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To Assess the Application of AI in E-Commerce

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ABSTRACT

The rapid evolution of artificial intelligence (AI) has remarkably transformed various industries, with e-commerce being one of the most significantly impacted sectors. The paper explores the application of AI in enhancing the e-commerce businesses.AI technologies, such as machine learning, natural language processing, and computer vision, are leveraged to personalize shopping experiences, enhance customer satisfaction, minimize supply chain management, and increase product recommendations. When used in the usual business tasks, these technologies can learn, act, and perform with human levels of intelligence. AI is used to replicate human intelligence in machines, saving us a lot of time and money in doing business. Other than product recommendations, online business men use e-commerce intelligence to provide Chatbot services, analyze customer comments, and offer personalized services to online shoppers. AI plays a crucial role in e-commerce by enabling businesses to analyze and understand customer behavior patterns, enhance the shopping experience, and streamline various processes. But E-commerce businesses also face challenges. By analyzing current trends and future directions, this study aims to highlight the application of AI in redefining the e-commerce landscape, ultimately creating a more efficient and personalized shopping experience for consumers.

Keywords: Artificial Intelligence, E-commerce, Customer, Personalization, Chatbot, Machine Learning.

Introduction:

The Artificial intelligence (AI) concept was developed around 69 years ago. According to [1], “AI is the art of creating machines that perform functions that require intelligence when performed by people.” Due to the changes in lifestyles, one needs to have an intelligent technology that not only saves the time but also automates the work. The technological disruptions like AI, Internet of Things (IoT), big data is affecting every person, from house hold to business and professional levels. It has drastically changed the way of conducting day to day operations. The new generation of AI is rapidly expanding in almost every field of work including education, banking, healthcare and finance, leading to benefitting different industries. The

technology is successfully getting incorporated in every field of work. The movement towards Industry 4.0 is the key driving force for every emerging technology in today's era [2].

E-commerce had come up with new opportunities and experience to the customers. It is not just a flexible platform for purchase and sale of goods and services but it had reached an extra mile. Expansion in the functionalities of e-commerce came in the form of video streaming and music. Apart from shopping convenience entertainment is also available at E-commerce in customized manner. AI helped to track customers in more detailed manner which further generate new leads and enhanced customer experience. Not only for online retailer application of AI equally helpful to the customers in their online shopping. It accompanies the customers in every step from browsing the products to make the payment. The success of virtual assistants such as Apple's Siri, Amazon's Alexa or Google home using AI- enabled chat bots to resolve shopping related queries are some of the examples. To reach on the level of enormous accuracy, flexibility and productivity for e-commerce the methods that come into the space of AI are machine learning, robotics, expert systems, artificial neural networks, data mining, natural language processing and computer vision [3]. In This study reported that AI-enabled systems in the organization are expanding rapidly. More and more automation is being applied to transform e-commerce activities. The rise in the usage of smart devices such as smart phones created a need for e- commerce to update itself to the next level. And the process of updating is impossible without the help of AI which is playing principal role in developing intelligent e-commerce [4]. The objective of this study is to present an overview to assess AI and its application in e-commerce. It is narrative in nature, consisting of conceptual knowledge involving wide range of subjective knowledge on the research area,

leading to an empirical understanding of the topic [5]. The study had comprised of dual aspects of the field. Firstly, the technologies incorporated in the field and secondly, the utility of these technologies in e-commerce. Moreover the study conducted by had reviewed the contribution of AI in e- commerce with special reference to recommendation systems [6]. The aim concerns covered under the study were sentiment analysis, trust and personalization, optimization, AI concepts and related technologies. This study had tried to portray a complete picture of AI and its applicability in e-commerce.

Objectives of the study

• To conduct an examination on the application of artificial intelligence in the field of e-commerce.

• To focus on how AI technology can enhance customer satisfaction by providing customized solution

• To empower AI to assist in delivering round the clock services to meet customer needs.

