Research on Cellular Wireless Location Algorithm Considering TDOA Location Technology under the Background of Network Big Data Fusion

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Abstract. The background and foundation of applying big data analysis to mobile communication network planning is precisely the current rapid growth of network data and the update and development of big data technology. With the help of big data analysis tools, based on the current communication network, planning goals, it can be more comprehensive Analyze and explore the value perception and behavior trajectory of network users, etc., so as to determine the market demand trend, formulate a more scientific and reasonable planning program. In short, the purpose of the application of big data in communication network, planning is to promote the healthy development of the network. The cellular wireless positioning algorithm that realizes TDOA positioning technology by using big data is a relatively important technology, which is studied in this paper.

Keywords: Network Big Data, Fusion, Positioning

1. Introduction

With the rapid development of the Internet, cloud computing, big data and other fields, the range of data applications is expanding. Big data technology can calculate the fragmented information generated by people's lives and work according to certain rules and then provide reliable reference data for the development of all walks of life in society. Based on this, we have analyzed the definition and usage status of the network big data technology in the article and then combined with the actual situation, discussed its development trend in TDOA positioning technology.

2. Analysis of the development of online big data

2.1. Development of application areas
In the application field, the application of big data will certainly be more extensive. Except for commercial use, big data will certainly develop in health prevention and control, education industry, industrial and agricultural production and other aspects. There are already precedents abroad in terms of health prevention and control. Government units and Internet companies can cooperate with each other to analyze the occurrence probability and occurrence area of infectious diseases in China and then can take corresponding health prevention and control measures before their occurrence; The education department can comprehensively analyze the situation of the educational experiment and then combine the current teaching situation in various regions of China and then can implement targeted teaching reform[1]. In addition, in the field of professional enrollment in universities, the application of big data can also provide valuable reference data; in the field of industrial and agricultural production, big data can analyze the development of local pests and diseases and the price increase of materials. The corresponding production enterprises and production farmers, corresponding prevention and control measures can be taken in advance[2]. The network big data processing architecture is shown as figure 1.

![Network big data processing architecture](image)

**Figure 1.** Network big data processing architecture

2.2. Technology integration development

With the continuous development of "big data", data content will inevitably become an "important resource" in the information age and resources have become the focus of enterprise development[3]. Since 2013, big data has been organically integrated with "cloud technology". In the future, emerging Internet forms such as the "Internet of Things" will inevitably form a unique technical form with big data, which will allow big data to exert greater influence. From an objective point of view, big data is an intelligent tool that helps people to analyze and make decisions, so with the rise of intelligent technology, big data will definitely merge with artificial intelligence and then achieve technological breakthroughs in algorithms to comprehensively improve big data. Data analysis capabilities. In the future, "data analysis" will surely become a specialized discipline and big data will certainly be recognized by more people and social enterprises will set up corresponding "big data posts" according to their development, which will surely encourage universities to develop Corresponding "data majors", from the aspects of academics, technology and social phenomena, big data will surely glow with its application and become an important part of the future social industry. In addition, the source data of big data cannot be effectively kept secret, so the data competition among social enterprises will
inevitably become more fierce, which actually reduces the analysis ability of big data to a certain extent[4]. In the future, social enterprises will also add corresponding "data security personnel" and all data will be protected accordingly at the initial stage of formation.

3. TDOA positioning technology

TDOA is a wireless positioning technology. Unlike TOA, TDOA (Time Difference of Arrival) determines the location of the mobile station by detecting the absolute time difference between the arrival of the signals at the two base stations, rather than the time of flight, which reduces the time synchronization requirements of the signal source and each monitoring station, but improves Time synchronization requirements of each monitoring station[5]. The positioning technology can be applied to various mobile communication systems and is particularly suitable for CDMA systems. The CDMA system uses spread spectrum to extend the signal spectrum to a wide range, making the system more resistant to multipath. CDMA is a "non-power sensitive system" and signal attenuation has little effect on the accuracy of time measurement. The schematic diagram of the positioning system distribution is shown as figure 2.

![Figure 2. Schematic diagram of the positioning system distribution](image)

4. TDOA cellular wireless positioning algorithm based on network big data

4.1. Overview of positioning algorithms

At present, wireless positioning can be divided into satellite wireless positioning and terrestrial wireless positioning. Satellite positioning uses GPS, GLONASS and China's Beidou binary satellite and other satellite systems, ground wireless positioning measures the propagation time and signal field of radio waves Parameters such as intensity, phase, angle of incidence, etc. realize two-dimensional positioning of moving targets. Cellular wireless positioning belongs to the ground wireless positioning system. Enhanced call routing Select services, etc. In the current cellular wireless positioning system, in order to avoid adding additional overhead to the mobile terminal, a network-based positioning scheme is mostly adopted, in which multiple base stations simultaneously receive and detect the signals sent by the mobile station and the network Perform positioning estimation[6]. Mobile terminals are usually
ordinary mobile phones, which requires installing monitoring equipment on the base station, measuring the signal parameters sent by the mobile station and then estimating the approximate location of the mobile station through an appropriate algorithm and the propagation of the signal depends largely on the mobile communication channel Characteristics, which greatly affect the positioning accuracy.

4.2. Error analysis

Existing various wireless positioning methods are calculated based on positioning parameters such as measured time, phase and field strength, using a certain algorithm and the determination of positioning parameters depends largely on the transmission characteristics of the mobile channel. In cellular systems, channel interference mainly comes from non-line-of-sight (NLOS) propagation of radio waves and multipath effects. These characteristics are the root causes of wireless positioning errors in cellular systems. Non-line-of-sight propagation causes a significant drop in the performance of the positioning algorithm. It turns out that even in the absence of multipath effects and the use of high-precision positioning technology, NLOS propagation can cause measurement errors. Therefore, how to reduce the impact of NLOS propagation is the key to improve positioning accuracy. At present, there are usually many ways to reduce the impact of NLOS propagation. For example, the prior information of ranging error statistics can be used to adjust the NLOS measurement value to a measurement value close to LOS within a period of time. The effectiveness of this statistical method is that Recognizing existing systems and measurement methods, the implementation cost is small; reducing the weight of NLOS measurement values in the LS algorithm, adding constraints to the LS algorithm, etc. These methods are currently research hotspots. In addition, you can combine positioning with a geographic information system and use existing geographic location information to make corrections to the positioning.

5. Conclusion

With the development of China's communication network, various business needs of network users are increasingly diversified and the various information exchanges between users and networks are frequent and complicated, so communication network planning is very important. Big data has powerful data analysis capabilities, which have far-reaching significance for network planning and network optimization and save the cost of network operators. It provides a better plan for the development of China's communication network, so it should be widely concerned and valued.

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