

## Research Article

# Intelligent Analysis of Logistics Information Based on Network Dynamic Data

**Honglin Yan** 

*School of Logistics, Henan Communications Polytechnics, Zhengzhou, Henan 450015, China*

Correspondence should be addressed to Honglin Yan; 1330221104@cjlu.edu.cn

Received 23 May 2022; Revised 10 June 2022; Accepted 18 June 2022; Published 30 July 2022

Academic Editor: Jackrit Suthakorn

Copyright © 2022 Honglin Yan. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Based on the concept of market sharing, the author has developed Internet technology-based logistics distribution data exchange to control the cost of shipping to benefit the transfer for new types of management and operations. Investigate the needs of export shipments, such as external management responsibilities, requirements of management responsibilities, data recovery, and data recovery requirements, based on the current state of the shared platform model integration, and determine the business model. Based on this, three types of IoT cloud, such as single-center multiterminal, multicenter multiterminal, and data and application layer, can be completed and the Internet of Things can be defined by education. About the use of the cost of distribution, the transportation contract is to identify the needs of Internet technology-based logistics distributions and complete the construction of Internet technology-based logistics distribution information exchange platform. The results of the experiment showed that the results recorded in the test group did not differ from the actual results only twice, the level of difference was small, and the mean error was less than 1%. In terms of logistics distribution exposure, the average level of the assessment group is significantly higher than that of the management group, with a minimum collection rate of 90.07%, while the minimum value of the control group is as low as 76.32%. Compared with blockchain-based integration, Internet of Things technology-enabled sharing platforms can capture real-time data, transfer data, monitor shipping costs, and improve management and operations.

## 1. Introduction

At present, China's home logistics industry has developed rapidly and information has been integrated into the logistics industry, becoming the most important of modern transportation, the characteristics of time. Large data logistics advantages, such as deep mining and analysis of data using modern data, make data efficient and use knowledge to support business innovation and business intelligence, which is the concept of logistics business. The e-commerce industry as a whole is looking for improvements [1].

However, the process is always better than statistical and archival data, which focuses on static and historical data [2]. With multiple, complex, and dynamic logistics data in a large data environment, existing processes make it difficult to properly collect and organize data, and it is difficult for an enterprise to get the experience it needs from logistics information. In terms of the supply chain, the main contradictions in the current logistics data management focus are on three

links. First, inability to pre-clean and compress data. The second is the challenge of management of the organization's logistics data, for example, the lack of data in the network equipment and the interference of data in the network equipment, arising from the archipelago of companies, which poses a risk to the groups of upper and lower traders [3]. Third, logistics data analysis and decision-making skills competition, such as data modeling technology, data mining methods, and the inability to support decision-making, making it difficult for the business information process to provide useful and seek professional support for logistics operations and strategic planning.

## 2. Literature Review

From the perspective of chain management, researchers at home and abroad have focused on the use of data collection, online analysis, and other technologies in the analysis of data logistics, the integration of different data, the integration of

multiple data, and the integration of different types of data. The benefits of research on logistics data separation are high.

Zhang et al. pointed out that the key to establishing a dynamic logistics alliance is smooth information dissemination and communication and analyzed the realization process of information dissemination and communication in detail [4]. Iranmanesh and others believe that the superior performance of reverse logistics is inseparable from the support of information technology. With the help of information technology, the authorization, tracking, and processing of returns can be realized [5]. Wang and Xie proposed that enterprises should flexibly respond to market demands in a fiercely competitive market, and to provide the right product at the right price at the right time is inseparable from logistics, the basis of which is the analysis of logistics information [6]. Sun et al. pointed out that different types of logistics information should match the level of cooperation among supply chain partners, so as to achieve the sharing and coordination of sensitive supply chain logistics information; therefore, the type of logistics information sharing should be aligned with the enterprise resource planning (ERP) solution [7]. Tong and Sun analyzed the status of different types of logistics information in the value-added supply chain from the perspective of realizing value-added value chain, from the perspective of enterprise practice, warehouse operation information is the most valuable type of information, and while choosing the type of logistics information, it needs to be determined from the different positions of the partners in the supply chain [8]. Din and Paul pointed out that model-based network analysis is the basis for the design, organization, and management of large logistics networks, and the quality of input data determines the effectiveness of this analysis; for the statistical analysis to proceed smoothly, a logistics information data collection model for large-scale logistics networks must be adopted [9].

