Research on the Application of Computer Software Development Technology in the Data System of Internet of Things

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Abstract. With the integration of the global market and the development of science and technology, people have higher and higher requirements for the efficiency of life and production. These high requirements prompt the improvement of the existing business model in the market. The Internet of things is a new form of organization produced in this case, which can help the market to form a complete network. At present, there are still some problems in the data system of the Internet of things, which need to be solved by using advanced computer software development technology. This study describes three parts: the overview of computer software development technology, the overview of Internet of things data system and the application of computer software development technology in Internet of things data system.

Keywords: Computer Software, Internet of Things, Big Data

1. Overview of computer software development technology

In the current social environment, business can be understood as two parts: production and sales. In terms of production, computer technology can help reduce labor costs and improve production efficiency. In terms of sales, the single channel of traditional sales is a big limiting factor. Computer technology can help expand the width of channels and make money flow more smoothly, such as some takeout platforms and the now hot live online shopping [1]. Before the live broadcast, people may not have thought of buying these products. But live streaming can promote people's desire to buy through a large amount of publicity and short-term information input, thus helping the whole business system flow. Whether it is a takeout platform or webcast, most of the emerging life modules are inseparable from the development of software and platform. The development of software platform relies on computer technology.

Software development will change old industries and even create new ones. The classroom using computer software technology can not only teach face-to-face, but also allow the explanation of complex and abstract knowledge to be explained more easily. In the past, the knowledge that teachers needed to explain can be easily expressed through a revolutionary educational platform, and students can also understand it efficiently. Computer software can help people save most of their time and greatly improve their work efficiency [2]. This can help promote the rapid development of the human
economy. In the context of computer software, science and technology is growing explosively, and the cost of education has been greatly reduced. The average educational level of the people is generally higher, and they have more time to learn new knowledge.

In 1946, the world's first computer was born. In 1990, the first Internet page was opened to the public. After that, people have experienced the era of PC and the era of mobile Internet. Although the development of computer technology and software design has gone through decades, the current process of information and Internet is far from over [3]. Moreover, people are gradually entering the era of data and intelligence. The emergence of computers and the Internet has indeed created great wealth, and the business prospect of the intelligent era is even more unimaginable. So, the industry still needs to replenish a large number of computer talents. The development of computer science is still very rapid, and the iterative period of technology renewal is short. Perhaps the framework that was the mainstream of the industry a few years ago is now out of date. So, in the computer industry, keep learning and keep up with the trend of the times is what computer researchers must do. At present, the government has also begun to attach importance to the Internet and the recruitment of computer talents. In recent years, in the recruitment of civil servants, we can see that the computer major has gradually occupied a certain proportion [4].

Therefore, the prospect of computer technology will be more and more broad, especially in software development. With the development of high and new technologies such as artificial intelligence and robots, the depth and breadth of computer science will continue to be excavated. The computer science we see now is just the tip of the iceberg floating on the sea, and its potential is far from being fully tapped. In the future, computer science and software development will pay more attention to cross-disciplines, pay more attention to solving problems in people's daily life, and will enter the application scene of daily life more deeply.

2. Overview of internet of things data system

2.1. Internet of things

In essence, the job of the Internet of things platform is to provide a ready-made framework for all the Internet of things infrastructure, integrate all the content, and help people start to benefit as soon as possible [5]. At present, the Internet of things is developing at an astonishing speed. The global market for the Internet of things will exceed $1.38 trillion by 2026, according to a report. The change in the value of the global market for the Internet of things is shown in figure 1.

![Graph of Market Value of the Internet of Things](image)

**Figure 1.** The value change and future trend forecast of the global market of the Internet of Things

The advantages of the Internet of things are as follows:
(1) Save money. By increasing the likelihood of project success, the Internet of things reduces the time it takes for companies to develop systems and solve problems. If you do not rely on the Internet of things platform, some projects are more likely to fail. These failures can cost the company a lot of money. The IoT platform can also centrally manage all IoT networks. Collective management of the network is more cost-effective than decentralized devices.

(2) The security is high. The Internet of things can ensure the security of companies' devices and protect valuable business data from hackers and cyber criminals.

(3) Increase the speed of entering the market. The Internet of things platform can be responsible for many aspects of the Internet of things project, saving a lot of time for the development of the company. Many goods can quickly realize the process from theory to actual production with the help of the Internet of things, so as to improve the competitiveness of products and companies as much as possible.

(4) The Internet of things provides some mature functions for the company's business, including billing help and data analysis support. All the features can help companies maximize the use of the Internet of things infrastructure. This enables the Internet of things to provide valuable support for every member of the team.

In fact, the development of the Internet of things has also encountered many obstacles. These obstacles can be expressed by a formula:

\[ I_{0T} = \text{DevOps}^2 \] (1)

In other words, the development of the Internet of things requires companies to recognize multiple teams scattered throughout the enterprise: OT development, OT operation, IT development and IT operation. These four different teams, like teachers in different disciplines, all have specific goals and concerns. Coordination and planning between teams is necessary. Otherwise, teams will be inefficient and even divided.

At present, there are many platforms of the Internet of things in China. Especially after the concept of industrial 4.0 and intelligent manufacturing was put forward, the Internet of things platform and industrial Internet platform emerged strongly. There are both overlap and distinction between the Internet of things and the industrial Internet. The concept of the Internet of things should include the industrial Internet. The Internet of things refers to enabling all objects to contact and communicate with each other. On the other hand, the industrial Internet only focuses on the industrial aspect, such as enabling the monitoring of production and consumption to be linked to each other. In a broad sense, the industrial Internet is not as broad as the Internet of things. In fact, although there are many platforms of the Internet of things, most of the platforms of the Internet of things only put forward the concept of the Internet of things.

