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The Internet of Things Applies in Medical Systems

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Abstract

The Internet of Things is a huge opportunity in a healthcare industry. We can use it in an Internet of Things (IoT) solution. Although, many believe that the healthcare industry is moving towards this goal, this process can become very complex and lengthy because it involves complex system structures as well as highly sensitive personal health data. IoT-related research and policy recommendations focus on how to address patient pain points through the Healthcare Internet of Things (IoT); and their needs for Iot products and services; and how providers can leverage IoT solutions to improve operational efficiency and patient satisfaction. We will next discuss these projects in detail to understand the significant impact of the Internet of Things on the hospital business.

Keywords

Health care; Internet of Things; hospital business; medical institutions

1. IoT Demand in the Healthcare Market

Despite a generally positive attitude towards wearable devices, demand continues to grow in the healthcare market. The Internet of Things (IoT) is a key factor in this demand for medical devices. Furthermore, there is a desire for more comprehensive and secure services. The IoT aims to provide a "healthy" world. This means everyone must know what they need and must act immediately when doctors require it. The application enables doctors to provide feedback to their patients, hospitals, patients' families, and the entire community (Chen et al., 2022).

1.1 Monitor health status

It is well known that in the United States, approximately 40% of people have diabetes and about 70% have cardiovascular disease. Furthermore, if you feel unwell or unwell, you may have already missed your chance for treatment. The Internet of Things (IoT) can help improve real-time monitoring of individuals and their health conditions in medical devices and environments. It can provide more information about signs of disease and share it with existing platforms – allowing doctors to see at any time whether a patient needs further treatment (Meng, Wang, & Liu, 2022). For example, doctors can use wearable devices to monitor patients for unhealthy lifestyle habits and provide appropriate treatment and recommendations based on their behavior. In addition, these applications can also collect relevant data to indicate risks of other conditions (such as depression) and remind patients to seek medical attention promptly (Zhan, Yang, & Dou, 2021).

1.2 Prevention of serious and chronic diseases

We all live in a world where exercise can help us maintain health and reduce the risk of disease. However, many people suffer from chronic illnesses such as high blood pressure, diabetes, and heart disease. This means that people have time to work on their health and healthcare. In fact, everyone wants to live a healthier and longer life (Dou et al., 2021). This desire, combined with the Internet of Things (IoT), is one of the most important characteristics of a healthy lifestyle. Currently, chronic disease prevention measures are often provided by medical devices, but these

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cannot fully cover everyone. Smart wearable devices and sensors can be used to identify signs of chronic diseases, allowing for accurate prediction of a patient's condition and adjustments to treatment based on lifestyle changes (Wang, 2019).

1.3 Improve diagnostic accuracy and safety

In some situations, without the support of IoT sensors, doctors cannot accurately diagnose a patient's condition. In other situations, IoT sensors can collect specific data to support a correct diagnosis. For example, doctors can use this data to assess a child with asthma and provide targeted treatment. In some cases, IoT sensors can also be used to detect potential ECG abnormalities by checking for abnormalities in the patient's electrocardiogram (ECG) before treatment. Furthermore, IoT can provide biometric-based security solutions to protect users from uncertainties. Additionally, IoT can help improve doctors' ability and accuracy in identifying patients with disabilities (Zhong, 2019).

1.4 Reduce costs and risks

The Internet of Things (IoT) allows companies to focus on costs and risks rather than pursuing profits. Healthcare is an expensive market involving many factors, including treatment and care costs. It is estimated that IoT applications consumed $125 million (RMB 349 million) in costs in 2018. In this field, wearable devices will not only reduce costs but also improve working conditions for patients and their caregivers. Medical device manufacturers face immense pressure as the healthcare industry becomes increasingly complex. To reduce costs and risks, the IoT will play a significant role by integrating sensors (especially for device monitoring) into health monitoring and largely replacing the current devices themselves (Zhang, 2017).

2. Application of IoT Solutions in Hospitals

The Internet of Things (IoT) is a technology that collects and analyzes data through connected devices. It not only helps reduce operational impact but also improves the patient experience. Healthcare organizations have been taking center stage in IoT development and have applied it to many areas. One of these is hospital security. IoT enables healthcare organizations to track and analyze patient data. From providing assistance to patients to offering them smartphones, security sensors, and other services; these applications can help healthcare organizations track and manage their operating costs and asset allocation (Fang et al., 2016).

2.1 Security

Security is one of the biggest challenges for all healthcare institutions. This refers not only to hospitals needing specialists to maintain security equipment, but also to the large number of doctors and nurses who rely on individual expertise. Therefore, security becomes a key topic of discussion in IoT application solutions for healthcare institutions. Such solutions can provide healthcare institutions with reliable and comprehensive security, enabling them to respond quickly to emergencies. For example, IoT applications can alert security personnel so they can take immediate action, and IoT can collect data and report results to users. Simultaneously, IoT can benefit from improved system management, meaning it can play a greater role in ensuring client privacy and protecting hospital systems (Zhang, 2016).

2.2 Patient experience

Patient experience is paramount to hospitals. Integrating applications within hospitals can improve patient satisfaction because devices and technologies can generate significant value in patient care. The Internet of Things (IoT) provides patients with a more direct and efficient way to track their health. For example, when a doctor detects symptomatic pneumonia, these test results can be sent to the doctor, who can then determine whether immediate treatment is needed or to avert danger. Healthcare systems can also combine these test results with patient records to document their condition after each treatment. IoT allows healthcare professionals to communicate with patients and helps them identify and resolve issues quickly. By integrating patient care into a single process using smartphones, doctors can complete tasks without accessing complex or cumbersome applications; this also reduces the time and manpower costs traditionally associated with call center operations (Zhang, 2016).