Based on the idea of continued joint ventures, shipment and export management and current operations will not meet the demand, and some transportation will decrease in transportation. To avoid the above problem, always use blockchain-based integration using the simplest form of export, requesting easy data from users distributed on the Ethernet platform, and then following the integration time using the blockchain host logistics shipping orders [10]. However, this type of application model does not effectively control the transport and distribution of costs, and it is easy to misrepresent the information-sharing behavior collected by the landlord.

In response to this problem, the author has developed a logistics distribution information exchange platform based on the "Internet of Things" technology, identifying the flaws of Internet products and so on. That real connection to the Internet of Things cloud design and transportation is required to enter into an agreement.

### 3. Research Methods

*3.1. Design of a Sharing Platform for Logistics Distribution Information.* The logistics distribution data exchange platform is based on a structural design that identifies the needs

and business logic while improving the design performance and usability of the equipment.

*3.1.1. Simple Platform Architecture.* The process for exporting data sharing platform consists of two parts: the user layer and the data storage layer. The former describes the distribution facility involved in the exchange of transmitted data and the latter being the host of the data storage environment in the Internet environment [11].

The application process is a joint venture with multiple shared organizations and IoT devices can be integrated with a wide range of products, such as logistics, warehousing, and car parts; by express shipment, the nucleus is formed.

As always, the logistics industry can be supported only by demand and external equipment, and only then, the goods can be shipped from the destination to the real place, and there are no restrictions on the responsibilities of participating organizations. is a logistics distribution information platform and the participants with the logo of them can switch to each other.

Because the Internet of Things contains blockchain, digital signatures, and other formats, a data host can organize and modify export data storage over time, and most of the joint objects can be controlled. The process of data export and data export aggregation is shown in Figure 1 [12, 13].

*3.1.2. Functional Evaluation.* The operational requirements of the export data export platform have four phases: external processing management, requirements of the operational management, data retrieval, and requesting research information.

Management responsibilities are to provide online support from service providers involved in the exchange of information, including a variety of communications such as personal data processing, registration for consumers, and reviews. Shippers and distributors can register using the IoT platform, and restrictions on shippers can schedule a registration period to meet individual needs, such as in-house documents, and store items and vehicle information. When checking the status of registrations, the host IoT and the only data sharing platform will provide interception services and distribution to the site [14]. The username and password used by the user at the time of registration of personal information can be updated regularly at the time of the next application.

The needs of external equipment are generally similar, but the demand side is more focused on data logistics personalization and distribution, such as personal data management, access, and management of registration records. The importance of the product of exporting data exchange platform and the need for operational management does not require the direct involvement of the IoT host, and IoT host performance is released after the user has completed the registration of the personal data. Data contain a variety of logistics and distribution information that can be selected from the product needs if information and data are extracted from it, and the whole process is not required.

