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Research on the Applications of Artificial Intelligence in Healthcare

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Abstract

Medical and health care have received widespread attention in modern society, which has objectively promoted the application of various technical methods in this field. This paper takes the advantages of artificial intelligence (AI) applications in the medical and health sector as the point of entry, analyzes its common application scenarios, and—based on these discussions—uses intelligent health management as an example to elaborate on the ways AI is applied in medical and health care. The paper discusses aspects such as the construction of Internet of Things (IoT) systems, personnel information collection, real-time analysis and comparison, and auxiliary functions, highlighting the technical characteristics and advantages of AI. It also provides support for the further application of AI in the medical and health field.

Keywords: Artificial Intelligence; Medical and Health Care; Health Management; Remote Services

Introduction:

Artificial Intelligence (AI) is a general term that encompasses the theories, methods, technologies, and application systems used to simulate, extend, and enhance human intelligence. It includes fields such as robotics, speech recognition, image recognition, natural language processing, expert systems, machine learning, and computer vision. Since its emergence, AI technology has rapidly gained attention and has been widely applied across various sectors, including the field of medical and health care. With its

remarkable advantages, standardized technical applications, and consistent methodological frameworks, AI can provide extensive services to organizations and personnel related to health care. Therefore, analyzing its application advantages, typical scenarios, and implementation methods holds significant practical and theoretical value.

1. Advantages of Artificial Intelligence in the Field of Medical and Health Care

1.1 High Convenience

The application of artificial intelligence in the medical and health care field. The direct advantage of applying artificial intelligence (AI) in the medical and health care field lies in its high degree of convenience, which is reflected in two main aspects: the internal management of medical institutions and the provision of medical and health services to the public.

In terms of internal management, hospitals and health centers can utilize AI technology to organize and manage information such as patients' medical records and hospital training data. Through intelligent technologies, relevant information can be automatically generated, stored, and made available to administrators at any time for data analysis, thus achieving greater convenience and efficiency compared with traditional management methods [1][2].

Similarly, in external management, patients can access hospital operating systems, where the system automatically performs intelligent identification based on default or stored information, providing various resources needed by the patients and thereby improving the overall convenience of medical and health care services.

1.2 Wide Applicability

Wide applicability is one of the key advantages of artificial intelligence (AI) in the field of medical and health care. This advantage refers to the high level of uniformity that AI technologies possess in terms of technical standards, application methods, and support systems. The AI technologies applied in one hospital can also function effectively in other hospitals without requiring additional technical analysis or separate standard management. From an application perspective, the technical adaptability of AI is remarkably high [3].

For example, in intelligent patient data management, information is generally organized through a combination of real-time data collection and intelligent comparison. The workflow, storage methods, and archiving systems used in hospitals are largely similar, reflecting the high applicability and standardized adaptability of AI technologies in the medical and health care field [4].

1.3 Scalability

The application of artificial intelligence (AI) in the medical and health care field also has the advantage of scalability, which is reflected in two main aspects.

First, AI itself is still in a state of development and evolution, allowing for continuous improvement and expansion of service capabilities. For example, in its early stages, AI's recognition capabilities could only perform facial feature identification and support patient information analysis and comparison. It could not yet integrate with big data or cloud technologies to analyze more complex information and extend its service functionality [5].

Second, during the application phase, AI can achieve functional extensions based on actual needs. For instance, by utilizing bus technology, AI can provide intelligent services to multiple entities simultaneously, further enhancing its service scope and adaptability [6].

2. Application Scenarios of Artificial Intelligence in the Medical and Health Care Field

2.1 Intelligent Health Management

The application of artificial intelligence (AI) in the medical and health care field is diverse, with a typical scenario being intelligent health management, primarily serving patients with chronic diseases, especially those with cardiovascular conditions. Cardiovascular diseases can deteriorate at any time, and sudden events such as hemorrhagic strokes carry a high risk of death.

With the support of AI technologies, patients with chronic conditions (e.g., hypertension) can be provided with smart wearable devices that continuously collect real-time data on blood pressure, heart rate, and pulse. When abnormal physiological indicators are detected, the system can automatically sense the issue and issue alerts, notifying relevant personnel to take action. In cases of sudden illness or loss of consciousness, family members and medical staff can quickly provide assistance based on location information provided by AI-enabled devices, thereby improving the quality of medical and health care services [7][8].

2.2 Construction of Intelligent Information Systems

The construction of intelligent information systems can simultaneously provide information services to hospitals themselves, higher-level administrative departments, and the general public. The primary focus of such systems is to transform repetitive and routine hospital tasks so that they can be carried out in semi-automated or fully automated modes, supported by intelligent modules and computer systems.

