
| RESEARCH ARTICLE

A Brief Discussion on the Current Development Status of the Digital Medical Industry

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| ABSTRACT

Research objective: Respond to the call to promote Internet + medical health, carry out path innovations in the development of the medical industry, and enable high-quality development of the medical industry. Research method: Taking government digital information as the main line, using enterprise and public surveys as the auxiliary line, and using two-dimensional perspectives of mutual verification of positive and auxiliary lines to examine the prospects of digital medical development from multiple angles. Research conclusion: Explore the future development model and innovative development path of my country's Internet hospitals under the background of normalized epidemic prevention and control. Provide suggestions for the healthy development of Internet hospitals in China.

| KEYWORDS

data, medical, development

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1. Research background

1.1 Political significance

In order to implement the policy of a healthy China, improve the level of modern comprehensive medical and health management in the region, optimize and upgrade resource allocation, and promote innovative promotion of service models, greatly improve service efficiency, further reduce the cost of services, and greatly satisfy people's growing demand for medical and health. Relevant Chinese units have issued relevant documents on promoting "Internet + Medical Health", which explains them from the three perspectives of "Internet + Medical Health" service system, support system and strengthening supervision. Therefore, studying the digital medical industry will help further promote the transformation of the data medical industry.

1.2 The concept and connotation of digital medical.

Digital medical is a new medical work method applied in the entire medical process with the help of Internet technology and artificial intelligence. It organically combines advanced digital technology and network technology with the field of health and health industry. By digitizing various medical-related information, it realizes a three-in-one information management system of digital medical equipment, information network platform, and digital medical software. Digital medical care greatly improves the immediacy, universality and accuracy of medical and health services.

The basis for realizing digital medical care is the construction of digital medical equipment and basic networks. As a large market, the digital transformation of medical equipment is at a level of tens of billions. As an important force in China's medical care, leading medical equipment companies in various subdivided medical equipment companies such as Mindray, Lepu, and Yuyue have an advantage in the docking of local medical resources and can promote the domestic substitution of digital medical and medical equipment at the same time. Domestic basic network construction has gradually matured with AI technology, 5G, big data, etc., which has gradually upgraded and matured digital medical application scenarios.

2. Current research status

With the development of social economy, the general public's demand for digital medical care is increasing day by day, and the traditional medical model can no longer meet the needs of the people. Relevant units should play a leading role and need to actively assume the social responsibility of introducing digital medical care. How to use the existing platform resources of the hospital, actively promote the application of emerging technologies such as digitalization, the Internet and artificial intelligence in the field of digital medical care, make full use of technical forces to play a radiation and driving role, explore new ways of digital medical care, and improve the medical literacy level of the general public, thereby promoting the construction of a healthy China has become a question that needs to be discussed at the moment.

3. Problems in the digital medical industry

There is a Chinese proverb that it is difficult to finish the work at the beginning. Now digital medical care is in its infancy. With the development of society, some issues about digital medical care are gradually exposed. Based on the statistical analysis of the surveys and investigations conducted, the following serious problems were summarized and analyzed.

3.1 High costs and difficult profits

At present, cross-border integration led by the digital economy is accelerating its evolution, and the medical and health field is also accelerating towards "patient-centered" digital integration. However, the high start-up costs of enterprises and the difficulty of making profits are common problems faced by digital medical companies. The sales cycle of digital medical products and services is more complex and uncertain than that of traditional medical industries, and startups must spend more time and capital to stabilize and balance the contradiction between market demand and corporate survival.

3.2 The foundation of digital transformation is weak

At present, the collaborative mechanism to promote the digital transformation and innovative development of traditional industries has not been established. Not only are there no leading digital economy companies like Huawei, Baidu, ByteDance, and Tencent, but there are also no top 10 electronic information companies, and there are no digital medical innovative companies that can enter the top 50 list of medical big data companies in China. There are not only digital medical unicorn companies like WeDoctor, Zerokk Technology and Penguin Apricot, but also innovative companies like Guangdong Jinyu Medical that focus on digitalization in the medical examination field.

3.3 The foundation of digital transformation is weak

There are prominent hidden dangers in the outflow of digital talents, and the overall competitiveness is not strong. In McKinsey's global digitalization report, the lack of human resources is listed as one of the three major obstacles to the digital development of the industry, which to a certain extent confirms the importance of cultivating digital talents. The shortage of talent supply in product research and development, in-depth analysis, digital marketing, etc. is relatively serious.

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4. Results and Discussion

The future prospect of the solution is based on China's current social background, based on the strategic goal of building a healthy China, and taking the bottlenecks that still exist as the starting point, we put forward some suggestions. As follows:

Firstly, improve strategic positioning and strengthen information infrastructure. It is recommended to formulate a special plan for the digital medical industry, and provide multi-channel financial support for industrial development through industrial funds, science and technology innovation funds and financial leasing. Further improve the one-stop health information service big data platform, connect and coordinate national health information data. Through a unified digital medical industry standard and specification system and security guarantee.