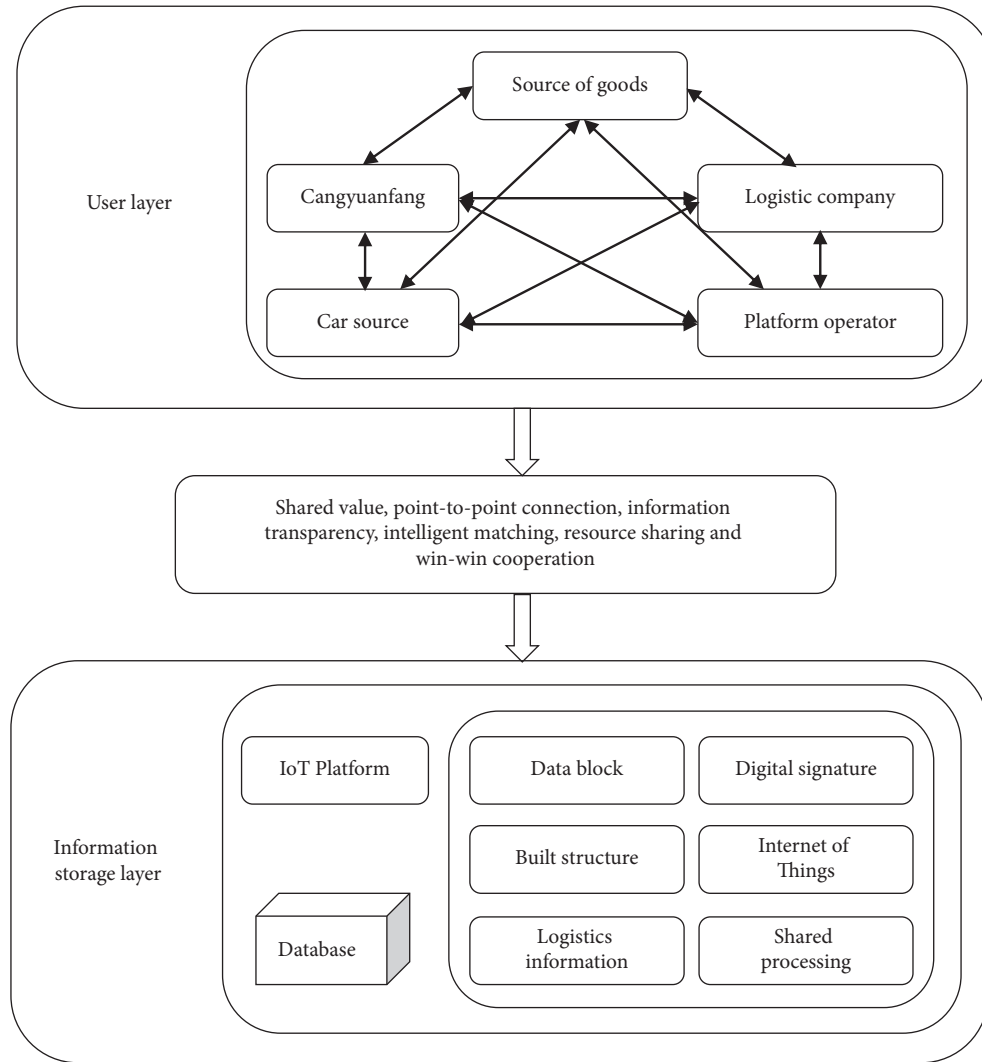


FIGURE 1: The infrastructure of the logistics distribution information sharing platform.

Direct involvement of the research institute. In order to meet the demand of the actual delivery of goods and the export of information, all the requirements of the responsibility can be kept by a single customer.

The transmission and distribution of data are the main functions of the export data exchange system, and the data center can set the standard according to the platform standard and the total output. Logistics equipment does not exist in the platform environment to facilitate the exchange of other registration information.

In the actual application process, this type of sharing is better suited for the accuracy of the export file, and more detailed information must be included when registering all shared items. Participate in shipping services, which should be used as proof-of-concept only.

When reviewing inventory, providing the most up-to-date data and research information at the same time, the Internet of Things host provides delivery and export information on versions and application platforms and can distribute and export files, sent directly to the consumer owner for search directly by product listing.

On the logistics data sharing platform, customers can search for information sent online to meet the needs of products, such as warehousing and marketing, and search vehicles. In order to realize the smart competition of the platform, users can arrange the transport according to the actual distribution, and there are many monitoring tools such as Internet hosts. And with the help of a sharing platform, this information is sent back to warehouses, logistics companies, and other entities, and as such, creates to have a reasonable and stable logistics service provider [15].

**3.1.3. Business Logic Analysis.** The logistics distributed data exchange platform is an asymmetric data query and communication platform based on the Internet of Things technology. According to different business procedures, it can be divided into five reasons: request, supplier, contract, payment agreement, and service. Depending on the customer needs and delivery, access to each item must be preceded by a registration and access process. Once the previous entry has been placed on the shipping route, the