Few platforms can really cover all parts of the Internet of things. The Internet of things platforms on the market all do what they are good at in their own field, and use other people's solutions to integrate their own parts of what they are not good at.

2.2. Internet of things data system
The data in the Internet of things will not be independent of each other. The data describing the same entity is related in time. Data describing different entities will be spatially related. There is also a correlation between the different dimensions that describe the entity [6]. Different combinations of relevance will produce rich semantics, and the changes of entities can be inferred from the relevance of data in time or space or dimensions. After analysis, it is not difficult to see that the data types in the Internet of things are:
1) RFID: Radio frequency identification.
2) Sensor data: Multidimensional time series data.
3) Physical model: Model is the template of reality.
4) General environmental data and location data.
5) Address / unique identifier.
6) Status of actuator and command data for control.
7) Descriptive data for processes, systems, and objects.
8) Historical data.

3. Application of computer software development technology in data system of Internet of things

Computer software is an important basis for the development of the Internet of things. Without the platform of the Internet of things, the Internet of things will not be able to play its role. The Internet of things platform includes middleware that connects sensors, assets, data, software and business processes. The platform integrates all the different components of the Internet of things infrastructure to enable enterprises to reap all possible benefits. At present, there are many platforms of the Internet of things in the market, so it is very important to find a suitable platform for the business of the Internet of things [7]. This can be a daunting task that requires companies to sift through a lot of complex and competitive information.

From the point of view of device operation and data integration, the Internet of things platform can integrate all the Internet of things devices in the company and integrate them into a central system. This enables the Internet of things data to be combined with enterprise systems, thereby enhancing the systematization of the organization and improving existing processes [8]. The data management system of the Internet of things is shown in figure 2.

![Data Analysis Diagram](image)

**Figure 2.** The basic framework of the data system of the Internet of Things

The result of the use of the Internet of things platform is to create a more cohesive network for the company. Each branch network in this network provides a support for the whole network. This makes the Internet of things not a patchwork and collection of individual devices. In addition, through the software platform, Internet of things data can also be combined with data from external sources. Diversified data can help improve the organizational structure of the enterprise and simplify the operation model of the whole enterprise. This enables the company's management to have a more comprehensive understanding of the organizational framework and make the workflow transparent, so as to better promote the completion of the company's business. In other words, companies with high-end Internet of things software platform can easily adapt to the trend of the times and achieve goals in various fields [9].

Therefore, in the process of using the Internet of things platform to establish a database, there are many technical factors of software development that need to be taken into account. This is also the part that needs to be improved in the current computer software development technology and Internet of things data system, including:

1) In terms of data, the Internet of things database needs to take into account the effectiveness and heterogeneity of dealing with a large amount of data, as well as the integration of the database.

2) From the point of view of the establishment of the database platform, the user-friendly model needs to be implemented, and the query language of the database should be as accurate and convenient as possible. The database should also take into account its security to ensure that the company's
exclusive data and the privacy of its members will not be compromised. Construction cost is also a part that needs to be noticed. The original idea of the establishment of the Internet of things data system is to have a good management way for a large number of Internet of things data, so as to reduce the necessary expenditure for managing data. If the cost can not be controlled from some point of view, then the establishment of the database will backfire [10].

3) Data systems should be portable, including process modeling and the transaction process of items on the Internet of things. Portability is also reflected in the convenience of archiving the extraction of data. In addition, the data system should also be displayed in the time dimension of the data. Time series aggregation of Internet of things data through database is a very important part.

4. Conclusion
With the progress of society and the arrival of the era of knowledge explosion, computer technology has been applied in every aspect of people's life. It can be seen that almost all fields need to be sent to computer software. Whether in schools or companies, computer software has become an indispensable tool in social development. As a hot concept in recent years, the birth of the Internet of things can stimulate the huge commercial potential contained in the market. In order to make the Internet of things play its role as much as possible, computer software development technology must be used in the construction of the Internet of things data system. Although there are still some defects in the Internet of things data software platform, there is no doubt about its development space.

References
[1] Hu Shengyan; On the Application of computer Software Technology under the background of big data era[J]; Computer Programming Skills & Maintenance; 2018.
[2] Ha Hongqiang; Technical Analysis of computer Software in the era of big data[J]; Modern Industrial Economy and Informationization; 2019.
[3] Zhang Lingling; Research on the Development and Application of computer Software Technology in big data era[J]; Telecom World; 2019.
[4] Zhuang Weigong; The Application and Development trend of computer Software Development Technology under the background of big data[J]; Technology Innovation and Application; 2020.
[5] Gao Yunquan, Li Xiaoyong, Fang Binxing; A Summary of search Technology of Internet of things[J]; Journal on Communications; 2015.
[6] Shen Subin, Lin Chuang; Special topic preface: opportunities and challenges in the study of the Internet of things[J]; Journal of Software; 2014.
[7] Dong Wenhua; Application of Software Development Technology in data system of Internet of things[J]; Journal of Fujian Computer; 2021.
[8] Jia Chen; Internet of things data system based on computer Software Development Technology[J]; China Plant Engineering; 2019.
[9] Yang Shaohui; Internet of things data system based on computer Software Development Technology[J]; Electronic Technology & Software Engineering; 2018.
[10] Yan Shuang; Analysis and Research on data system of Internet of things based on computer Software Development Technology[J]; Digital Technology & Application; 2017.