Construction of Intelligent Logistics Model Based on Big Data

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Abstract: The arrival of the era of big data and the rapid development of e-commerce has provided a new direction for the development of modern logistics industry. It has promoted the logistics industry to transform the past experience thinking into data thinking. The operation mode has gradually changed from the traditional extensive mode to the intelligent logistics mode characterized by informatization, data, sharing and intelligence. Based on the analysis of the characteristics of intelligent logistics under big data, this paper expounds the development trend of intelligent logistics in the future, with a view to realizing the transformation and upgrading of logistics industry. Firstly, this paper introduces the concept of intelligent logistics under the background of big data, and then puts forward the construction of intelligent logistics framework based on big data, as well as the construction method, which provides suggestions for the stable operation of intelligent logistics and has reference significance for its better development..

1. Introduction

With the development of information technology, especially the growing popularity of the Internet, facing the vigorous development of Internet e-commerce, logistics has become an important guarantee for the effective operation of e-commerce. Therefore, both traditional logistics enterprises and manufacturing enterprises have realized that in order to realize logistics informatization, it is necessary to establish an information management platform specifically for logistics. Intelligent logistics is the use of integrated intelligent technology, so that intelligent logistics imitates human intelligence, using perception, learning, reasoning and judgment thinking ability, so that logistics system has the ability to solve some problems in logistics. Intelligent logistics integrates existing resources and technologies of Internet of Things, Sensor Networks and Internet. Through fine and dynamic scientific management, it realizes logistics automation, visualization, controllability, intellectualization and networking, thereby improving the utilization rate of resources and productivity level. Big data technology is the basis of the realization of smart logistics. Using big data technology, smart logistics can greatly improve logistics efficiency, improve customer satisfaction, and reduce logistics costs. Therefore, it is of great significance to study and construct an intelligent logistics model based on big data.

2. Intelligent cloud logistics technology based on big data

With the extensive development of Internet and information technology, the traditional logistics management mode has been changed. The vigorous development of e-commerce has promoted the further development of logistics and raised the logistics industry to a very high level. At the same time, logistics is also an important guarantee for realizing e-commerce. The rapid development of e-commerce requires the improvement of enterprise logistics level and logistics service level.

2.1. E-commerce logistics

E-commerce logistics is a kind of logistics based on computing technology, interconnection technology, e-commerce technology and information technology under the condition of e-commerce environment, which is an informationized and socialized logistics. Logistics system has three functions: transportation, storage and distribution, as shown in Figure 1 below.
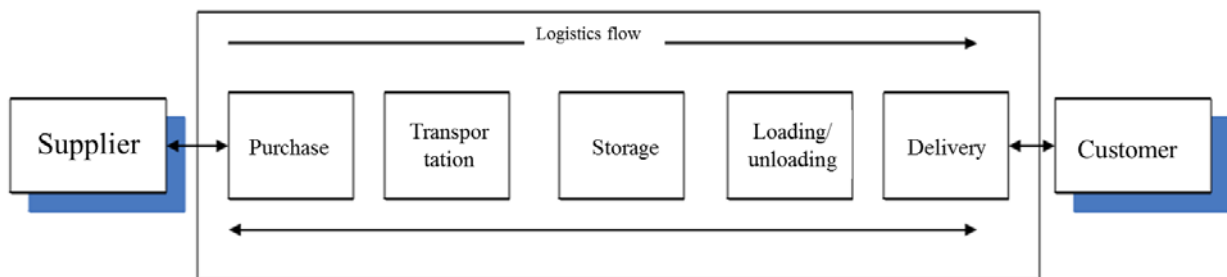

Figure1. Functions of logistics system

2.2. Key technologies of big data

Big data is extracted from massive data for processing, and these data are related to each other to some extent, which has analytical value. Its core technologies are divided into two categories: pattern recognition technology, data mining technology, distributed database technology, signal processing technology and cloud computing technology. Big data is closely related to cloud computing, which cannot be processed by a single compute, it should rely on the distributed processing of cloud computing, distributed database, cloud storage and virtualization technology to mine large amounts of data. Large data technology system has complex structure and various functions. For logistics system, it can be divided into distributed large data cloud storage technology, distributed large data processing technology and a large number of data operation and management technology.

