

The Key Technology of Intelligent Medical Information Technology under the Application of Internet of Things

Jing Ling

Suzhou Vocational Institute of Industrial Technology, 215000, Suzhou, Jiangsu, China.

How to cite this paper: Jing Ling. (2022)

The Key Technology of Intelligent Medical Information Technology under the Application of Internet of Things. *Advances in Computer and Communication*, 3(1), 29-33. DOI: 10.26855/acc.2022.06.003

Received: April 25, 2022

Accepted: May 23, 2022

Published: June 27, 2022

***Corresponding author:** Jing Ling, Suzhou Vocational Institute of Industrial Technology, 215000, Suzhou, Jiangsu, China.

Abstract

Medical services can reflect the level of economic development and the development of information technology, in the period of high technology and information technology development of big data, and with the high demand for medical services, intelligent medical care is an important innovation and reform to enhance the level of medical care and improve medical services. This paper further outlines the key technology that can make smart healthcare more intelligent and informative based on Internet of Things (IoT) applications in the context of the meaning and role of smart healthcare. As the focus of the hospital's work, medical quality management can not only promote the stable progress of the hospital's work and safeguard the interests of patients, but also accelerate the pace of modern medical technology development and improve the hospital's economic benefits and industry competitiveness.

Keywords

Internet of Things, intelligent medical care, information technology, key technology

With the development of information technology in the new era, the Internet of Things is an emerging technology to promote the rapid development of the information industry after the computer, Internet, and mobile communication network. The emergence of the Internet of Things has gradually transformed production, life, and social management into intelligence and information technology, improved the level of public services and social governance, and advanced the technological upgrading of various industries. And relying on the Internet of things under the application of intelligent medical trends towards the development of information technology cannot be delayed, through the development of key technologies, helping intelligent medical information become intelligent and make a great difference to medical services, social services, and economic development.

1. The significance of intelligent medical care

1.1 The concept of intelligent medical care

With the continuous development of the economy and the gradual improvement of medical standards, as well as the core development concept of human-centeredness, the concept of intelligent medical care has begun to emerge, aiming to provide patients with new, intelligent, and convenient medical services. Through big data, Internet of Things and other technology applications, processing and integration of patient medical data and all kinds of medical resources, rationalization of medical resources allocation and intelligent medical process as well as improvement of

medical efficiency will be helpful to promote the development of medical career, help the medical service close to people, and establish better, more convenient, faster, and more intimate medical services for the people [1].

1.2 Problems solved by intelligent medical services

1.2.1 Effectively solve problems of scarcity and uneven distribution of medical resources

China is a large and aging population, and although the level of medical care has improved in recent years, medical resources are still unevenly distributed, with medical specialists, medical equipment and medical technology all tending to favor the tertiary hospitals in the big cities. Moreover, the primary target of medical school graduates is mostly the tertiary hospitals in big cities. The mobility of talents and the level of economic development trigger the scarcity and uneven distribution of medical resources; therefore, some poor or remote areas have a great lack of medical resources and fail to enjoy professional medical teams, medical technology, and medical equipment. To solve this problem, the process of remote consultation by experts can also rationalize the distribution of medical resources in each region, avoiding delays in treatment due to the high number of patients and shortage of beds in tertiary hospitals in big cities, and achieving the purpose of allowing local hospitals in remote areas or lack of medical resources to enjoy consultation by teams of experts from tertiary hospitals in big cities.

1.2.2 Effectively solve the problem of cumbersome medical process and high time cost

Hospitals are overcrowded every day, especially the tertiary hospitals in big cities, and the difficulties in making appointments, long queues, and lack of patient information exchange between major hospitals have reduced the efficiency of patient access. In addition, for patients in remote areas who want to come to a big city to see a doctor, it takes a lot of time and money, and they may not be able to see a doctor smoothly, and they may miss the best time for treatment. Smart medical can effectively solve the above problems, offer online appointments or online consultations, save time and money at the same time, effectively improve the efficiency of the consultation, and optimize the consultation process.

