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Exploring the scale application of the IOT in Intelligent Logistics

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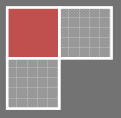
ABSTRACT

This study mainly discussed the basic definition of Internet of Things (IOT), intelligent logistics as well as the developing process of IOT technology; with the rapid development and extensive application of IOT technology, especially the wider application of IOT technology in the field of logistics, intelligent logistics has been developing rapidly in the support of IOT technology. Since there is less research and discussion on the intelligent logistics at present, the intelligent logistics is in its early stage of development and requires government's strong guidance and support. Unlike traditional logistics mode, E-commerce logistics is the resource integration of E-commerce and logistics, and it has developed for ten years in China. There are currently three basic mode of e-commerce. In this study, the two of the most popular B2B and C2C mode were chosen as the object of study to research the service quality evaluation. B2B model is the business-to-business and in this mode, we mainly study the enterprise e-commerce logistics; C2C model is consumer to consumer and in this mode, the content of our research is retail e-commerce, or online shopping logistics. In this study, we mainly researched the generality and characteristics of the above two service modes and designed the assessment index system of E-commerce Logistics, and finally constructed service quality evaluation index system in both modes. Exploring the application and practice in this study provided a strong technical support for the application of IOT in intelligent logistics.

KEYWORDS

"The concept of internet of things (IOT)"; "The Field of Intelligent Logistics"; "Large-scale Technology and its application"; "The key technologies of IOT".



INTRODUCTION

IBM proposed the "Smarter Planet" in 2008 and US president took the "Smarter Planet" as a national strategy. We have studied the generality and characteristics of the two e-commerce mode. Their generality is as follows: E-commerce logistics services are similar in the contents; E-commerce logistics services are consistent in the characteristics; the operation target of E-commerce logistics services is logistics enterprises and can form complementary chain in the operation. In the design of e-commerce evaluation index system, we should consider all aspects of e-commerce logistics services and assess its various elements involved. The similarities and differences between different modes are reflected by evaluating and supervise different indicators system. In this part of the work, we must follow such five principles as basic principles, central principles, important principles, essential principles and key principles. In the determination of E-commerce evaluation system, the determination of evaluative dimension has a direct impact. Despite all this, the maturity and imperfect of IOT will bring a new round of information wave.

IOT AND THE KEY TECHNOLOGIES OF IOT

Concept and connotation of IOT

IOT is based on Internet and traditional telecommunications networks and it uses radio frequency identification technology, sensor networks, infrared and other high-techs. With the rapid development and popularity of the network, logistics service has undergone enormous changes. Logistics has gradually become an essential part of commodity trading process and more and more people are choosing logistics services as a primary tool to buy goods[1].

The operational process of IOT (Figure 1) includes three steps in general. However, due to China's vast territory, large population and the uneven distribution of computers and network resources, the development and promotion of logistics services is not very perfect. Different problems arise inevitably in the distance education platform in practical application, and it needs improving and updating[2]. The advent of the concept of IOT was as early as in 2007 and the biggest advantage of cloud computing technology is its efficient operational capability and unlimited storage capacity. Therefore, since its advent, more and more people research it. This study was just researching the advantages and feasibility of IOT in the logistics information platform for public service. Through a comprehensive demonstration, this study proposed to apply IOT to logistics information platform for public service, and the shortage of traditional logistics information platform for public service can be solved with the aid of the efficient computing power and unlimited storage capacity of IOT. It is discovered by practice that, the logistics information platforms for public service which integrates IOT have made a much more progress in improving logistics service quality and in the informatization, networking and automatization of logistics industry and are more conducive to large-scale promotion of logistics services. Based on cloud computing technology, this study constructed logistics information platform based on calculations and applied efficiently the cloud computing technology to the logistics service business. IOT includes sensors and sensor networks, information processing and computing and high-speed and reliable public network carrier[3].