For example, a hospital's archival database can be upgraded using AI technologies to establish access management workflows and intelligent identification methods. Hospital staff can gain access using fingerprints or facial recognition, while higher-level departments, patients, or family members can use authorization codes. The database performs intelligent verification to allow or deny access, supporting tasks such as epidemiological management and patient medical record management [9].

2.3 Intelligent Remote Services

Intelligent remote services can also leverage AI technologies to provide medical and health care services to various stakeholders. For example, in health care services provided to the public, hospitals can establish an information resource database managed intelligently. Individuals within the hospital's service scope can pre-submit information to the hospital, such as personal ID numbers or medical record numbers, which are uniquely identifiable. The hospital's information resource database collects and stores this data.

When individuals attempt to access the database—regardless of whether they are physically within the hospital—they can provide their information to the hospital's management system. As long as the submitted information matches the initially provided data, the system can intelligently verify the user and quickly respond to their needs, offering various health-related knowledge and improving the overall accessibility and quality of health care services.

2.4 Intelligent Robotic Assistants

Intelligent robotic assistants are a type of modern robot that, when adapted for applications in the medical and health care field, are equipped with intelligent programs to perform tasks that previously

required human effort. These tasks include ward care, meal delivery, and patient information collection.

For example, in inpatient wards, intelligent robotic assistants can collect patient information according to preset work protocols, recording vital signs twice daily, understanding patient needs, and providing consultation services based on default programs.

Moreover, some advanced robots are already being used in operating rooms and outpatient services. These robots often have superior perceptual capabilities, system precision, and intelligent service extensions. Supported by comprehensive information systems and AI technologies, they can perform auxiliary tasks during surgical procedures, thereby enhancing their application value in the medical and health care field [10][11].

3. Application of Artificial Intelligence in the Medical and Health Care Field: Taking Intelligent Health Management as an Example

3.1 Construction of Internet of Things (IoT) Systems

Analysis Using Intelligent Health Management as an Example

In intelligent health management, the application of artificial intelligence

(AI) in the medical and health care field should begin with the construction of Internet of Things (IoT) systems as the front-end framework. By leveraging IoT-based work systems, intelligent health management can perform remote monitoring, routine analysis, and other tasks, thereby enhancing the extensibility and coverage of health management.

Table 1. Computer Configuration Requirements for Hospital IoT Systems

Equipment	Number of Units (pcs)	Virtual Memory (GB)	VRAM (GB)	Storage Capacity (GB)
Host	1~2	32	16	2048
Computer Extension	5~10	8~16	4~8	512

After the construction of the small-scale computer cluster, both external and internal network links are opened, connecting hospital administrators, patients (primarily via their smart wearable devices), and patients' family members to the IoT system. External connections use wireless networks, while internal connections are recommended to be wired.

When a patient's information shows no abnormalities, it is provided in real time to the patient. If abnormalities are detected, the system determines the appropriate response based on the nature of the anomaly. For anomalies in vital signs that do not pose serious risks, the system provides relevant information to the patient while also notifying medical staff and family members, enabling them to intervene or take preventive measures against potential health risks, such as elevated blood pressure or stroke.

If a patient remains immobile for an extended period or exhibits severely abnormal vital signs (e.g., blood pressure or heart rate), the system immediately alerts medical staff and family members, who can take action based on the patient's location information to save the patient's life.

For example, when providing intelligent health management services to hypertension patients, and using IoT as the foundational platform, the operational model of this technology can be described as follows:

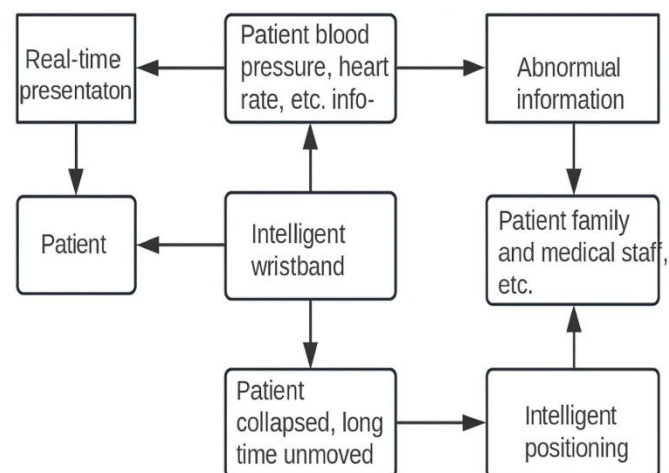


Figure 1. IoT-Based Operational Model for Intelligent Health Management As shown in Figure 1, the IoT-based model primarily connects four main entities within the Internet of Things: patients, smart wearable devices, patients' family members and medical staff, and patients' real-time information. To ensure effective interaction, all external entities are connected via wireless networks. The hospital serves as the operational center of the IoT system and acts as the core platform linking the four entities. Hospitals can equip the IoT work center with high-performance computers. If the number of service recipients is large or the workload is heavy, a small-scale computer cluster can be established. The configuration requirements for computers within this cluster are as follows:

All of these operations are carried out automatically, relying on smart wearable devices as the basis and the IoT system as the operational platform and logical support. This allows continuous monitoring and management without human intervention, improving the quality and convenience of medical and health care services.