1.2.3 Effectively solve the problem of lack of value-added medical services

With the development of the economic level and the people's demand for life services, the demand for value-added medical services is also increasing. For example, disease prevention reminders and health advice through medical data and analysis can effectively help patients establish healthy and good living habits and offer timely medical checkups and examinations, making medical care more intelligent and personal [2].

2. Goals and challenges of intelligent medical information technology should be achieved based on the Internet of Things

Smart medical can not only help solve the above-mentioned problems but also truly realize the construction and development of digital and information-based hospitals by realizing the information technology of intelligent medical. In today's era, modern hospitals are taking innovative steps to gradually shift their construction and goals to the field of intelligent medical information technology, converting from traditional treatment and consultation methods to the direction of information technology, appointment-based, prevention-oriented intelligent convenience, and health care. It is also the direction of China's development in health care and the current goals and challenges facing the healthcare industry. The above goals can be pursued through the addition and processing of information technology, which in turn allows medical services to expand to the community, family, and individual levels, focusing on the entire health management process of residents, thus enhancing the service capacity of hospitals, and improving the level of medical coverage.

Through the information technology of intelligent medical care, the latest Internet of Things (IoT) technology makes the internal processes of hospitals more perfect, convenient, and intelligent, and meanwhile enables the radiation of high-quality medical resources to other small cities and towns, ultimately attaining the goals of medical data and service sharing.

Therefore, to achieve the above goals and challenges, the research, and development, as well as application validation of relevant key technologies, are required. Under the support of core key technologies, the above medical service objectives can be perfectly realized, thus forming the technical specifications and standards of the product. After the practical demonstration of the application as well as vigorous promotion, the intelligent medical information system under the application of the Internet of Things will take shape.

Therefore, to achieve the goals and challenges faced by intelligent medical information technology, the research and development of key technologies and the implementation of processes are mainly focused on the discussion of the following:

1) To achieve the integration of medical information and the sharing of medical resources and data, it is necessary to build a medical infrastructure and information integration platform based on IoT applications, including the application of information technologies like mobile communication networks, wireless LANs, and wired networks, as well as interference suppression technologies for medical devices and equipment, etc.

2) It is necessary to study the technology and equipment for personal health management, for the technical aspects, it is crucial to have the ability of data processing and analysis of residents' health indicators, in terms of the equipment, these can be developed, including touch smart devices with Internet connection or wearable sense node devices as well as rapid access to residents' health data extraction and analysis technology to provide residents with more convenient and personalized health services.

3) After the infrastructure and technology development are completed and up to standard, first of all, the application and practice will be carried out in a third-rate hospital as a pilot, and the information system of the medical Internet will be established within the hospital, and the problems will be debugged and updated for improvement. After the test, medical systems in second and third-tier cities and towns will be updated and interoperated based on the third-tier hospitals, connections will be established, and testing will continue in terms of achieving data and service sharing, eventually forming standards and specifications for the medical industry to be promoted and applied nationwide. Secondly, after realizing the application of an intelligent medical information system for the hospital, the application will be gradually connected to the community, family, and individuals who collaborate with the hospital, to realize the sharing of medical service information and technology from the hospital to the community, family and individual in all aspects [3].

3. The key technologies of intelligent medical information technology based on the application of the Internet of Things

To better solve the above problems through smart medical, based on the application technology of the Internet of Things, some key technologies are used to realize the information-based application of smart medical, as follows:

3.1 Cross-regional medical service technology

To better address the difficulty and high cost of medical care in remote and poor areas due to the unreasonable distribution of medical resources, it is of great significance to study and apply cross-regional service technology, which is also increasingly needed in today's Internet era. For example, the establishment of personal health management files and their disclosure to qualified and authorized medical institutions allow specialists to access personal medical information, understand medical history, and make a higher diagnosis promptly when conducting remote consultations and consultations, providing technical support for medical activities in remote areas.