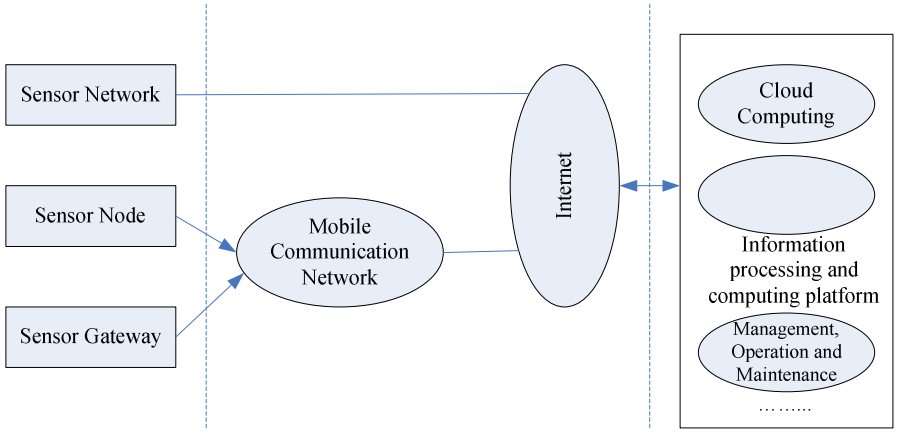


Figure 1 : The concept of IOT

Key technology of IOT

IOT technology is a technical system rather than a single technology[4]. After the design of index in the quality evaluation of E-commerce benefits and the establishment of dimensions, evaluating indicator system was established at the end. In choosing logistics enterprise, according to the above analysis, QOS Indicator System in the B2B model is shown in Figure 1. In C2C mode, the body and service objects of e-commerce are consumers for consumers. However in the determination of reliability dimension, the focus of the attention in C2C is the same to that of B2B, that is, the attention should be paid to accuracy, timeliness and completeness. But in choosing the logistics, as service objects are faced with consumers and at present, China's network speed is not ideal, and network and servers are unbearable centralized access, distance education schools usually build multiple learning Center shunt server off campus, most of which use B / S mode. Central Learning Center servers are constructed in the IOT of the school and other learning centers that are also equipped

with teaching resources servers. All the servers of system background stores learning resources, including documentation resources and video resources for users to freely use. Therefore, relatively large changes exist in the transaction, and a variety of factors should be taken into account in the transaction process, such as costs, prices of single items, whether the consumer are satisfied with goods, and whether changing or refunding arise[5]. So in choosing of logistics enterprises, not only the enterprises are reliable, but also the distribution points of the logistics enterprises are reasonably distributed, and can adequately reflect the humane care at the time of delivery of the goods. Based on the above analysis, QOS Indicator System was derived in the model of C2C, and the chart of IOT is shown in Figure 2.

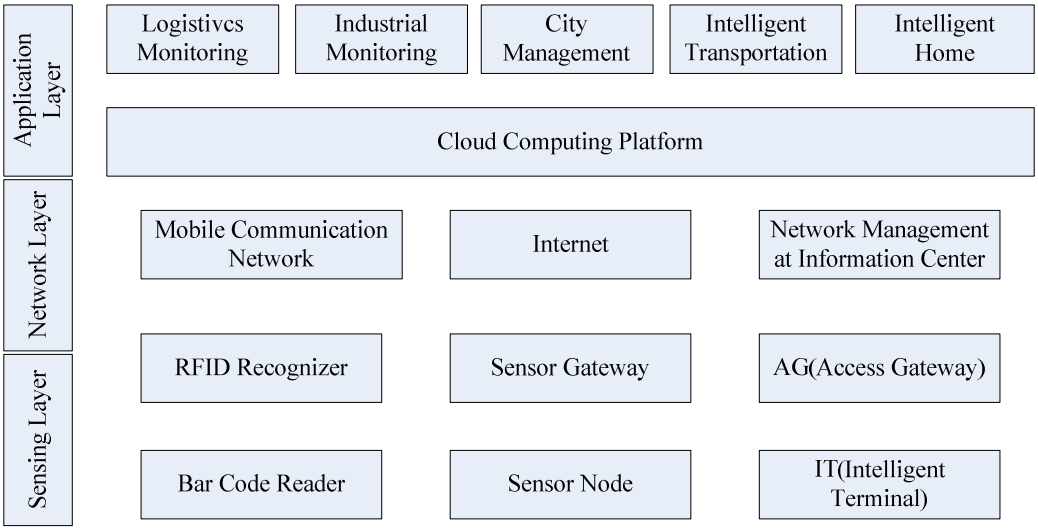


Figure 2 : The Internet of things system architecture diagram

INTELLIGENT LOGISTICS BASED ON IOT

With the proposal of the "Smarter Planet" and the deepening and development of the research of the "Intelligent" concept, Wi-Fi, RFID and sensor technology, as well as laser technology, coding technology and satellite positioning and other high-techs provide technical support and protection for intelligent logistics.