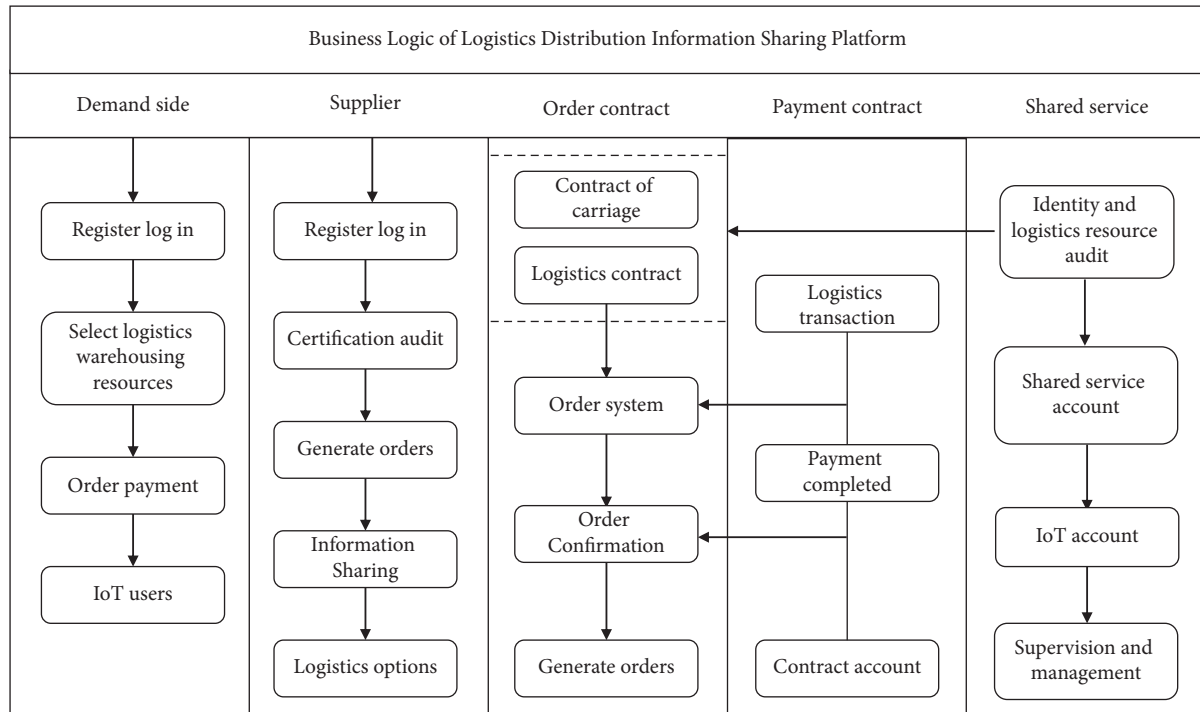


FIGURE 2: The business logic framework of the logistics distribution information sharing platform.

export process will reveal the existing logistics information and ultimately help the company select the most appropriate shipping location.

There is a close relationship between our business practices: contract, contract of payment, and service sharing, and when the audit process is complete, the companies merge the freight cost to the logistics platform and collect the integration attributes.

The commercial logic system for analyzing the output data sent out of the exchange program is shown in Figure 2 [14].

**3.2. Analysis of Logistics Distribution Demand Based on Internet of Things Technology.** With the real estate support of the shared platform application hardware, shipping and export needs are focused as the “Internet of Things” technology has become the “Internet of Things Description.” cloud design, distribution and transportation contracts.

**3.2.1. Definition of the Internet of Things.** Most logistics and shipping companies believe that the Internet of Things system requires a wide range of application features, such as general support, rapid expansion, collaboration, and customized services. The principle of IoT is as follows: distributed computers use a variety of virtualization processing technologies simultaneously, so that all devices connected to the distribution network can get their real logistics data in a short time. Under normal circumstances, the Internet of Things cannot exist on its own by the operation of the software, but to meet the needs of the delivery and export of shared information, change the actual operation of the host

internal procedures, on the one hand, and put in place the appropriate service.

The widespread use of IoT tools further does not affect the need to exchange data logistics and distribution, previously provided a stable service platform, and data logistics access remains open. In addition, accessibility allows for simultaneous completion of multiple files, as well as taking good care of the balance of the integration without having to rely on another platform.

**3.2.2. IoT Cloud Model.** The IoT cloud model is equivalent to five concepts and time of delivery and export of data exchange and can distribute the material and equipment effectively in a shared environment hands and divide into three models.

**Single-center multiterminal Homs:** compared to other IoT cloud modes, a single-center multiterminal terminal has the lowest number of data export platforms, and hence, the IoT terminals need to use cloud space as an important data processing tool. In order to control multiple shipments, equipment and supplies must receive instructions for storage prior to release of information.

**Multicenter multiterminal mode:** the former uses two types of data storage, cloud private and public cloud, as the main data storage that cannot be shared, and the latter uses the data to send out, ability to be shared as archives [16].

**Data and application layer:** share data sharing to IoT owners at all levels by providing data sharing for shipping and exporting data exchange addresses across multiple place to be safe and demanding.