3.2 Intelligent information fusion technology

Due to the differences in information systems and management between regions and medical institutions in each region, information discrepancies may occur in the process of information integration. Therefore, intelligent information fusion technology is needed to circumvent these discrepancies and to be able to quickly and accurately find the data and information needed according to demand, contributing to the integration of healthcare services and the improvement of intelligent healthcare. Intelligent information fusion technology can effectively make up for the lack of extensiveness and difference of medical information, and coordinate, integrate and reprocess to resolve data conflicts and inconsistencies, and effectively ensure the accuracy and quality of medical data.

3.3 Medical device interconnection and information integration technology

With the high development of information technology and the application of the Internet of Things (IoT), modern medical devices are transmitted through WiFi or Bluetooth connections, so smart medical care needs to be more based on information technology like IoT to make the transmission and analysis between medical devices and medical data smoother, more harmonious and closer.

In order to accurately integrate the patient's health monitoring data information, medical information and files within the current patient's area, it is necessary to establish a unified medical and health information collection

through the key technologies of medical equipment interconnection and information fusion. Model system to provide targeted health services to the target population. At the same time, under this model system, it is also necessary to integrate the behavioral perception, environmental perception, automatic identification and other technologies of a variety of health equipment, which can effectively solve the problem of low information collection efficiency in the current medical technology development process. Can well achieve the integration of technology. In addition, in the design and operation of terminal equipment, there are also high requirements for the compatibility of network transmission protocols. It is necessary to use active protocols such as TCP, and use wireless networks to monitor data information in real time to ensure the reliability and accuracy of data transmission. In addition, in the interface design of the device network, it is also necessary to effectively use the communication network to allow the system to realize functions such as perception, communication, and management to ensure the reasonable operation of the device.

3.4 Personalized intelligent recommendation service technology

To better promote medical services and meet the medical needs of patients, as the big data develops, it is necessary to adopt personalized intelligent recommendation service technology to develop personalized treatment plans and health plans based on patient's personal information and visit data, and to provide effective value-added medical services, including the addition of patient data analysis technology, automatic patient behavior recognition technology and patient family history analysis technology, thus effectively improving the efficiency of the clinic and the accuracy of the consultation. Through the application and blessing of personalized intelligent recommendation service technology, on the one hand, the efficiency of medical services is improved, and it also reflects the scientific nature of medical technology, so that medical information can be uploaded and used accurately, and patients' treatment plans can be accurately arranged. It protects the health of patients and provides convenience for other medical departments.

3.5 Personal privacy protection and information security technology

Personal privacy has always been one of the concerns of many patients. There are many hospitals where patients' personal information is leaked, as well as through mass data collection for academic research and publication in medical journals or magazines. Therefore, to protect patients' personal privacy as well as information security, it is necessary to use personal privacy protection and information security technology in the era of intelligent healthcare to effectively prevent personal privacy leakage, which can be achieved in two main ways. Firstly, new data sets are formed by hiding the original information data, and these newly processed data will be released to academic research centers for research or publication. Secondly, efforts should be made to set up permissions for patients' personal information, only those who have the permission can view patients' personal information, thus ensuring information security.

3.6 Intelligent analysis technology for healthcare data

To obtain more accurate and effective medical and health data, it is crucial to collect, integrate and analyze various types of data or data from various platforms through intelligent analysis technology, and apply it to find and make decisions in the medical process. Through effective analysis, accurate conclusions can be drawn to assist in the analysis of medical indicators and medical diagnosis, allowing medical information to be data-driven, intelligent, and intuitive, thus providing more effective support for medical activities [3].

3.7 Multiple concurrency and high-performance computing technology

For the business needs of personal health management and medical services, it is necessary to develop and apply multi-concurrent and high-performance computing technologies to accurately mine and analyze residents' health data and medical data. The high-performance technical architecture is established through high-performance computing technology, and the application of integrated technologies like technical analysis, storage technology, and fault handling is used to achieve goals including the extraction and analysis of personal health data.