Intelligent logistics

The so-called intelligence, logistics, refers to a network system of logistics and distribution constructed by means of IOT technology and information technology which integrates informationization, intellectualization and systematization. The logistics information platform for public service designed in this study consists of base layer, the service layer and the application layer. There are four modules in this platform, which are data processing and monitoring, processing, decision-making, base modules, etc[6]. The resource library of base layer platform system is required to ensure the reliability and stability of the foundation repository by means of hardware, software, virtual technology, etc. The base layer provides the base support for server and application layer, such as providing computing capacity and storage. It is can be said that the base layer is like the energy depot of platform system. Since the service processing module of the system is at the application layer, the core of the platform systems is surely the application layer. Service processing module can further divided into the following sub-modules: consolidated supervision, permission assignment, business processes, the system automatic registration, document processing, information collection, search, etc. Application layer mainly provides interactive interface for students or other programs. Distance education platform whose data security requirements are based on cloud computing method use the backend server, database management systems to automatically manage data and schools themselves don't manage by hand anymore; Maintenance and upgrading of the entire system are also done by professional service providers, schools no longer maintain their own management; IOT can't do without the Internet as all the request to send and data transmission of logistics are achieved via the Internet, so it is very difficult to guarantee the secure transmission of data in the process. Though the security requirements to the distance education platform is not higher than that to the business systems, especially to the financial system, but the confidential data such as personal information of teachers and students, exam answers, especially sensitive exam answers and teaching documents can't freely open to the public[7]. This requires that in the design of new distance education platform, the safe reliability of sensitive data must be guaranteed. The market size and market segments of IOT in China's modern logistics industry are shown in Figure 3.

Application and practice of intelligent logistics

Intelligent logistics is a high-level of logistics in the modern development and it features multi-body, involving a wide field and multi-industry. Application interface consists of five parts: the login screen, the "community" management, cloudy storage, cloud computing, platform management and control[6]. System users upload their own information through the logon mode in the login screen and can use the platform learning resources after landing the system; according to user's

needs, the platform get resources from corresponding server and provide them to users. After the filling out and submission of information by users, "community" will manage the information submitted. "Community" has all the resources on the platform. "Community" is like a collation of user needs in essence and it abstracts the users of the same class or similar needs into the household in a "community" and gives them managers. Platform users need to comply by Community Management System in the "community" and according to certain process use community resources, namely learning resources on the platform. The managers understand the specific needs of users according to their action in the "community" and commend related resources to users. In cloud computing service module, as the powerful computing capability of IOT can easily meet the needs of a large number of users frequently access, all teaching resources are stored on the cloud servers; IOT can also help the users reduce a lot of input in bandwidth, firewalls, load balancing equipments; It can furthermore help users solve the such major problems of network as security issues, complex computing problems, data integrity issues, etc. Cloud computing uses the XML technology to exchange data in the bottom layer. The system has an interactive function and teachers can directly answer questions for students on education platform. System management module can manage and control all the resources on the platform, including monitoring each module of the system itself and supervising the actions of teachers and students on the platform. All resources and operations on the platform can be seen by system management module.

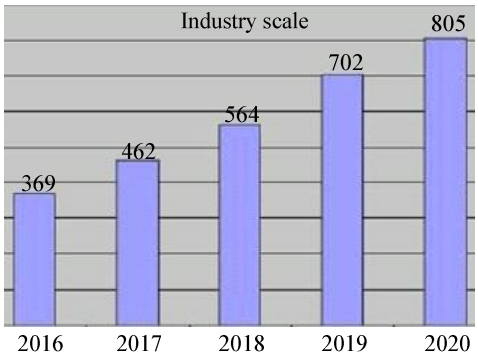


Figure 3 : The market size and growth of IOT in the intelligent logistics in China in 2016-2020

Through testing and validation of this platform, the distance education system is found to have the following advantages: firstly, overall service capacity of the system is strong, particularly its storage capacity, the ability to computing complex problems; advantages of cloud computing technology was fully demonstrated on this system and greatly improved the ability to share resources and computational ability of the distance education. Secondly, the system makes it possible to establish a unified national distance education platform. Distance Education Center around the country can also be unified to deploy and construct resources, thus effectively avoid wasting resource and greatly reducing logistics cost. Finally, learning resources can be flexibly configured according to the different needs of system users. It is also possible functionally to customize their learning system according to user needs without changing the code and system independent deployment. What all it needs is that database independence of each user should be maintained and an account corresponds to a database. Such isolation scheme isolates the most thorough and data security is the highest but it has a drawback that funding invested is too much. In the second scheme that the data pattern is isolated while library is sharing. The whole educational platform only has one database, and each account has a separate mode; each user is provided with abstract logical data isolation, not actual physical isolation; and a database is capable of supporting multiple users, which effectively reduces system cost. As the isolation is abstract and logical relation is relatively complicated, it is difficult to manage. In the third scheme data pattern and library are shared and the entire education platform has only one database and one data pattern. IOT related industries are shown in Figure 4.