2.3 Hospital cost and asset management

Healthcare organizations frequently use asset allocation to manage their operating costs. Using intelligent asset

management software, organizations can track equipment usage and categorize data from sensors and devices. This helps reduce waste, improve efficiency, and lower operating costs and complexity. For example, surveillance cameras can be used to track patients and equipment such as ventilators, and the location of medical equipment and the type of batteries used can also be tracked. In hospitals, data on asset status and inventory conditions provided by healthcare management systems can also be used to monitor fixed assets. This system not only provides healthcare organizations with information to better utilize hardware assets but also extracts real-time data from medical equipment, helping to manage equipment and optimize operations for improved performance (Zhang, 2016).

3. Patients' Needs and Pain Points

While the benefits of the Internet of Things (IoT) are obvious, what are the needs and pain points of patients? Like everyone else, everyone wants access to the best healthcare. Patients want to monitor their health through smart devices and interact with doctors via smartphones and other devices, giving them the opportunity to communicate with those who need them most. Furthermore, they want healthcare services to provide the best possible experience to ensure they receive the best care, anywhere. In addition, patients expect more healthcare and service options from healthcare institutions. For example, healthcare institutions could provide guidance on current and past health data, as well as what they believe to be the best health care plans (Yao & Wu, 2015).

3.1 Healthcare needs

IoT solutions offer a rapid way for healthcare professionals to leverage their experience and knowledge to manage patients. In healthcare, patients often face numerous challenges. Among the biggest are time constraints, heavy workloads, and a lack of time to access necessary assistance. Therefore, leveraging IoT technologies to improve the patient experience, enhance the quality of care, and increase operational efficiency is crucial (Hu, 2013).

3.2 Pain points

No matter how much patients desire quality healthcare, they face numerous challenges. While this is a positive sign for the healthcare system, many aspects need to be addressed. In most cases, patients expect safe, effective, and efficient medical services to recover their health with optimal results. However, applying the Internet of Things (IoT) to certain types of healthcare services could present challenges for many vital healthcare systems: patients frequently require the review of their personal information, such as their physical condition or the effectiveness of their medications.

References

Chen, Q., Huang, Y., Chen, J., Zhong, G., & Li, Z. (2022). High-performance non-invasive IoT system promotes refined management of large imaging medical equipment (taking CT as an example). *Medical Equipment*, *35*(17), 45-50.

Dou, F., Zhang, S., Zhou, P., Zhang, W., & Huang, X. (2021). Design of a secure Internet of Things medical system based on human body sensor network. *China Medical Equipment*, *18*(1), 2-6.

Fang, B., Wang, H., Bai, T., Lin, J., Pang, Y., Jiang, X., & Jiang, Y. (2016). Design of an Android-based IoT-based intelligent remote medical system. In *IoT and Wireless Communication—Proceedings of the 2nd National Conference on IoT Technology and Application and the 11th National Conference on Radio Application and Management* (pp. 71-74).

Hu, X. (2013). Construction of Smart Healthcare System Architecture Model under the Internet of Things Framework—Taking Wuhan Smart Healthcare as an Example. *E-Government*, (12), 24-31.

Meng, L., Wang, Y., & Liu, D. (2022). Application of Internet of Things Technology in Refined Management of Medical Equipment—Taking Endoscopic Equipment as an Example. *China Medical Equipment*, *37*(6), 110-114.

The launch meeting for the medical and health Internet of Things (IoT) standards work of the Wuxi Research Institute of the National Health and Family Planning Commission's Statistical Information Center was successfully held. (2015). *China Health Information Management Journal*, *12*(2), 122.

Wang, M. (2019, July 29). *Research on the Application of Internet of Things Technology in Indoor Personnel Tracking and Positioning and Optimization of Medical Resource Allocation in Medical Facilities*. Zhejiang Provincial Hospital

of Integrated Traditional and Western Medicine.

Yao, W., & Wu, M. (2015). Application of Wi-Fi real-time positioning system in medical system. In *Proceedings of the 15th National Academic Conference of the Chinese Society of Medical Engineering* (p. 446).

Zhan, D., Yang, J., & Dou, Z. (2021). Design and application of "Internet + Internet of Things" technology in medical waste management in Liaoning Province. *China Health Supervision Journal*, *28*(4), 345-350.

Zhang, G. (2017). Design and Implementation of a Clinical Trial Drug and Subject Management System Based on RFID and Cloud Computing (Master's thesis). Chengdu University of Traditional Chinese Medicine.

Zhang, X. (2016). Application of Internet of Things Technology in Medical Management—Taking Dalian University Affiliated Zhongshan Hospital as an Example. *China Hospital Architecture and Equipment*, (3), 35-38.

Zhang, Z. (2016). The application value and significance of key technologies for integrated diagnosis and treatment using the four diagnostic methods in new medical models (Doctoral dissertation). Beijing University of Chinese Medicine.

Zhong, X. (2019). A survey and analysis of the application status of "Internet + Maternal and Child Health" in prefecture-level maternal and child health care institutions in China (Master's thesis). Chinese Center for Disease Control and Prevention.