CHAPTER 1. INTRODUCTION

1.1 Significance of the Study

With the rapid development of science and technology and the increasing competition in society, people's lives have become more and more unbalanced, and their work and life have become more and more stressful. Studies show that 70% of workers are in poor health. Among them, common symptoms such as sleep deprivation, obesity and immune dysfunction threaten human health. As we enter the 21st century, people are increasingly concerned about their health as the population ages. Over the past 20 to 30 years, healthcare systems have gradually improved and past epidemics, such as dysentery and plague, have virtually disappeared. The World Health Organization (WHO) predicts that the incidence of chronic diseases is increasing globally and will be the leading cause of human disability by 2025. Medical research has shown that the development of these chronic diseases requires a complete process of low risk, moderate risk, high risk, pathologic conditions, and the development of clinical symptoms. If human health parameter indicators can be measured in real time during this process, there is an opportunity to detect any of these problems in advance and provide early prevention and treatment. Human health monitoring and alarm systems can significantly reduce the time and effort of families and caregivers in keeping an eye on and treating patients' health conditions.

Studies have shown that both systolic and diastolic blood pressure increase when the heart rate increases. Increased heart rate in patients with hypertensive disorders leads to increased risk of death. So effective management of heart rate can help reduce mortality in patients with hypertensive disorders.

The human heart rate fluctuates significantly between daytime and nighttime, as sympathetic excitation predominates during the daytime and is not higher than 100 beats/minute. However, at night the human vagus nerve excitation is dominant, and after the vagus nerve excitation is dominant, the heart rate of a normal person can show a normal decrease. If there is no symptom at night, the heart rate fluctuates above 40-50 beats/min or 60 beats/min, which are all within the normal range.

Intelligent detection system for human health parameters is a system that integrates sensor, data processing and artificial intelligence technologies to monitor and analyze human health parameters in a real-time, continuous and non-invasive manner. Traditional health monitoring methods require manual collection, analysis and recording of health

data, which is less efficient. In contrast, the human health parameter intelligent detection system can automatically collect and analyze health data to improve monitoring efficiency. Traditional health monitoring methods may also have errors and subjectivity, while the human health parameter intelligent detection system can collect data in real time through sensors, avoiding errors and subjectivity and improving monitoring accuracy. The system can customize the health monitoring program according to different people's health conditions and needs to achieve personalized health monitoring. It can detect and prevent health problems in time and promote the development of health management and preventive medicine. The system integrates sensor, data processing and artificial intelligence technologies, promoting the application and development of artificial intelligence technologies in the medical field.

Overall, the research significance of the intelligent detection system for human health parameters is to improve the efficiency and accuracy of health monitoring, realize personalized health monitoring, promote the development of health management and preventive medicine, and promote the application and development of artificial intelligence technology in the medical field.

1.2 Status of Research

1.2.1 Current Status of Domestic Research

Many traditional medical devices, such as sphygmomanometers and blood glucose meters, have been digitized and equipped with certain intelligent functions, which can be used to transmit and analyze data by connecting with devices such as smartphones or computers. Biosensors can detect various physiological parameters of the human body, such as blood pressure, blood oxygen, heart rate, etc. They have the advantages of being real-time, non-invasive and portable, and thus have received widespread attention. Currently in China, many universities and research organizations are carrying out research on biosensor technology. Artificial intelligence technology can process and analyze a large amount of data, and can be used to build health prediction models and achieve personalized health management through technologies such as machine learning and deep learning. Currently in China, many companies and research organizations are conducting research on the application of AI technology in health testing. With the popularization of mobile devices, mHealth has become one of the most important ways of health testing. In China, many medical institutions and companies have launched mHealth services, which can be used to collect and manage health data through mobile apps and other means. Overall, there are still many challenges and opportunities in the research of

intelligent detection systems for human health parameters in China, which need to continuously strengthen the technical research and application promotion.

1.2.2 Current Status of Foreign Research

Research on intelligent detection systems for human health parameters has also been very active globally. Biosensor technology is an important component of intelligent detection systems for human health parameters and has been extensively studied. Various sensor technologies, such as cardiac sensors, blood pressure sensors, blood glucose sensors, respiratory sensors, etc., have been developed and widely used. The application of artificial intelligence technology can help achieve the management and analysis of health data, thus providing the basis for personalized health management. Machine learning, deep learning and other technologies have also been widely used in the research of intelligent detection systems for human health parameters. With the popularization of mobile devices, mobile health technology has become an important part of intelligent detection systems for human health parameters. Many companies and organizations have launched various health management applications to enable the collection and management of health data through smartphones and other devices. Many other organizations have developed various health data analysis platforms and applications using big data and cloud computing to achieve in-depth analysis and mining of health data. Overall, many countries and regions are stepping up their research and application promotion. In the future, with the continuous emergence of various new technologies, intelligent detection systems for human health parameters will be more widely applied and promoted.

1.3 Prospects for Applications

The smart monitoring systems studied in this paper can monitor human physiological parameters, such as heart rate, body temperature and blood pressure, as well as exercise and sleep quality and other lifestyle habits. Through Wi-Fi, ZigBee, Bluetooth and NFC technologies, they transmit data to the cloud platform to provide users with accurate and comprehensive health status analysis and health management services. In the future, smart health monitoring devices will develop more intelligent functions, such as sensor technology, artificial intelligence assisted analysis, virtual reality and so on. The addition of these features will enable the device to more comprehensively and accurately analyze the user's health status and provide more diversified and personalized health

management recommendations. The human body intelligent monitoring system can also be paired with a variety of smart devices, such as wearable devices, smart bracelets and so on. These devices can monitor heart rate, body temperature, blood pressure and other data in real time, and through the cloud connection, the data will be transmitted to the medical institutions or personal APP. users can analyze the data to determine their own health status, or to improve their health awareness, lifestyle habits and other aspects of the adjustment. The advantage of the human body intelligent monitoring system is that it can monitor physiological changes and prevent and detect potential health problems in time. Not only can it help people of different age groups with health management and risk assessment, but it can also play an important role in focusing on rookie sports people, weight loss, tendon and bone health care and other areas.