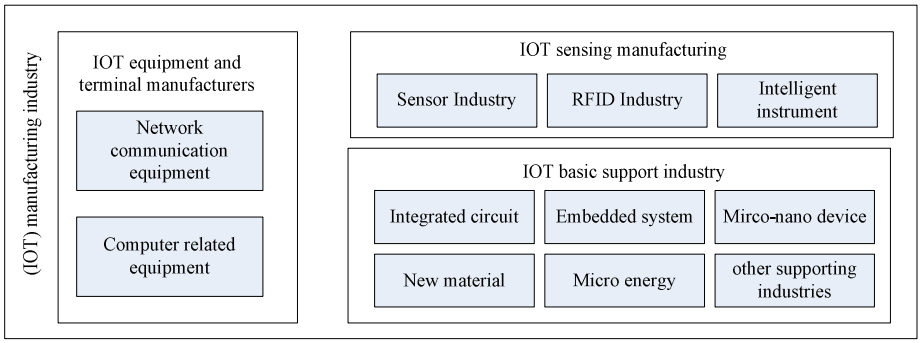


Figure 4 : Technology related industrial networking and material

Users can use the platform learning resources after landing the system; according to user's needs, the platform get resources from corresponding server and provide them to users. After filling out and submission of information by users, "community" will manage the information that is submitted. "Community" has all the resources on the platform. "Community" is a collation of user needs in essence and it regards the users of the same class or similar needs to be the household in a "community" and give them with managers. Platform users need to comply by Community Management System in the "community" and according to certain process use community resources, namely learning resources on the platform. The managers understand the specific needs of users according to their action in the "community" and commend related resources to users.

PROBLEMS AND COUNTERMEASURES

IOT technology is in the ascendant and the Intelligent Logistics which is based on IOT technology is also booming. As the powerful computing capability of IOT can easily meet the needs of a large number of users frequently access, all teaching resources are stored on the cloud servers; IOT can also help the users reduce a lot of input in bandwidth, firewalls, load balancing equipments; It can furthermore help users solve the such major problems of network as security issues, complex computing problems, data integrity issues, etc. Cloud computing uses the XML technology to exchange data in the bottom layer. The system has an interactive function and teachers can directly answer questions for students on education platform. System management module can manage and control all the resources on the platform, including monitoring each module of the system itself and supervising the actions of teachers and students on the platform. All resources and operations on the platform can be seen by system management module.

TABLE 1 : Factors influencing modern logistics synergy

classification of coefficient	name of impact factor	score
Technical Cooperation	(1)Unified Data Format	3.0
	(2)Standardization of the interface	2.3
	(3)Products in general	2.0
	(4)Unified product specification	1.9
Information Cooperation	(5)The degree of the information sharing	4.7
	(6)advanced and liable information equipment	3.2
	(7)Data Format Compatibility	4.8
	(8)Degree of Message Delay	3.0
	(9) Saturation of Amount of Information	3.1
	(10)System Stability	4.5
Service Cooperation	(11)Degree of collaboration of suppliers	3.3
	(12)Timely feedback from customers	1.7
	(13)Degree of collaboration of partners	2.9
	(14)Support of collaborators	2.2
	(15)Relationship of competitors	2.2
	(16)Strength of replacers	1.5
Management Cooperation	(17)Rationality of marketing plan	3.2
	(18)Merits of service quality	3.0
	(19)Science of strategic planning	3.8
	(20)Sharing resource and reasonable use	4.3
	(21)Rational utilization of organization relationship	4.0
	(22)Smooth business process	3.9
	(23)Advanced technical specification	3.1
Interference of Non-human	(24)Meteorological disaster	1.9
	(25)Seasonal increase or decrease in the order	2.2
	(26)Traffic condition	2.7
	(27)Infrastructure is damaged	3.6
	(28)Storage capacity	3.0

Through testing and validation of this platform, the distance education system is found to have the following advantages: first, overall service capacity of the system is strong, particularly its storage capacity, the ability to computing complex problems; Advantages of cloud computing technology was fully demonstrated on this system and greatly improved the ability to share resources and computational ability of the distance education. Secondly, the system makes it possible to establish a unified national distance education platform. Distance Education Center around the country can also be unified to deploy and construct resources, thus effectively avoid wasting resource and greatly reducing logistics cost. Finally, learning resources can be flexibly configured according to the different needs of system users. It is also possible functionally to customize their learning system according to user needs without changing the code and system independent deployment. Platform upper application system runs in the support of the system software platform. Their success in spanning will lead the big leap and development of Intelligent Logistics. Factors are shown in TABLE 1.

CONCLUSIONS

In this study, the two of the most popular B2B and C2C mode were chosen to be object of study to research the service quality evaluation. B2B model is the business-to-business and in this mode, we mainly study the enterprise e-commerce logistics; C2C model is consumer to consumer and in this mode, the content of our research is retail e-commerce, or online shopping logistics. In this study, we mainly design the assessment index system of E-commerce Logistics by researching the generality and characteristics of the above two service mode, and finally construct service quality evaluation index system in both modes. Exploring the application and practice in this study provides strong technical support for the application of IOT in intelligent logistics.

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