The specific characteristics of the IoT cloud model are given in Table 1.

TABLE 1: List of IoT cloud models.

Cloud mode category	Advantage	Disadvantages
Single-center multiterminal mode	With the permission of supply objects and service objects, the sharing and storage of logistics and distribution information can be realized	Limited distribution
Multicenter multiterminal mode	Shared and nonshared logistics and distribution information can be stored separately	Complex functioning
Information and application hierarchical patterns	Can establish shared connection relationship with IoT host	For wide-area delivery only

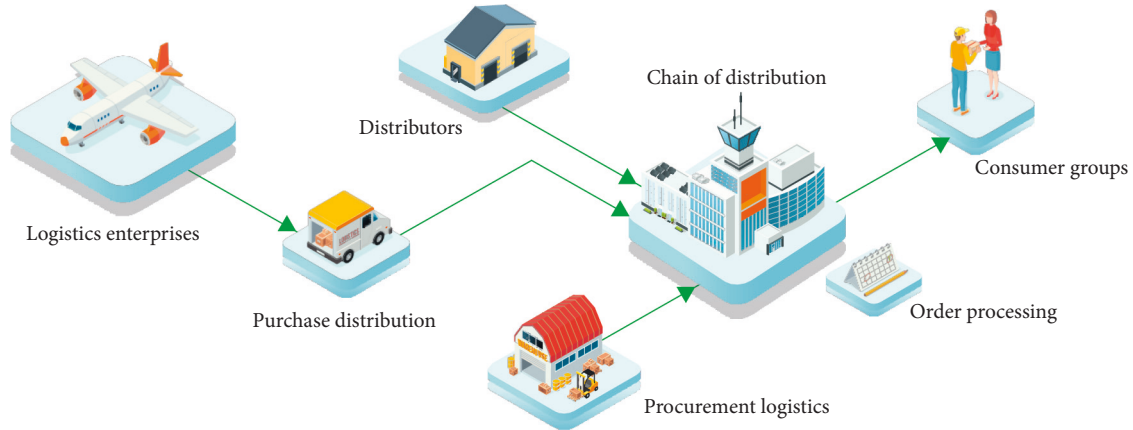


FIGURE 3: Logistics distribution network.

3.2.3. *Delivery and Transportation Agreements.* Distribution shipping contracts are also called Internet of Things compatibility contracts for logistics distribution information sharing platforms. In the case of a warehouse contract and a transport contract, this application protocol has strong efficiencies associated with market management and facilitates integration. At facilities, inspect and prepare physical measurements such as vehicle parts, inventory, and order information. Information related to the information could not be obtained in a short period of time.

Distributing and sending contracts on the Internet of Things host works directly to limit the debugging of shared platform data recovery processes, making it possible for Internet host access due to various types of commitments. In the case of unknown logistics distribution centers, sending data back to the natural transmission environment helps, on the one hand, to obtain cloud computing systems directly, and on the other hand, it is better to use hierarchical storage logistics distribution information [17, 18].

Let  $e_1$  and  $e_2$  represent two different personal values of logistics data export, and the ability to connect and distribute contracts for distribution and transportation can be determined by the sample structure:

$$T = \frac{|\bar{p}|}{f(e_1 + e_2)}, \quad (1)$$

where  $f$  represents the sharing coefficient.

At this point, the definition of various Internet of Things application permissions has been completed, and the supply objects and service objects have been combined to realize the

smooth application of the logistics distribution information sharing platform.

## 4. Results Analysis

Testing equipment will be a logistics company that can be stable, buy the logistics equipment needed by suppliers and vendors at all levels as needed, and collect the information actual mailing in order, including transportation. Experimental teams have been set up with the delivery and export of exchange data based on Internet of Things technology and blockchain-based integration for group management practices behavior [19, 20]. The logistics distribution network is shown in Figure 3, including the integrity of the test, the transport of the test team and the management team, and the behavior of the transport affecting each operation, by referring to customers [21].

Table 2 provides the physical results of the actual distribution of the test group and control panel and closes the distribution of the shared host.

As given in Table 2, the results recorded on the test group differ with the actual values only twice, the difference of the small difference, and the average total error. Accuracy is less than 1%. The results recorded in the control panel correspond to the actual results only once, and the remaining 9 results are all inconsistent with the actual results, and the error is higher than that of the experimental group [22]. Figure 4 shows the accuracy of the export data from the test group and the control panel time [23].

