Analysis on the Application of Big Data Technology in Medical and Health Industry

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Abstract. With the advent of the information age and the continuous development of big data technology, big data technology is widely used in the medical and health industry. By using big data technology, the data of medical and health industry can be collected, integrated, analyzed and shared intelligently. The structure system of medical data can be established. It can not only improve the utilization rate of data, but also realize a better grasp of the residents, thus promoting the continuous development of medical services. Based on this, this paper will analyze the concept of big data, combined with the characteristics of medical big data, explore the application of big data technology in the medical and health industry, hoping to provide a reference for the future development of the medical industry.

1. Introduction
Big data technology refers to the collection, analysis and decision-making of massive and diverse data information under the new data processing mode, including structured data and unstructured data. With the rapid development of information technology in China, Internet of things technology, health information technology has been widely used and popularized. Intelligent medical treatment is an important trend in the development of medical industry in China. It combines a variety of information technologies, including big data technology, cloud computing technology and Internet of things technology. This article mainly studies the application of data in the medical and health industry under the background of big data, and puts forward some suggestions for the reasonable application of big data technology.

2. Basic concepts of big data
Big data is a collection of data from many different sources and structures. Its capacity is very large, and the form and structure of data are rich and diverse. If it still uses the traditional data processing method, it will be difficult to collect, analyze, process and store the data. In the medical and health industry, big data refers to medical big data, which refers to a large number of data information generated in the medical and health industry, including patient data, equipment data information, health management information, medical research data and other medical and health data. In the context of the era of big data, how to screen data and determine the status of patients prompt processing and analysis is a major issue that must be resolved.
The characteristics and data processing model of the combination of the medical and health industry and big data

2.1. Characteristics of Medical Big Data
The so-called medical big data is the data that is generated in the process of providing services in the medical and health industry and related to management and clinics, including medical imaging data, electronic medical record data, and medication records. When processing medical big data, it is easy to find that medical big data also has some of the characteristics of big data. The specific characteristics are shown in the following table:

| Characteristics | Content |
|-----------------|---------|
| Great scale     | For medical data, the size of a CT image is about 150MB, and the size of a standard medical record is about 5GB. For a community hospital, its data volume is about several terabytes to petabytes, while the data volume of the national medical and health industry is tens of ZB. |
| Types           | The types of medical data include audio, text, video and other forms. |
| Growth          | With the development of information technology, medical information is becoming more and more digital, and online or real-time data are increasing, such as medication, disease analysis and clinical diagnosis. |
| Great value     | The effective use of medical data can promote the prevention and treatment of public diseases, the development of new drugs, the control of medical expenses and the accurate diagnosis. |
| Timing          | Patients will have a progress in seeing a doctor and in the pathogenesis of the disease. The wave forms and images detected in medicine are practical functions. |
| Privacy         | For the patient’s medical data, it should have a high degree of privacy. Once the patient’s information disclosure will have very serious consequences. |
| Imperfection    | For medical data, most of them come from manual counting, which can easily lead to deviation and tragedy of data recording, which is not conducive to the complete collection of medical data and the comprehensive reflection of disease information. |

In view of the above characteristics and the shortcomings, it should improve the big data technology and means reasonably, so as to help the medical and health services to develop better and promote the continuous development of the medical and health industry.

2.2. Data Processing Model
In order to better analyze and utilize the data in the medical process through big data, it should rely on a certain data processing model, obtain the relevant data from the hospital information platform, then integrate and analyze the relevant data. After further processing of the data, it is provided to medical staff, patients, and relevant management personnel of the hospital for use, thereby promoting the good development of precision medicine, hospital cost control, intelligent auxiliary diagnosis and treatment, and rational drug use. It can help the medical and health industry better develop and bring greater convenience to people’s medical treatment. The data processing model applied to medical data is shown in the figure below.
When applying the above data processing models, attention should be paid to various processing mechanisms, so as to better apply big data technology, promote the informatization of medical data, and improve the utilization of medical data. The mechanism for each link in the data processing model is shown in the following table.

| Segment            | Mechanism                                                                                                                                 |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Data procurement   | The acquisition of data is to obtain the original data from the information platform of the hospital according to the subject of the application of the data, and store it in the database of the medical big data platform. |
| Data integration   | For medical data, many data are scattered in different departments such as medical technology, management, and clinical. It is difficult to query and access the data. Through data integration, the data extracted from the hospital’s information platform can be integrated according to a certain classification, which is convenient for medical management personnel to consult and analyze. |
| Data processing    | The integrated data is further cleaned, converted and loaded, so as to calculate and aggregate the data by establishing a model according to the business. |
| Data presentation  | Data presentation is to realize the visualization of data, and adopt relevant technologies to transform the data, so as to facilitate the understanding and analysis of data by medical staff, managers and patients. |

Figure 2. The data processing model applied to medical data

Figure 3. The mechanism for each link in the data processing model
3. How to promote the application of big data technology in health industry data

3.1. Harmonization of Data Styles
For the medical data, the vast majority of medical data cannot be shared, which is due to the shortcomings of inconsistent data standards and inconsistent data types. The format of data processing system between medical and health institutions in different regions is different, which makes the integration of existing medical data appear a great problem. It is of great significance to promote the practical application of big data technology in medical and health industry.