3.2 Personnel Information Collection

In IoT-based intelligent health management, personnel information collection is essential for establishing a scientific and accurate AI operational model. Taking hypertension patients as an example, the key information to be collected includes two aspects:

- (1) Real-time information from daily life, collected through smart devices, such as patients' vital signs.
- (2) Basic patient information, obtained by the hospital during medical visits.

In practice, hospitals are required to record patient information and perform multiple rounds of repeated measurements to obtain general values of vital signs, including blood pressure, heart rate, and other key parameters. This information is recorded in the

patient's smart wearable device. Additionally, reference data—such as standard blood pressure ranges, mild/moderate/severe hypertension thresholds, normal heart rates, and exercise heart rates—are also provided.

Once patients receive the smart wearable device, the built-in contact sensors collect real-time vital signs according to the default program settings of the device. Following the IoT model shown in Figure 1, the collected data is then used to determine subsequent management and intervention steps.

3.3 Real-time Analysis and Comparison

Real-time analysis and comparison require the application of artificial intelligence technology, which is also the key for intelligent health management to achieve its expected effect. The focus is on using intelligent technology to realize information comparison, perform intelligent analysis after comparison, determine the patient's physical condition, and issue subsequent instructions. According to general standards, for individuals in a non-exercise state, blood pressure and heart rate indicators are generally as follows:

Systolic pressure: 100–120 mmHg, diastolic pressure: 60–80 mmHg, heart rate: 60–100 beats per minute.

Based on this, the information collected when a patient is admitted to the hospital is recorded. Suppose individual A's blood pressure and heart rate are as follows:

Systolic pressure: 130 mmHg, diastolic pressure: 90 mmHg, heart rate: 80 beats per minute.

It can be seen that the heart rate is normal, but the blood pressure is slightly high, meeting the standard for mild hypertension. The two sets of information above are entered into the intelligent wristband's memory system for recording. For the purpose of health management, a third set of data, namely risk management data, is generated with the following standard: Systolic pressure: 160 mmHg, diastolic pressure: 140 mmHg, heart rate exceeding 100 beats per minute or below 60 beats per minute.

This data is also entered into the intelligent wristband's memory system for recording. At the same time, GPS positioning software is embedded in the wristband to monitor the patient's location in real time. After individual A leaves the hospital, the intelligent wristband continuously collects real-time physiological data. One such collection result is as follows:

Systolic pressure: 110 mmHg, diastolic pressure: 85 mmHg, heart rate: 82 beats per minute.

This set of data is similar to the general standard, consistent with the blood pressure and heart rate levels of healthy individuals. The intelligent wristband provides this information to A, who finds that his physiological indicators are normal and can continue routine medication and daily life. The intelligent wristband continues to collect real-time data. Another collection result is as follows:

Systolic pressure: 132 mmHg, diastolic pressure: 91 mmHg, heart rate: 83 beats per minute.

This data is slightly higher than the standard for healthy individuals and also slightly higher than the data collected when individual A was admitted to the hospital, but it is not high enough to cause serious issues such as stroke.

The intelligent wristband analyzes the data and finds that it still differs from the risk management data, thus not considered a health

risk. The data is routinely provided to the patient. The intelligent wristband continues to collect real-time data. Another collection result is as follows:

Systolic pressure: 169 mmHg, diastolic pressure: 151 mmHg, heart rate: 119 beats per minute.

This set of data exceeds the standard for healthy individuals and is higher than the data collected at the time of A's hospital admission, also exceeding the risk management data. The intelligent wristband assumes that A is facing the risk of high blood pressure and rapid heart rate, provides this data to the hospital, the patient's family, and the patient himself, and promptly alerts them to intervene to prevent serious safety issues such as stroke. When the patient's family or medical staff cannot contact the patient, GPS positioning information can be used to quickly locate the patient, intervene in physiological changes, and provide timely rescue.

The core of the above work lies in information collection, intelligent comparison, and analysis, all of which are completed by artificial intelligence technology. With the help of the Internet of Things, multi-agent linkage is achieved, which can improve the quality of medical and health services [12].

3.4 Auxiliary Functions

On the basis of the above work, artificial intelligence technology can also enhance the application quality of auxiliary technologies, including visualization technology [13], cloud technology, and big data technology.

Taking big data technology as an example, when providing intelligent health management services for individuals, big data technology can be integrated to collect and store information such as patients' heart rate and blood pressure in real time. Intelligent technology can then provide logical control support on a daily basis, performing calculations and statistical analyses on the patient's physiological data to determine daily fluctuations in vital signs.