2.3. Intelligent logistics based on big data

Intelligent cloud logistics is the concept of introducing big data cloud computing technology into modern logistics management mode. Based on standardized operation process, big data processing ability, precise link control, intelligent decision support, flexible business coverage and in-depth information sharing, it establishes a service platform based on big data to complete all aspects of logistics activities. The smart logistics structure is shown in Figure 2 below.

Figure2. Smart logistics structure

3. Construction of intelligent logistics model framework in big data era

From the perspective of supply-demand balance, intelligent logistics makes logistics intelligent, and makes logistics system have the ability to think, perceive, learn and solve problems by itself. Its goal is to maximize the profits of suppliers, that is, logistics enterprises, to provide the best services for demanders, and to maximize resource utilization under the premise of supply-demand balance. Intelligent logistics under the background of big data has advanced technical characteristics such as informationization, networking, integration and visualization. Logistics information is processed according to big data. Intelligent logistics information technology mainly includes logistics information perception technology, logistics information push technology, logistics information processing technology, analysis technology and prediction technology.

The architecture of intelligent logistics system consists of four layers: perception layer, network transmission layer, data storage layer and application service layer. Among them, the data perception layer includes recognition system, positioning system and tracking system. Data transmission layer uses various transmission networks and communication technologies, timely and secure transmission of information collected by sensing devices. The function of the data storage layer is to process and manage the data acquired by the perception layer. Application service layer, including data exchange platform, public service platform and enterprise user service platform.

4. Intelligent logistics system construction approach based on big data

Different from traditional logistics, intelligent logistics system starts with data, and the application of data runs through the whole process, and rises cyclically. Through reliable data source and processing technology, with the help of big data and its technology, we can design intelligent logistics system. The design and construction process of the system can be achieved through the following three steps.

4.1. Building intelligent sensor based on big data technology

The comprehensive perception of logistics information is the premise of building intelligent logistics system. The main application technologies include: sensing technology, image recognition technology, positioning and navigation technology, etc. By quickly and timely grasping the information of warehouse outlets, transportation vehicles, distribution tools, terminal stores, people and goods, the database is established to provide information support for the follow-up cloud computing, intelligent decision-making and so on. For example, the application of RFID tags, temperature and humidity sensors and GPS receiving devices on transport vehicles can realize dynamic tracking and monitoring of transport goods, and intelligent scheduling of transport vehicles according to road traffic conditions.

4.2. Building transmission channel based in internet and communication technology

The transmission channel is a bridge connecting the data acquisition layer and the data storage layer. Logistics information transmission is accomplished through Internet, mobile communication network and wireless sensor network. At present, the development of Internet, mobile communication and other technologies has been relatively mature, which can realize the transmission of logistics data. All kinds of access devices are connected with mobile communication network and Internet, and information is transmitted in network channels, and preliminary processing is carried out such as classification. Relevant information obtained by each perception end is transmitted to the storage server on the network timely and accurately through the transmission channel.

4.3. Building storage cloud based on big data technology

Storage layer comes from massive data of transaction and logistics links. A single computer or server cannot accommodate it. How to store and process these data is very important. Cloud computing can provide huge storage and computing resources for intelligent logistics systems because of its powerful storage capacity and computing processing capacity. Using a unified data storage format and data processing method, these massive data are stored in various storage devices and servers in the network according to a certain distribution mode, forming storage clouds, transport clouds and so on, which can provide decision support for managers. Cloud computing is the core support of all kinds of information processing, integration and Application on the perception side. The cloud computing centre in intelligent logistics integrates the information collected and transmitted by the perception end and the transmission end, provides customized services for users, reduces application costs and improves processing efficiency.

5. Conclusions

Intelligent logistics is the development trend of current logistics industry. Intelligent logistics based on Internet and integrated intelligent technology such as big data and cloud computing has become the pioneer of supply-side structure reform of logistics industry and a new momentum of improving quality, increasing efficiency and transforming development. Large data, as a large-scale, multi-type, low density, complex structure, timeliness and high value data set, is an important resource and production factor of intelligent logistics. Intelligent logistics based on big data is a complex system engineering. It is necessary to promote the organic integration of big data technology, smart logistics technology and logistics enterprises by combining the characteristics of information communication, data-driven, resource sharing and artificial intelligence of smart logistics, so as to enhance the intelligence level of the whole logistics system, so as to promote the overall and efficient development of the logistics industry.

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