"Innovations in Science and Technologies" scientific electronic journal
www.innoist.uz
ISSN : 3030-3451
Volume 1
№ 1
February, 2024

THE APPLICATION OF ARTIFICIAL INTELLIGENCE IN SMART LOGISTICS

Ismailov Otabek Mirxalilovich
Professor of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi
Sabirbayev Davranbek Sabirbayevich
Student of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi.

Abstract: This article presents an overview of the present state and evolving patterns in applying Internet of Things and artificial intelligence technology within the realm of smart logistics. It delves into the synergy between the Internet of Things and artificial intelligence technology, elucidating their collaboration in realizing the efficient functioning of smart logistics systems. The article also addresses the challenges and opportunities that arise in this context. It asserts that the Internet of Things and artificial intelligence technology constitute the fundamental propellants for smart logistics. These technologies can bring about informatization, automation, and intelligent processing across diverse facets of logistics, leading to enhanced efficiency, reduced costs, and the advancement of green and sustainable development in logistics.

Keywords: Internet of Things; Artificial Intelligence; Smart Logistics; Collaborative Applications.

INTRODUCTION

Logistics encompasses the broad spectrum of activities involved in transporting, storing, distributing, and packaging goods from their origin to their final destination, constituting a crucial component of contemporary social and economic endeavors. The escalating demands for logistics, spurred by the forces of globalization, e-commerce, and intelligent manufacturing, necessitate addressing challenges such as enhancing service quality, curbing operating costs, and mitigating environmental impact. In response to these challenges, the concept of smart logistics has emerged [1]. This entails leveraging cutting-edge information technologies, including the Internet of Things, artificial intelligence, big data, and cloud computing, to digitally connect, network, and intelligently transform various facets

of logistics. Smart logistics aims to achieve optimized configuration, dynamic scheduling, real-time monitoring, intelligent decision-making, and other functionalities, thereby enhancing efficiency, safety, reliability, and environmental sustainability.

The trajectory of modern logistics development is increasingly directed towards smart logistics, representing an inevitable choice for the transformation and upgrading of the logistics industry. The pivotal technologies underpinning smart logistics are the Internet of Things and artificial intelligence. Their collaborative integration in smart logistics is pivotal for achieving its full potential. The Internet of Things involves connecting diverse physical devices, items, and personnel via the Internet to facilitate information exchange and communication. On the other hand, artificial intelligence empowers machines with human-like intelligence, encompassing machine learning, deep learning, natural language processing, computer vision, speech recognition, among others. The joint application of the Internet of Things and artificial intelligence endows smart logistics systems with capabilities such as perception, learning, understanding, reasoning, decision-making, and execution, thereby facilitating the efficient operation of logistics.

This article primarily aims to delve into the collaborative application of the Internet of Things and artificial intelligence technology in smart logistics. It endeavors to analyze the synergy between these technologies, exploring the challenges and opportunities they encounter, all with the ultimate goal of optimizing the operation of smart logistics systems.

THE COLLABORATION BETWEEN THE INTERNET OF THINGS AND ARTIFICIAL INTELLIGENCE TECHNOLOGY ENABLES EFFICIENT OPERATION OF SMART LOGISTICS SYSTEMS

The collaborative application of the Internet of Things and artificial intelligence technology in smart logistics refers to the process of collecting, transmitting, and sharing logistics data using Internet of Things technology, analyzing, processing, and optimizing logistics data using artificial intelligence technology, and achieving intelligent management and service of logistics [3]. How the Internet of Things and artificial intelligence technology work together to achieve efficient operation of smart logistics systems mainly includes the following aspects:

Data layer: The data layer is the foundation of the collaborative work of the Internet of Things and artificial intelligence technology, and is the core resource of smart logistics systems. The data layer mainly involves the collection, storage, transmission, and sharing of logistics data. It requires the use of Internet of Things

technology, such as sensors, locators, communicators, electronic tags, etc., to achieve real-time perception, positioning, tracking, and recognition of logistics objects (such as vehicles, goods, personnel, etc.), forming a massive amount of logistics data. At the same time, it is necessary to utilize technologies such as cloud computing and big data to achieve secure storage, high-speed transmission, and effective sharing of logistics data, providing a data foundation for the analysis and processing of logistics data.

Intelligent layer: The intelligent layer is the key to the collaborative work of the Internet of Things and artificial intelligence technology, and is the core capability of smart logistics systems. The intelligent layer mainly involves the analysis, processing, and optimization of logistics data, and requires the use of artificial intelligence technologies such as machine learning, deep learning, natural language processing, computer vision, speech recognition, etc. to achieve intelligent analysis and processing of logistics data, forming logistics knowledge and rules. At the same time, it is necessary to utilize artificial intelligence technologies such as optimization algorithms, decision algorithms, recommendation algorithms, etc. to achieve intelligent optimization and decision-making of logistics data, and form logistics plans and strategies.