• To discover how artificial intelligence will amplify productivity within the e-commerce industries.

RESEARCH METHODOLOGY

Secondary data is the foundation of the article. Data gathered from a number of sources. The secondary data were gathered from internet sources as well as published books, journals, research papers.

Artificial Intelligence and Related Technologies

The term artificial intelligence was first coined by John McCarthy in 1956 during the first academic conference on the subject [7]. Artificial intelligence (AI) is the branch of computer science that can perform human oriented tasks such as problem solving, decision making and reasoning similar to human behavior. It operates through sensors and commands and responds to the surrounding environment of operation [8]. McCarthy (1956) defines AI as "the science and engineering of making intelligent machines." In the early stage of evolution of AI, it was resembled to "Department of Clever Tricks" in the field of computer science [9].

Machine Learning (ML)

In 1959, Arthur Samuel explained machine learning as a "Field of study that gives computers the ability to learn without being explicitly programmed" [10]. ML is an automated process that enables the computer to learn from data, after systematically analyzing statistically significant pattern between them [11]. It means ML is inherently related with the element of data analysis and statistics [12]. ML is a significant subset if AI that enables the system to obtain cognitive insight, make predictions and support decision making [13].

Robotics

Robotics is the technology employed in developing anthropomorphic mechanical devices known as robots [14]. The American Institute of Robotics, 1979 describes a robot as "a reprogrammable, multifunctional manipulator designed to move material, parts, tools or specialized devices through variable programmed motions for the performance of a variety of tasks".

Expert system

An expert system is imitation of decision making ability of human based on some rules, these rules describes what one needs to do while encountering certain situation [15]. World's first expert system was developed in the year 1965 by Edward Feigenbaum and Joshua Lederberg of Stanford University in California [16].

Artificial Neural Network (ANN)

Artificial neural network is a method of processing inspired by the interconnectivity of neurons with human brain and nervous system [17]. It is the artificial creation based on computational principles used by the nervous system [18].

Data Mining

Data Mining is defined as the process of identifying valid, potentially novel and ultimately understandable patterns in data [19]. It is known as the process of extraction of viable hidden information from the large databases [20].

Natural Language Processing (NLP)

Natural Language Processing (NLP) is a branch of computer science, linguistics and artificial intelligence. It enables the interaction between human and computer by extracting the meaning out of the input provided in order to perform the task given by the user. The objective of NLP is to translate human language into the commands executable by computers [21].

Computer Vision

Computer vision mimics the human visual system with the aim of extracting information from the images available to the computer [22]. Computer vision is among the most powerful tools of AI, as it provides a 'cite' to the machine. Like a biological vision, computer vision is an artificial enabled vision provided to the machines. It enables a machine to view things surrounding it by an artificial machine suited eye. It is concerned with the analysis of images from real world and is based on AI and image processing [23].

E-Commerce

Before understanding electronic commerce one needs to understand the meaning of the term "commerce". According to Tassabheji commerce resembles trade; it is an exchange of goods and services on a large scale [24]. Therefore electronic commerce means the exchange of goods and services on a large scale using an electronic medium. According to the editor-in-chief of International Journal of Electronic Commerce, Vladimir Zwass, e-commerce is sharing business information, maintaining business relationships and conducting business transactions by means of telecommunication networks [25].

Artificial Intelligence in E-Commerce

Artificial Intelligence (AI) in e-commerce primarily revolves around mastering technologies and algorithms. The progress of AI technology within e-commerce has resulted in substantial transformations in the shopping experiences. Online retailers are extensively leveraging this technology by offering features such as Chatbot and virtual assistant's, analyzing customer quires and delivering personalized services to online shoppers. The applications of AI have notably progressed in recent years and are increasingly prevalent in the e-commerce sector.