What's more, establish a big health and medical data group to promote the open sharing of health data. Establish a management system with clear property rights and consistent responsibilities and powers of health and medical big data, and improve the sharing and open mechanism, integrity mechanism and exit mechanism. Clarify specific regulations on sharing and opening up and review and evaluation mechanisms, and strictly regulate the development, mining and application of big data.

Least but not last, establish a Digital Medical Industry Technology Research Institute to promote the integration of digital technology and medical care to strengthen technological leadership and coordination, as well as common technology research and breakthroughs, participate in the research of national digital medical equipment and system standards, and guide enterprises to conduct technology research and development and standardize market applications. Actively support cross-industry and collaborative innovation in medicine and industry, explore application scenarios with focus on biomedicine, medical devices, artificial intelligence, health insurance, etc., explore data value, and enrich service supply. Explore and gradually establish application models for health and medical data in the fields of drug clinical trials, insurance actuarials, precision medicine, medical research, etc.

Build an innovation path for the digital medical industry. Under the new situation of comprehensively improving the health literacy of the whole people, integrate medical resources, innovate innovation paths in the digital medical industry, make full use of technologies such as the Internet, rely on medical platforms, ensure and improve the level of digital medical care, and promote the healthy communication and development of the digital medical industry.

5. Conclusion

China attaches great importance to developing the digital economy, elevates it to a national strategy, and makes overall arrangements. As an important part of the digital economy, digital medical care is an important direction for the development of the medical industry and the medical industry. High-tech industry, education and research have a strong foundation and huge medical data assets. Building digital medical care into an important industry in the province's digital economy is not only an important measure to implement the national digital economy strategy, but also a pragmatic move to deepen the development of the xx digital economy.

We should fully grasp the advantages of the biomedicine and digital economy industries, cultivate super-large digital medical enterprises and leading enterprises, and seize the highland of the national digital medical industry; strengthen collaborative innovation in the development of digital medical care, and break through policies, standards, regulations and technical barriers; cultivate core markets such as high-end population, surrounding areas, and related industries through the development of advantageous fields such as chronic disease treatment, remote diagnosis and treatment, pharmaceutical e-commerce, new drug development, and information services; consolidate basic support such as policies, data, technology, platforms, and funds, face people's lives and health, and build healthy cities, add new momentum for high-quality development, create new advantages, and effectively promote new development of the digital economy.

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References

- [1] M. Karthigha, L. Latha and K. Sripriyan, "A Comprehensive Survey of Routing Attacks in Wireless Mobile Ad hoc Networks", 2020 International Conference on Inventive Computation Technologies (ICICT), pp. 396-402, 2020.
- [2] R. Kumar, S. Kumar, A. Soni and R. Kumar, "Remote Patient Monitoring and MANET: Applications and Challenges Remote Patient Monitoring and MANET: Applications and Challenges", pp. 4275-4283, July 2015.
- [3] M. N. Siddiqui, K. R. Malik and T. S. Malik, "Performance Analysis of Blackhole and Wormhole Attack in MANET Based IoT", 2021 International Conference on Digital Futures and Transformative Technologies (ICoDT2), pp. 1-8, 2021.
- [4] A. B. Emami, S. Samet, A. Azarpira and A. Farrokhtala, "SNACK: An efficient intrusion detection system in Mobile Ad-Hoc Network based on the Selective-Negative Acknowledgement algorithm", Can. Conf. Electr. Comput. Eng, vol. 2015-June, no. June, pp. 903-907, 2015.
- [5] R. Verma, R. Sharma and U. Singh, "New approach through detection and prevention of wormhole attack in MANET", Proc. Int. Conf. Electron. Commun. Aersp. Technol. ICECA 2017, vol. 2017-Janua, pp. 526-531, 2017.
- [6] N. Arya, U. Singh and S. Singh, "Detecting and avoiding of worm hole attack and collaborative blackhole attack on MANET using trusted AODV routing algorithm", IEEE Int. Conf. Comput. Commun. Control. IC4 2015, pp. 1-5, 2016.
- [7] T. Kaur, "Mitigation of Blackhole Attacks and Wormhole Attacks in Wireless Sensor Networks Using AODV Protocol", 2018 IEEE Int. Conf. Smart Energy Grid Eng, pp. 288-292, 2018.
- [8] P. Khandare and Y. Sharma, "Countermeasures for Selective Forwarding and Wormhole Attack in WSN", International Conference on Inventive Systems and Control, pp. 1-7, 2017.
- [9] R. K. Kapur and S. K. Khatri, "Analysis of attacks on routing protocols in MANETs", Conf. Proceeding - 2015 Int. Conf. Adv. Comput. Eng. Appl. ICACEA 2015, vol. 5, no. 6, pp. 791-798, 2015.
- [10] L. Prashar and R. K. Kapur, "Performance analysis of routing protocols under different types of attacks in MANETs", 2016 5th Int. Conf. Reliab. Infocom Technol. Optim. ICRITO 2016 Trends Futur. Dir, pp. 405-408, 2016.