Application layer: The application layer is the purpose of collaborative work between the Internet of Things and artificial intelligence technology, and is the core value of smart logistics systems [4]. The application layer mainly involves the display, execution, and feedback of logistics data, and requires the use of Internet of Things technology, such as smart devices, intelligent platforms, intelligent terminals, etc., to achieve functions such as visual display, intelligent execution, and real-time feedback of logistics data, forming logistics services and management. At the same time, it is necessary to utilize artificial intelligence technologies such as intelligent customer service, intelligent prediction, intelligent recommendation, etc. to achieve intelligent service and management of logistics data, forming logistics value and benefits.

THE CHALLENGES FACED BY THE INTERNET OF THINGS AND ARTIFICIAL INTELLIGENCE TECHNOLOGY IN SMART LOGISTICS

The application of the Internet of Things and artificial intelligence technology in smart logistics has brought about significant efficiency improvements and value creation, but it also faces some challenges and problems that require further research and solutions.

– Data security and privacy protection: The application of Internet of Things and artificial intelligence technology has greatly increased the collection, transmission, storage, analysis, and sharing of logistics data, while also increasing the security risks of data and the possibility of privacy leakage. How to ensure the integrity, reliability, availability, controllability, etc. of logistics data, how to protect the privacy rights and interests of customers, enterprises, governments and other parties involved in logistics data, and how to prevent the tampering, theft, abuse, etc. of logistics data are ethical challenges for the development of smart logistics.

– Formulation of technical standards and specifications: The application of Internet of Things and artificial intelligence technology involves multiple technologies, devices, platforms, and scenarios, and requires unified technical standards and specifications to guide and regulate. How to develop technical standards and specifications that meet the characteristics and needs of smart logistics, how to coordinate the interests and demands of all parties, and how to promote the promotion and implementation of technical standards and specifications are the technical challenges for the development of smart logistics.

– Talent cultivation and quality improvement: The application of Internet of Things and artificial intelligence technology has greatly increased the technological content and knowledge density of the logistics industry, requiring corresponding talents to support and drive [5]. How to cultivate and introduce logistics professionals with backgrounds and capabilities in the Internet of Things and artificial intelligence technology, how to improve the technical level and innovation ability of logistics practitioners, and how to build and improve the training and incentive mechanism for logistics talents are the talent challenges for the development of smart logistics.

CONCLUSION

Starting from the concepts and characteristics of the Internet of Things and artificial intelligence technology, this article analyzes the significance, current situation, and challenges of their collaborative application in smart logistics, aiming to provide some theoretical and practical references for the development of smart logistics.

The collaborative application of the Internet of Things and artificial intelligence technology is the core driving force of smart logistics. It can achieve the intelligence, digitization, and networking of logistics, improve the efficiency, quality, safety, green, innovation and other levels of logistics, and bring huge value

and contribution to the sustainable development of the logistics industry and social economy.

The collaborative application of the Internet of Things and artificial intelligence technology needs to follow the logic of the data layer, intelligent layer, and application layer, to achieve intelligent management and services for the entire process of logistics data collection, transmission, sharing, analysis, processing, optimization, display, execution, feedback, etc., and to build a smart logistics network that covers the world, connects all parties, and operates efficiently.

The collaborative application of the Internet of Things and artificial intelligence technology has shown broad application prospects and potential in multiple fields and industries such as e-commerce, manufacturing, healthcare, and agriculture. By building intelligent logistics systems such as intelligent warehousing, intelligent transportation, and intelligent customer service, efficient, convenient, and low- cost logistics services are provided for various industries.

The collaborative application of the Internet of Things and artificial intelligence technology also faces challenges and problems such as data security and privacy protection, formulation of technical standards and specifications, talent cultivation and quality improvement. It is necessary to strengthen relevant research and solutions, establish sound legal regulations, technical standards, talent cultivation, social supervision and other mechanisms, and ensure the healthy development of smart logistics.

The collaborative application of the Internet of Things and artificial intelligence technology still needs further innovation and exploration. It is necessary to strengthen interdisciplinary, cross disciplinary, and cross industry cooperation and communication, fully leverage the advantages and potential of the Internet of Things and artificial intelligence technology, continuously launch more smart logistics application scenarios and products, and bring more surprises and benefits to the development of the logistics industry and socio-economic development.

REFERENCES

1. Liu Xuexue, Yang Zhipeng (2023). Research on the Development Path of Smart Logistics in China under the Background of Big Data. China Storage and Transportation (04), 110. doi: 10.16301/j.cnki.cn12-1204/f.2023.04.034.
2. Ye Qianlin, Fan Xuemei (2021) The Current Situation and Future Trends of Smart Logistics Development in China during the 14th Five Year Plan Period. Digital Economy (03), 36-41. doi: 10.19609/j.cnki.cn10-1255/f.2021.03.006.

3. M. Allen, "The development of an artificial intelligence system for inventory management using multiple experts," ProQuest Dissertations Publishing, 1986.
4. Wu Zhongsheng (2023). Application of Artificial Intelligence Technology in the Development of Smart Logistics. China Aviation Weekly (24), 75-77.
5. W. T. Barcode, "The barcode warehouse enhances customer service for hepburn," Total Telecom Online, 2010.