Thoughts on the Integration of Internet of Things and Traditional Chinese Medicine

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**Abstract.** There are many problems in the development of traditional Chinese medicine, such as relying on manpower, lack of structured management, difficult to realize the process and data display of results, which hinder the pace of traditional Chinese medicine entering the international market. With the continuous development of Internet technology and the popularization of Internet + action, the integration of Internet and Chinese medicine development has become an inevitable trend [1]. By saving personal health electronic files in hospital database and introducing the latest medical equipment and systems, a new intelligent medical model is proposed [2]. To a great extent, it can alleviate the contradiction between doctors and patients and create a positive, efficient and affordable medical environment. In the cultivation of traditional Chinese medicine, prevention of breeding, mining, grading, processing, pharmacy storage, sale, transfer, modern research laboratory management, automatic operation of experimental instruments and other fields are also gradually glowing[3].

**Introduction**

Internet of things refers to a network concept that any object is connected to the Internet for information exchange to realize intelligent management, and it is an extension of Internet application [4]. According to the current situation, the core of the Internet of things is radio frequency identification technology, and its main functions are object identification, sensor technology, information transmission, data processing and storage technology [5]. Early visit to the hospital, a greater part of the time is spent in the treatment time. In addition, some emergency diseases are not treated in the local hospital, and some patients died on the way to other hospitals because they were not treated in time. With the development of Internet of things technology in the hospital, there have been successful cases of remote real-time surgery, so that sudden diseases can be treated in time [6]. The establishment of electronic archives of patients' health status is effectively summarized in the database, which shows the characteristics and convenience of TCM diagnosis and treatment. It can provide patients with services such as medical reminder and medication [7]. With the continuous integration of Internet of things technology and traditional Chinese medicine, smart Chinese medicine gap production, smart pharmacy, smart hospital, smart operating room, smart campus, smart laboratory and so on are gradually emerging. Make the Internet of things technology in the field of traditional Chinese medicine development prospects more bright, improve patients' satisfaction with the efficiency of medical treatment in the hospital.

**The Starting Point of the Integration of Internet of Things Technology and Traditional Chinese Medicine**

The Internet of things and traditional Chinese medicine have been integrated in the early stage. With the continuous development of the Internet, the two have been further integrated. Compare the
two, find the entry point, carry out the integration development, and gradually form a network to cover the field of traditional Chinese medicine from point to line to surface.

Social Development Needs of Internet of Things Technology

The concept of the Internet of things originated in 1991 [8], the modern fast-paced lifestyle makes people need more and more time, which leads to the emergence of various intelligent products. The concepts of Internet of vehicles and Internet of medicine have also entered the public view. The Internet of things has been applied in many fields such as intelligent medical treatment, intelligent power grid, intelligent transportation, intelligent home and intelligent logistics in most provinces and cities of the country, and has formed a series of industrial chains, producing large-scale entrepreneurial benefits [9].

Feasibility of Integration of Internet of Things Technology and Traditional Chinese Medicine

Traditional Chinese medicine (TCM) and traditional Chinese medicine (TCM) have had very mature experience from ancient times to today, but there are still some problems such as the inability to determine the main effective components of TCM by experience alone, the slow efficacy, and the inability to express them with data [10]. And with the western medicine entering the market of our country, its advantages such as quick effect and small dosage have challenged the development of TCM in our country. With the development of Internet technology in China, Internet of things technology is also making rapid progress. Some hospitals have applied Internet of things technology more mature, just download a small program, you can register on the app, charge. Pharmacy, each department location, even toilet, drinking water place can be real-time navigation [11]. The application of Internet of things technology in traditional Chinese medicine and traditional Chinese medicine for integrated development and data and transparency is not a passive to active opportunity [12].

The Reality of the Integration of Internet of Things Technology and Traditional Chinese Medicine

With the development of the Internet, the Internet of things technology is also constantly improving, people's cognition of the Internet of things is constantly deepening, medical equipment is constantly upgrading, medical system is constantly improving, the Internet of things technology in hospital registration, medical treatment, payment, drug purchase and other aspects of coverage is gradually comprehensive, as well as drug management, real-time monitoring, case electronic filing and other information integrated application, It makes people feel more about the benefits of Internet of things technology and arouses people's interest in the research of Internet of things technology.