- [11] F. A. Khan, M. Imran, H. Abbas and M. H. Durad, "A detection and prevention system against collaborative attacks in Mobile Ad hoc Networks", *Futur. Gener. Comput. Syst.*, vol. 68, pp. 416-427, 2017.
- [12] H. M. Ibrahim, N. M. Omar and E. K. William, "Detection and Removal of Gray Black and Cooperative Black Hole Attacks in AODV Technique", *Int. J. Adv. Comput. Sci. Appl.*, vol. 6, no. 5, pp. 60-70, 2015.
- [13] I. Woungang, "Defending Against Collaborative Attacks by Malicious Nodes in MANETs: A Cooperative Bait Detection Approach", *IEEE Syst. J.*, vol. 9, no. 1, pp. 65-75, 2015.
- [14] P. L. Chelani and S. T. Bagde, "Detecting collaborative attacks by malicious nodes in MANET: An improved bait detection scheme", *Proc. Int. Conf. Commun. Electron. Syst. ICCES 2016*, pp. 1-6, 2016.
- [15] A. Rana, V. Rana and S. Gupta, "EMAODV: Technique to Prevent Collaborative Attacks in MANETs", *Procedia Comput. Sci.*, vol. 70, pp. 137-145, 2015.
- [16] G. Singh Bindra, A. Kapoor, A. Narang and A. Agrawal, "Detection and removal of co-operative blackhole and grayhole attacks in MANETs", *Proc. 2012 Int. Conf. Syst. Eng. Technol. ICSET 2012*, pp. 1-5, 2012.
- [17] M. Shinde and D. C. Mehetre, "Black Hole and Selective Forwarding Attack Detection and Prevention in WSN", *2017 Int. Conf. Comput. Commun. Control Autom.*, pp. 1-6, 2017.
- [18] U. Singh, M. Samvatsar, A. Sharma and A. K. Jain, "Detection and avoidance of unified attacks on MANET using trusted secure AODV routing protocol", *2016 Symp. Colossal Data Anal. Networking CDAN 2016*, pp. 1-6, 2016.
- [19] S. Mehta and M. Sharma, "Analysis of Black Hole and Wormhole Attack using AODV Protocol", vol. 1, no. 1, pp. 44-48, 2013.
- [20] K. Patidar and V. Dubey, "Modification in routing mechanism of AODV for defending blackhole and wormhole attacks", *Proc. 2014 Conf. IT Business Ind. Gov. An Int. Conf. by CSI Big Data CSIBIG 2014*, 2014.
- [21] R. Mehta, "Trust based mechanism for Securing IoT Routing Protocol RPL against Wormhole Grayhole Attacks", *2018 3rd Int. Conf. Conver. Technol.*, pp. 1-6, 2018.
- [22] D. S. K. Tiruvakadu and V. Pallapa, "Honeypot Based Black-Hole Attack Confirmation in a MANET: Black-Hole Attack Confirmation", *Int. J. Wirel. Inf. Networks*, vol. 25, no. 4, pp. 434-448, 2018.
- [23] D. A. Sanders, D. C. Robinson, M. Hassan, M. Haddad, A. Gegov and N. Ahmed, "Making decisions about saving energy in compressed air systems using ambient intelligence and artificial intelligence", *Adv. Intell. Syst. Comput.*, vol. 869, pp. 1229-1236, September 2018.
- [24] R. Shbib, S. Zhou and K. Alkadhimi, "SCADA system security complexity and security proof", *Lect. Notes Comput. Sci. (including Subser. Lect. Notes Artif. Intell. Lect. Notes Bioinformatics)*, vol. 7719, pp. 405-410, 2013.
- [25] D. S. K. Tiruvakadu and V. Pallapa, "Confirmation of wormhole attack in MANETs using honeypot", *Comput. Secur.*, vol. 76, pp. 32-49, 2018.
- [26] D. L. Ndzi et al., "Wireless sensor network coverage measurement and planning in mixed crop farming", *Comput. Electron. Agric.*, vol. 105, pp. 83-94, 2014.
- [27] O. Fasunlade, S. Zhou and D. Sanders, "Comprehensive Review of Collaborative Network Attacks in MANET", *2020 IEEE 44th Annual Computers Software and Applications Conference (COMPSAC)*, pp. 1542-1545, 2020.