chain Management:**

AI predicts future demand using historical data, optimizing inventory levels to prevent overstocking or stock outs.

5. **Visual and Voice Search:**

Customers can use images or voice commands to search for products, improving the user experience.

6. **Fraud Detection:**

AI detects patterns and anomalies in real-time, helping to prevent fraudulent transactions.

Benefits of AI for Ecommerce Companies

The advent of Artificial Intelligence (AI) and Machine Learning (ML) has changed the face of online shopping for good by making it more personalized search and responsive than ever before. Aimed at improving customer experience, By 2027, 80% of retail CEOs want their companies to use AI-powered intelligent automation. Here 'a list of benefits that an intelligent-commerce platform provides:

1. **Personalized Marketing**

With Artificial intelligence, e-commerce businesses can create personalized marketing strategies based on the needs and wants of their customer. They can collect data from social media, shopping history, and browsing habits to understand better what customers need and want. The AI will use this information to make predictions about customer behavior. It will also make AI-based recommendations about how much they're willing to pay for a product or service.

2. **Improve Customer Retention**

Whether it's a local shop or a multinational corporation, nearly every business relies on customer retention to keep its business running. This is especially true in the e-commerce industry, which has created enormous opportunities for growth and development around the globe. However, despite how important it is to retain customers, many businesses still struggle with this part of the process. And if they're not working already, they will be soon enough because some significant changes are coming that will impact companies in the online marketplace. The rise of artificial intelligence and chat bots can change things dramatically for businesses that haven't perfected customer retention strategies yet.

3. **Seamless Automation**

E-commerce companies are now using artificial intelligence to improve their business. Many of them are opting for AI automation, which is quickly replacing humans in many industries. AI vendors have created services that help e-commerce companies

automate their operations to focus on growth and sales optimization. The main advantage of AI automation is the ability to scale up the business while keeping costs low.

4. **Efficient Sales Process**

Artificial intelligence is helping e-commerce companies to improve their sales. It's also used to find the right market for a product, recommend products that are likely to have high demand, and forecast how many copies of each product need to be produced. In addition, AI can understand customer behaviour by analysing search history and browsing patterns. This allows companies to provide better-targeted marketing strategies and offers as well as AI-based recommendations. The result is that customers can be directed towards items that best match their interests and needs based on who they are as people rather than what they buy.

- **Increased Conversion Rates:** Personalized shopping experiences and faster, intuitive, AI-driven checkouts lead to higher sales.
- **Operational Efficiency:** Automation of repetitive tasks, such as inventory management and order processing, streamlines operations.
- **Enhanced Customer Retention:** Personalized service and tailored recommendations foster customer loyalty.

Conclusion

Artificial Intelligence has emerged as a transformative force in the e-commerce sector, reshaping the way businesses operate and interact with customers. By integrating technologies such as machine learning, natural language processing, and predictive analytics, e-commerce companies can deliver highly personalized shopping experiences, improve operational efficiency, and make data-driven decisions. AI-powered tools like recommendation systems, chat bots, dynamic pricing models, and fraud detection mechanisms not only enhance customer satisfaction but also increase conversion rates and profitability. Additionally, AI plays a crucial role in optimizing supply chains and inventory management, reducing costs and ensuring timely delivery of products. The adoption of Artificial Intelligence in e-commerce provides a competitive advantage by enabling businesses to stay agile, innovative, and customer-centric. As technology continues to evolve, the role of AI in e-commerce will become even more significant, driving future growth and transforming digital commerce into a smarter, more efficient ecosystem.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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