Advantages of Integration of Internet of Things Technology and Traditional Chinese Medicine

Internet of things technology is widely used in the modern integrated information management system of the hospital, which greatly saves the time of patients in the treatment, improves the efficiency of treatment, and improves the efficiency of diagnosis and treatment of the hospital. It has safeguarded the interests of both doctors and patients and eased the doctor-patient relationship [13]. And provide reference for the introduction of Internet of things in other fields. The problems of weak platform support, low service level, lack of security and high management cost in some medical industries were obviously alleviated.

Technological Development of the Integration of Internet of Things Technology and Traditional Chinese Medicine

In the near future, the first 5g urban medical fund and rescue system in China realizes seamless linkage between the hospital and the hospital. When the patient is still on the ambulance, emergency rescue can be carried out through 5g technology, thus shortening the rescue time [14]. The first successful 5g + Mr remote real-time mastectomy is the crystallization of the rapid development of Internet of things technology in traditional Chinese medicine industry [15].
Examples of Integration Development of Internet of Things Technology and Traditional Chinese Medicine

**Application of Internet of Things Technology in Traditional Chinese Medicine Cultivation.** The quality of traditional Chinese medicine has been affected by the confusion of basic source and varieties. And with the decrease of wild herbs, most of them are cultivated in the market. The cultivation of traditional Chinese medicine needs a series of requirements, such as suitable ecological environment, scientific cultivation and selection, correct cultivation, reasonable fertilization, and effective pest control. If it is all carried out manually, the monitoring of temperature, humidity, light, growth environment, etc. will inevitably be too cumbersome and inaccurate. The gap production of traditional Chinese medicine has a high demand for science and technology. Now many control technologies such as automatic temperature and humidity sensing automatic water spraying system have been mature and applied in the important gap production process [16].

**Application of Internet of Things Technology in Medical Treatment.** From manual registration to online appointment registration, from taking the prescription in person to pick up the medicine in the drugstore to mail the medicine after showing the prescription to the seller, from the doctor must carry out on-site surgery on the patient to the successful realization of remote control surgery. The establishment of the hospital’s comprehensive information system can save the patient's health data in electronic file [17], provide data information for medical staff in time, and make the treatment more convenient.

**Application of Internet of Things Technology in Drug Management.** The application advantage of Internet of things technology in pharmacy is reflected in the convenience of patients’ taking medicine. After treatment, patients do not need to take prescriptions in line to take medicine, but doctors have passed the prescriptions to the pharmacy through the information system at the time of treatment. The pharmacy prepares in advance, which saves the time of waiting in line for patients [18]. Secondly, the circulation of drugs. All drug batches, names and quantities are stored in the comprehensive information system of the pharmacy, so that the reduction of drugs can be clearly seen, so as to timely replenish and clean up expired drugs [19]. In addition, in the storage stage of drugs, real-time monitoring of the temperature, humidity, oxygen content, etc. of the drug warehouse will be carried out [20], and the environment of the drugs will be monitored, and problems will be handled in time, so as to avoid unnecessary losses [21].

**Application of Internet of Things Technology in Drug Circulation.** For pharmaceutical enterprises, drug sales channel is an important part of marketing. If a new product wants to enter the market, it is very important to choose the market selling point, but at the same time, the sales channel also has a high position. Enterprises should establish a reasonable drug sales channel to supply and sell drugs to patients in a timely manner to meet their medical and health care needs. In addition to the initial agent level sales, telemarketing, etc., with the development of the Internet, enterprises can publish advertisements on the Internet, spread drug information more widely, and at the same time, add drug links, so that consumers can more easily understand drugs. If there is a need for purchase, you can also link to purchase directly without going to the drugstore and other sales points [22]. Compared with the traditional indirect sales, it realizes the direct transaction between the consumers and the enterprises, and saves the patients a part of the high drug cost due to the circulation. At the same time, it can also effectively prevent the circulation of fake drugs and substandard drugs in the market [23].