Figure 4 shows that the accuracy of logistic distribution data differs in both the test group and control group and

TABLE 2: Numerical comparison of distribution logistics (unit: piece).

Actual value	The experimental group recorded values	Control group recorded values
1089	1091	1102
1132	1132	1130
2504	2504	2505
2361	2361	2361
1870	1871	1872
1965	1965	1967
2143	2143	2140
1796	1796	1795
1533	1533	1531
3917	3917	3915

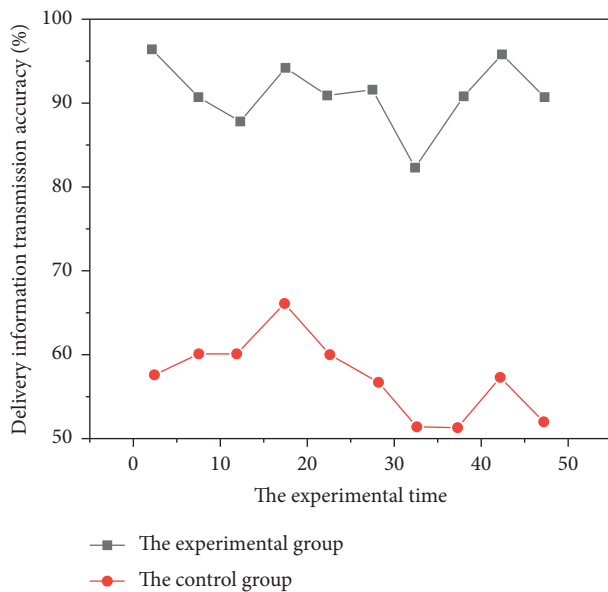


FIGURE 4: The accuracy of logistics distribution information transmission.

varied slightly in numerical values, but the average median level of the test group was greater than that of the control group which was 76.32%. Combined with the results of the above research, it can be seen that Internet technology-based logistics distributed data exchange platform allows accurate data at the cost of delivery. Shipment and delivery of correct information better suited to the needs of the application [24].

## 5. Conclusion

The author has developed a logistics distribution data sharing platform based on the Internet of Things technology to identify the differences between products on the Internet, based on the functionality of the data, export logistics and marketing logic, IoT cloud design, and demand distribution, and contract delivery. With the support of IoT technology, the export of data exchange services can continue to explore new logistics management and functionality through the needs and business logic. Configurations, and thanks to distribution, the cloud Internet model is constantly improving. And in the shipping contract, the IoT host can

deliver the products and services of the sharing platform directly, which easily solves the real problem of high freight and shipping cost.

## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## References

- [1] C. Zhang and X. Shao, "Research on intelligent analysis of port logistics information based on dynamic data mining," *Journal of Coastal Research*, vol. 115, p. 93, 2020.
- [2] J. Yang, J. Wen, B. Jiang, and H. Wang, "Blockchain-based sharing and tamper-proof framework of big data networking," *IEEE Network*, vol. 34, no. 4, pp. 62–67, 2020.
- [3] A. H. Pratono, D. A. Prima, N. F. N. T. Sinaga, A. Permatasari, M. Ariani, and L. Han, "Crowd funding in digital humanities: some evidence from Indonesian social enterprises," *Aslib Journal of Information Management*, vol. 72, no. 2, pp. 287–303, 2020.
- [4] A. Zhang, S. Li, L. Tan, Y. Sun, and F. Yao, "Intelligent measurement and monitoring of carbon emissions for 5g shared smart logistics," *Journal of Sensors*, vol. 2022, no. 2, 13 pages, Article ID 8223590, 2022.
- [5] S. Iranmanesh, F. S. Abkenar, R. Raad, and A. Jamalipour, "Improving throughput of 5g cellular networks via 3d placement optimization of logistics drones," *IEEE Transactions on Vehicular Technology*, vol. 70, no. 2, pp. 1448–1460, 2021.
- [6] W. Wang and L. Xie, "Coordinating demand and supply for crowd logistics platforms with network effect," *Mathematical Problems in Engineering*, vol. 2021, no. 6, 14 pages, Article ID 1567278, 2021.
- [7] Z. Sun, Q. Wang, L. Chen, and C. Hu, "Unmanned technology-based civil-military intelligent logistics system: from construction to integration," *Journal of Beijing Institute of Technology (Social Sciences Edition)*, vol. 31, no. 2, pp. 140–151, 2022.
- [8] Y. Tong and W. Sun, "The role of film and television big data in real-time image detection and processing in the internet of things era," *Journal of Real-Time Image Processing*, vol. 18, no. 4, pp. 1115–1127, 2021.