Application of Artificial intelligence in E-Commerce

1) Personalized shopping

Personalization in the e-commerce industry has permeated the expanding online retail landscape, ascribed to advancements of AI and machine learning technologies. The process entails tailoring the shopping experience to align with customers' tastes and preferences, consequently fostering brand loyalty.

2) AI-powered assistants

AI powered assistants carry out their functions through the utilization of advanced AI, natural language processing, Robotic Process Automation (RPA) and machine learning technologies. By leveraging algorithms, the system amalgamates historical data to identify behavioral patterns and adjusts this information based on new inputs.

3) Fraud prevention

Online retailers are facing the two significant challenges: credit card frauds and fake reviews. Artificial intelligence is poised to mitigate such fraudulent activities by recognize and rejecting dodgy proceedings, as well as flagging undertakings for further investigation. Additionally, considering the customers often rely on reviews when making purchasing decisions, the AI tool will assist in detecting any suspicious activities in reviews.

4) Recommendation system

AI will enhance its operations by using advanced methods to analyze data for the purpose of predicting customers' behavior accurately and providing tailored recommendations to watch customers. The algorithms consider numerous factors such as customer preferences, past behavior and external data sources. This approach will enable online retailers to offer more customized information and suggestions to their customers, ultimately leading an enhanced customer experience with optimized solutions.

5) Chatbots

Chabot's also known as Chatterbots, operate based on machine learning algorithms. The integration of chatbots has propelled online conversation to a more advanced level in the e-commerce sector. They are specialized programs designed to engage in conversations with users online. By generating responses from a pre-defined pool of information, chatbots assist in resolving customer probe, improving customer service and providing assistance interminably.

6) Inventory Management

Another field within e-commerce involves the utilization of artificial intelligence to forecast and analyze future market trends. These predictions are made feasible through machine learning, enabling businesses to accurately project the quantity of raw materials required for order and consumption

7) AI-Driven CRM

Customer Relationship Management (CRM) facilitates businesses in monitoring and evaluating their connections with customers, suppliers and employees. Online retailers have the capability to merge AI with CRM to boost amplify e-commerce sales. CRM enables obtain to customer history and sales data, assisting online retailers in refining their sales strategies and services.

8) VR and AR

Virtual Reality (VR) and Augmented Reality (AR) are both technologies that stimulate a real life environment. AI technology uses the smart phone camera to enhance live views, creating a real shopping experience for customers.

Advantages of Artificial Intelligence in E-Commerce

1) Virtual Personal Assistant (VPA)

VPA is a more advanced tool compared to the chatbot utilized by the e-commerce business. It improves the businesses to keep updated with all the activities that are taking place in their business.

2) Improved customer services

Chatterbot also known as Chatbot plays a crucial role in artificial intelligence by revolutionizing communication principles within businesses. By offering around- the- clock services and aiming promptly resolve issues, chatbots have become one of the most prevalent AI powered technologies, enhancing customer service quality.

3) Focus on predictive marketing

Social media marketing, which capitalizes on AI technology, plays a remarkable role in predictive marketing strategies that optimize e-commerce websites. By securing that customers see their products first, businesses can boost their sales potential.

4) Cyber security

Machine learning and AI capabilities, online retailers can effectively pinpoint the origin of fraudulent activities, such as unauthorized transactions and successfully prevent them.

5) Automation

Artificial intelligence has remarkably contributed to the automation of processes in the e-commerce industry. AI is instrumental in streamlining repetitive functions necessary for the continuous operation of online stores, such as scheduling sales, publishing new products, providing product recommendations, loyalty discounts and more.

6) Marketing solutions

Particularly, in the realm of e-commerce solutions, AI is the most notable for its marketing applications. By integrating AI into e-commerce practices, businesses can benefit from the ability to analyze precise customer preferences and tastes.

E-commerce faces the challenges and AI Solutions

E-commerce faces challenges like data privacy, security, high implementation costs, and the need for seamless integration of AI with existing systems, but AI offers solutions for personalization, fraud detection, and improved customer service.