For example, in view of this situation, the state should be advocated to issue corresponding policies to unify the styles and types of medical data, and to force various medical institutions to carry out the transmission project of the national medical big data database. To establish a unified national medical database. At the same time, all kinds of medical institutions should require employees to take the prescribed style to carry out the related work of medical data in order to promote the good application of big data technology. For the equipment needed for data acquisition, it is also necessary to unify effectively in the current scope, so as to promote the deep application of big data in the medical and health industry. After the data acquisition work, if the collected data is deviated to a certain extent, then the data needs to be uploaded according to the data standard to ensure that different institutions can read the data smoothly on the big data cloud platform.

3.2. Build a Standardized Information System
Due to the problem of relatively introduced information islands for the current information systems of various medical institutions, the data between various medical institutions cannot be interconnected with each other. It is not conducive to the acquisition of medical data, and the positive role of medical big data cannot be fully utilized. Therefore, it is very meaningful to carry out the standardized construction of big data information system. While standardizing the information system, attention should be paid to the formulation and implementation of standards. It allows the staff to strictly follow the standards when applying the information system to ensure the good development of medical work.

3.3. Develop Big Data Knowledge of Relevant Staff
In the context of big data, the application time of big data technology is not very long. For some employees, they lack the understanding of big data technology and the knowledge of applying big data technology. Especially for some older medical staff, the lack of application of network technology is not conducive to the good development of medical and health services. Regarding this issue, various medical institutions should pay enough attention. For those who lack relevant knowledge, the learning of big data-related knowledge and the improvement of application ability are carried out to improve the quality of relevant staff, so as to better apply medical data and promote good medical work.

For example, for relevant medical staff, they can first get a certain understanding of the knowledge and abilities of the relevant staff through a questionnaire. After understanding, according to the specific situation, it can take the form of corresponding classroom training to popularize the knowledge of big data to relevant personnel and teach relevant staff how to apply big data technology. After completing the training, they can learn about the staff’s mastery by means of tests, so as to adopt relevant methods to solve the problem. At the same time, it should also carry out regular communication activities with related staff, so that staff can share and communicate the problems in the application of big data technology, and better solve the problems in the application process. It can better carry out related work, and help various departments to conduct good communication, promote mutual cooperation, and improve the work efficiency of staff. For people who do not have the basic theoretical knowledge of big data, they can learn the relevant knowledge of big data through training, communication and so on, so as to improve their application ability. It can also improve the quality of related staff, so as to better apply medical data and promote the good development of medical work.
4. Conclusion
At present, there are still some shortcomings and difficulties in the application of big data technology in medical data. One of the more important ones is that the current insufficient preparations for policies, regulations, and data security technologies have caused the phenomenon of isolated islands in the data of various medical institutions, which is not conducive to the sharing of data between various medical institutions, which has resulted in certain hindrances in medical research. At the same time, in the application of big data technology in the medical and health industry, attention should also be paid to the standardization of relevant information systems and the improvement of relevant personnel capabilities, so as to promote the development of big data in medical data, so that data can become more visualized and promote. The continuous development and progress of the medical and health industry will better perform medical and health services, enhance the well-being of the people, and promote the continuous development of the national medical industry.

References
[1] Wang Shuping, Liang Ying. Research on the application of data in the medical and health industry under the background of big data [J]. Electronic technology and information science: Medical education and medical marginal subjects, 2020, 39(01): 54-57.
[2] Huang Dakang. Thoughts on the information construction of medical and health statistics based on the background of big data [J]. Economics and Management: Research on Medical and Health Policies and Laws and Regulations, 2021, (01): 144-145.
[3] Sun Miao. Thoughts on the sharing of hospital information resources in the era of big data[J]. Electronic technology and information science: Research on medical and health policies and laws and regulations, 2020, 21(11): 39-40.
[4] Jin Shuigao, Zhang Yewu. The application of big data and related technologies in the field of medical and health [J]. Medicine and Health: Medical Education and Medical Marginal Disciplines, 2020, 14(05): 227-229.
[5] Jiang Han. Analysis of the big data industry in health care and its prospects [J]. Medicine and Health: Medical Education and Medical Marginal Disciplines, 2020, (18): 21-