Furthermore, certain key information can be mined and presented, such as the patient's maximum daily blood pressure fluctuation and highest blood pressure value. These data help patients understand changes in their physical condition and the effectiveness of blood pressure control, while also providing valuable references for medical personnel to improve patient prognosis.

Conclusion

In summary, artificial intelligence has been widely applied in the field of healthcare, offering advantages such as high convenience, broad applicability, and scalability. Its specific applications include intelligent health management, intelligent information system development, intelligent remote services, and intelligent robotic assistants.

Within the framework of intelligent health management, it can be seen that the application of artificial intelligence in healthcare requires a high level of professional expertise. The process should begin with the construction of an Internet of Things (IoT) system, followed by the collection of personal information and real-time analysis and comparison. Additionally, various auxiliary functions should be integrated to enhance the overall performance of intelligent health management, providing individuals with more comprehensive and efficient healthcare services [14][15].

References

1. Wang Chen, Sun Qigui, Xu Fei. Development Trends of Ethical Research on Medical Artificial Intelligence: Topic Distribution, Knowledge Base, and Future Prospects [J]. *Journal of Dialectics of Nature*, 2023, 45(12): 18–29.
2. Wong E .Media Review: Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again[J].*InnovAiT*, 2021.DOI:10.1177/17557380211018237.
3. Liu Kejun, Xiao Yue, Qiu Yingpeng, et al. Research and Application of the Clinical Evaluation Guidelines for Artificial Intelligence Medical Technology in China [J]. *Journal of Medical Informatics*, 2023, 44(10): 16–21.
4. Meng Xiangfeng, Wang Hao, Li Jiage. Interpretation of the Industry Standard “Artificial Intelligence Medical Devices — Quality Requirements and Evaluation — Part 1: Terminology” [J]. *Peking Union Medical Journal*, 2023, 14(06): 1175–1179.
5. Davenport T , Kalakota R .The potential for artificial intelligence in healthcare[J].*Future Hospital Journal*, 2019,6(2):94-98.DOI:10.7861/futurehosp.6-2-94.
6. Zhang Shuyan, Pi Tingting. The Dilemma and Governance of Explainability in the Application of Artificial Intelligence in the Medical Field [J]. *Medicine and Philosophy*, 2023, 44(03): 25–29+35.
7. Dinh-Le C , Chuang R , Chokshi S ,et al.Wearable Health Technology and Electronic Health Record Integration: Scoping Review and Future Directions[J].*JMIR mHealth and uHealth*, 2019, 7(9).DOI:10.2196/12861.
8. Rajpurkar P , Chen E , Banerjee O ,et al.AI in health and medicine[J].*Nature Medicine*, 2022, 28:31 - 38.DOI:10.1038/s41591-021-01614-0.
9. Long Youlin, Wang Xinyi, Guo Qiong, et al. Challenges and Countermeasures in the Design and Implementation of Clinical Trials for Artificial Intelligence Medical Devices [J]. *Chinese Journal of Evidence-Based Medicine*, 2022, 22(12): 1453–1458.
10. Yang G Z , Cambias J , Cleary K ,et al.Medical robotics—Regulatory, ethical, and legal considerations for increasing levels of autonomy[J].*Science Robotics*, 2017, 2(4):eaam8638.DOI:10.1126/scirobotics.aam8638.
11. Hashimoto DA, Rosman G, Rus D, Meireles OR. Artificial Intelligence in Surgery: Promises and Perils. *Ann Surg.* 2018 Jul;268(1):70-76. doi: 10.1097/SLA.0000000000002693.
12. Jiang F, Jiang Y, Zhi H, Dong Y, Li H, Ma S, Wang Y, Dong Q, Shen H, Wang Y. Artificial intelligence in healthcare: past, present and future. *Stroke Vasc Neurol.* 2017 Jun 21;2(4):230-243. doi: 10.1136/svn-2017-000101.
13. Esteva A , Chou K , Yeung S ,et al.Deep learning-enabled medical computer vision[J].*npj Digital Medicine*, 2021, 4(1):5.DOI:10.1038/s41746-020-00376-2.
14. Char DS, Shah NH, Magnus D. Implementing Machine Learning in Health Care - Addressing Ethical Challenges. *N Engl J Med.* 2018 Mar 15;378(11):981-983. doi: 10.1056/NEJMp1714229.
15. McCoy LG, Bihorac A, Celi LA, Elmore M, Kewalramani D, Kwaga T, Martinez-Martin N, Prôa R, Schamroth J, Shaffer JD, Youssef A, Fiske A. Building health systems capable of leveraging AI: applying Paul Farmer's 5S framework for equitable global health. *BMC Glob Public Health.* 2025 May 2;3(1):39. doi: 10.1186/s44263-025-00158-6.