Here's a breakdown of the challenges and potential AI solutions

Challenges:

*** Data Privacy and Security:** AI algorithms rely on vast amounts of consumer data, raising concerns about privacy and security.

***High Implementation Costs:** Implementing AI solutions can be expensive, requiring investment in technology, infrastructure, and skilled talent.

*** Complexity of Integration:** Integrating AI with existing e-commerce systems can be complicated and time-consuming.

*** Data Quality and Quantity:** AI algorithms require high-quality and sufficient data to make accurate predictions and recommendations.

*** Talent Shortage:** Finding and retaining skilled AI professionals can be challenging.

*** Algorithm Bias:** AI systems can perpetuate biases if trained on biased data, leading to unfair outcomes.

*** Customer Trust:** Customers may be hesitant to use AI-driven solutions if they feel their privacy is compromised or if the experience is impersonal.

*** Ethical Considerations:** The use of AI in e-commerce raises ethical questions related to privacy, consent, and algorithmic fairness.

*** Scalability:** E-commerce businesses need to ensure their AI solutions can scale to handle increasing traffic and data volumes.

*** Customer Experience:** AI-driven customer service, like chatbots, can't replicate the empathy of human agents and may struggle with complex issues.

AI Solutions:

*** Personalization:** AI can analyze customer data to provide personalized recommendations, product suggestions, and targeted marketing campaigns.

*** Fraud Detection:** AI algorithms can identify and prevent fraudulent transactions and activities.

*** Demand Forecasting:** AI can predict customer demand, optimize inventory levels, and improve supply chain efficiency.

*** Dynamic Pricing:** AI can adjust prices in real-time based on demand, competition, and other factors.

*** Enhanced Customer Interactions:** AI-powered chatbots and virtual assistants can provide instant and personalized customer support.

*** Image Recognition:** AI can enable customers to search for products using images, making it easier to find what they are looking for.

*** Review Filtering:** AI can help filter out fake or irrelevant reviews, ensuring that customers have access to reliable information.

*** Optimized Customer Service:** AI can help businesses understand customer needs and provide more personalized and efficient customer service.

*** Supply Chain Optimization:** AI can help businesses optimize their supply chains by predicting demand, managing inventory, and improving logistics

*** Data Analysis and Insights:** AI can help businesses analyze large amounts of data to identify trends, patterns, and opportunities for growth

*** Personalized Retargeting:** AI can help businesses create and maintain narrower and more defined audiences based on customer behavior and browsing history.

Suggestions:

• Efforts to improve the human intervention in which customers are not solely reliant on machines for all tasks must be pursued. It is crucial to take proactive measures to educate customer about AI technology.

• Moreover, to enhance online identity verification by embedding one time password, AI biometrics, two-factor authentication and other advanced methods, the e-commerce sector should focus on converting potential leads into paying clients.

• Since AI is a technical concept, it is imperative to offer adequate education and training programs to online businesses and its employees to ensure smooth operations.

Conclusion:

As highlighted in this article, artificial intelligence in Ecommerce is playing a leading role in driving innovative solutions and customer experiences. Some of the important uses of artificial intelligence in Ecommerce is in the area of personalized shopping, product recommendations, and inventory management..Artificial Intelligence (AI) is now a crucial tool for several businesses, and Global technology market is expanding quickly. Artificial Intelligence has incorporated itself into every aspect of modern life, from online shopping to educational data. Additionally, many startups in the world are growing and creating AI solutions for the financial, healthcare, and other sectors. The rising demand in the present and the future has been increasing enormously businesses to adopt the trend over the past few years, increasing investment. Therefore, investing in AI technologies and can yield enormous profits in the E-commerce industry for upcoming years.

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Artificial Intelligence By Example: Develop Machine Intelligence From Scratch Using Real Artificial Intelligence Use Cases Paperback By Denis Rothman (Author)