3.8 Massive data processing technology

Since a large amount of data such as medical data information and stored personal health information is generated in medical services, to be able to process these massive data more intelligently and perform accurate data extraction, definition, integration, and analysis, massive data processing technologies need to be invoked. This technology re-

quires analysis, redefinition, and classification of medical data across regions, institutions, and types of healthcare, and then integration and analysis of the data are put into the final database to achieve information sharing within hospitals and across regions, thus making the final data presentation more efficient and accurate [4].

3.9 Raise awareness of informatization construction

Hospital informatization construction requires a lot of human, material and financial resources, and also involves many aspects such as hospital management process optimization and reform. Therefore, it is especially necessary to vigorously promote the hospital management or even the “top leader”. Otherwise, the informatization construction progress will be particularly difficult. Then this requires the hospital management to have a more in-depth understanding of the hospital informatization construction. It is necessary to fully understand that although the hospital informatization construction will invest a lot in the short term, it will not be able to achieve immediate results. However, once the informatization construction is completed, it will bring great changes to the whole hospital. And the impact of this change is long-term and benign. At the same time, the hospital management should also increase the publicity of the hospital informatization construction, and let all the hospital staff form an ideological consensus on this, so as to actively participate in and cooperate with the promotion of the informatization construction, and no longer let the hospital informatization construction only stay in the On paper and verbally, but to make practical achievements in informatization construction

A variety of skills will be adopted to achieve intelligent medical information technology, which involves all aspects, in addition, it is a complex and long-term plan, and goals and challenges faced also need to be overcome one by one. The above-listed technologies are more significant and core key technologies, the development, and exploration of these core key technologies and the perfection have a long way to go, and these technologies are vital forces to truly realize smart medical information technology, digital information hospital construction, and comprehensive medical services.

4. Conclusion

To sum up, in the era of big data with highly developed information technology, the intelligent medical treatment under the application of the Internet of Things needs to improve the level of information technology and development through various key technologies, in line with the concept of people-oriented medical treatment, to solve the unreasonable and uneven distribution of medical resources, improve the efficiency of medical treatment and the accuracy of consultation, and provide more efficient value-added services to patients. Through the development and utilization of key technologies, medical activities will be more convenient, intelligent, and safe for patients, and medical institutions will provide more medical services for patients and more and better support in medical activities so that intelligent medical care can come into the lives of the people.

References

- [1] Fu Ziyang, Zhao Lina, and Tian Anhong. (2020). An introduction to the effectiveness and development of intelligent medical information construction [J]. *Smart City*, 2020(616): 17-18.
- [2] Che Yajin. (2019). Research and analysis of intelligent medical system based on Internet of Things [J]. *Electronic Measurement Test*, 2019(4): 78-79, 112.
- [3] Hou Yan. (2020). Key technology research of intelligent medical informatization based on Internet of Things [J]. *Science and Technology Wind*, 2020(3): 92.
- [4] Hou Yan. (2020). Research on key technologies of smart medical informatization based on the Internet of Things [J]. *Science and Technology Wind*, 2020(3): 92.
- [5] Wan Zhen, Qiu Dan, Liu Yuanzhe, Xu Hua, Zhao Weikang, and Liu Yong. (2020). Development and application status of domestic medical Internet of Things technology [J]. *Medical and Health Equipment*, 2020(11).
- [6] Wang Zhan, Li Shengnan, Song Yifan, Zhu Siyu, Wang Zhixian, Wen Xin, and He Siyi. (2020). The current situation and thinking of the development of smart medical care in my country under the background of healthy China [J]. *Medical Information*, 2020(22).
- [7] Fu Ziyang, Zhao Linna, and Tian Anhong. (2020). Talking about the effect and development of smart medical informatization construction [J]. *Smart City*, 2020(16).