**Application of Internet of Things Technology in Health Service Industry.** With the aging of the population and the increasing pressure of life and other reasons, the expansion of sub-health population, the social demand for health services is increasing. More and more software is also rapidly emerging to help busy modern people care for their bodies, such as Ali's health, etc. These softwares, after the registrants fill in their basic information, push articles related to health care that they are interested in, remind women of menstruation, etc. [24]. The hospital also stores the patient's disease history and other information in the database to remind the incurable patients to return to the
clinic, take medicine and pay attention to matters in their daily life, bringing convenience to the patients. The development of Internet of Things technology has brought great convenience to health education, health guidance, health care and other aspects [25].

**Application of Internet of Things Technology in Modern Research.** Modern research relies more on instruments to observe. HPLC, WB and other instruments are all the applications of Internet of Things technology in research. In the laboratory, the laboratory animals need a qualified living environment, automatic temperature and humidity adjustment system, air purification system, smoke and heat alarm, attendance check, entrance guard and so on all have certain help to the experimental research, thus realizing the intellectualization, informatization and automation of laboratory research [26].

**Discussion**

With the development of Internet technology, its business expansion and the continuous development of Internet of Things technology, the traditional hospital treatment mode is no longer suitable for modern fast-paced life and cannot meet the requirements of modern people on the quality of treatment [27]. The intelligent medical model and the development of the international market cannot be separated from the integration and development of Internet of Things technology and traditional Chinese medicine. Only through continuous integration, continuous innovation and continuous injection of new energy can the development prospect of traditional Chinese medicine be bright and smooth [28]. Traditional Chinese medicine and the Internet of Things have been continuously integrated and developed together. In recent years, some patents have also appeared in some applications of the Internet of Things technology, such as: Internet of Things intelligent blood glucose meter acquisition device [29], Internet of Things-based self-service intelligent medicine cabinet [30], Internet of Things-based medical hand wash basin [31], etc. However, at present, the development of hospitals is not mature enough. Advanced technology is only implemented in some projects in some hospitals. It is difficult to apply Internet of Things technology in all aspects. It does not realize real intelligent medical treatment and still faces many problems. The development of Internet of Things technology is not beneficial without harm. In the field of traditional Chinese medicine, a patient's electronic file can simplify the treatment process, but patients cannot see their prescriptions or the amount of fees charged. However, if the electronic files are lost, there is a risk of disclosing the patient's privacy. If the patient's medical records are accidentally disclosed, it will bring not only economic but also reputation losses to the patient. At the same time, the cost of advanced technology and equipment is also very high, which requires higher economic strength of patients and is difficult to be fully popularized.

If the hospital successfully establishes a comprehensive data information system, then the information of all hospitals will be comprehensively classified and analyzed, and a larger database will be established to integrate the patient information. When seeing a doctor, the health status of the patient is directly retrieved from the database to check the past medical history, thus avoiding the waste of resources caused by repeated examination and saving expenses for the patient. In addition, the hospital will inevitably apply the functions of real-time monitoring and data storage of Internet of Things technology to medical equipment, medical staff management, drug management, inpatient department management and logistics management. The value of Internet of Things technology to people and hospitals is obvious. This shows the necessity of the development of Internet of Things technology in the field of traditional Chinese medicine.

The emergence of a new thing is bound to bring two voices. At present, the integration of Internet of Things technology and traditional Chinese medicine is not perfect. The problem is to give us the opportunity to make the integration of Internet of Things technology and traditional Chinese medicine more perfect. The integration of Internet of Things technology and traditional Chinese medicine is in line with the development trend and is a product driven by history. With the continuous integration of Internet of Things technology and traditional Chinese medicine, GAP production of intelligent traditional Chinese medicine, intelligent pharmacy, intelligent hospital, intelligent operating room, intelligent campus, intelligent laboratory, etc. are also gradually
emerging, but these now exist more as a concept and have not been fully applied in practice. With the continuous development of Internet technology in various industries, more time-consuming manual operations can be saved and people's time can be used to a greater extent. It will provide more convenience for the development of traditional Chinese medicine and traditional Chinese medicine industry in the future.

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