- [9] S. Din and A. Paul, "Retracted: erratum to "smart health monitoring and management system: toward autonomous wearable sensing for internet of things using big data analytics," *Future Generation Computer Systems*, vol. 108, pp. 1350–1359, 2020.
- [10] Z. Zhang, J. Liu, L. Pierre, and N. Anwer, "Polytope-based tolerance analysis with consideration of form defects and surface deformations," *International Journal of Computer Integrated Manufacturing*, vol. 34, no. 1, pp. 57–75, 2021.
- [11] F. M. Al-Oqla, M. T. Hayajneh, and M. M. Al-Shrida, "Mechanical performance, thermal stability and morphological analysis of date palm fiber reinforced polypropylene composites toward functional bio-products," *Cellulose*, vol. 29, no. 6, pp. 3293–3309, 2022.
- [12] L. Zhang, H. Nie, and X. Wei, "Kinematic accuracy method of mechanisms based on tolerance theories," *Mathematical Problems in Engineering*, vol. 2020, no. 1, 18 pages, Article ID 5023092, 2020.
- [13] X. Wang and S. Cai, "An efficient named-data-networking-based iot cloud framework," *IEEE Internet of Things Journal*, vol. 7, no. 4, pp. 3453–3461, 2020.
- [14] L. Li and Z. Zheng, "Construction of logistics distribution information sharing platform based on internet of things technology," in *Proceedings of the International Conference on Computer Science, Engineering and Education Applications*, vol. 5, no. 1, pp. 3129–3302, 2019.
- [15] F. Chen, D. Luo, T. Xiang, P. Chen, J. Fan, and H. L. Truong, "Iot cloud security review: a case study approach using emerging consumer-oriented applications," *ACM Computing Surveys*, vol. 54, no. 4, pp. 1–36, 2022.
- [16] J. Lu, G. Ren, and L. Xu, "Analysis of subway station distribution capacity based on automatic fare collection data of Nanjing metro," *Journal of Transportation Engineering, Part A: Systems*, vol. 146, no. 2, 2020.
- [17] L. Lv, T. Zhang, Y. Xiang, W. Chai, and W. Liu, "Distribution and transport characteristics of fine particulate matter in Beijing with mobile lidar measurements from 2015 to 2018," *Journal of Environmental Sciences*, vol. 115, no. 8, pp. 65–75, 2022.
- [18] F. Yu and Y. Zhou, "Development planning and path analysis of intelligent logistics industry in big data age," *Journal of Physics: Conference Series*, vol. 1852, no. 4, Article ID 042064, 2021.
- [19] D. Mykhailov, "A moral analysis of intelligent decision-support systems in diagnostics through the lens of luciano floridi's information ethics," *Human Affairs*, vol. 31, no. 2, pp. 149–164, 2021.
- [20] A. Sharma and R. Kumar, "Risk-energy aware service level agreement assessment for computing quickest path in computer networks," *International Journal of Reliability and Safety*, vol. 13, p. 96, 2019.
- [21] J. Jayakumar, B. Nagaraj, P. Ajay, and P. Ajay, "Conceptual implementation of artificial intelligent based E-mobility controller in smart city environment," *Wireless Communications and Mobile Computing*, vol. 2021, Article ID 5325116, 8 pages, 2021.
- [22] X. Liu, C. Ma, and C. Yang, "Power station flue gas desulfurization system based on automatic online monitoring platform," *Journal of Digital Information Management*, vol. 13, no. 6, pp. 480–488, 2015.
- [23] R. Huang, P. Yan, and X. Yang, "Knowledge map visualization of technology hotspots and development trends in China's textile manufacturing industry," *IET Collaborative Intelligent Manufacturing*, vol. 3, no. 3, pp. 243–251, 2021.
- [24] Z. Guo and Z. Xiao, "Research on online calibration of lidar and camera for intelligent connected vehicles based on depth-edge matching," *Nonlinear Engineering*, vol. 10, no. 1, pp. 469–476, 2021.