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THE "BIG DATA" APPLICATION TO COMMUNITY MANAGEMENT IN CHINA DURING THE COVID-19 OUTBREAK¹

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Abstract. This paper first discusses and analyzes the application of big data in China's COVID-19 epidemic at this stage. We systematized the areas of application of big data for the prevention and control of COVID-19 in community management, and determined the goals of their use in each of the areas. Then we found the problems of data accuracy, data fragmentation, data disclosure and insufficient privacy protection in the application of big data in major epidemic prevention and control. Finally, the application of big data is prospected, and effective suggestions are put forward. Indicators have been identified that need to be collected and analyzed in addition to the continuous development, improvement and innovation of big data application technologies in the field of prevention and control of COVID-19. We also propose a range of measures that can help local governments understand the dynamics of public opinion and public sentiment, as well as identify and assess the risks of social governance.

Keywords: big data; epidemic prevention; epidemic control; COVID-19; advice.

JEL codes: P32; C55.

Introduction

Beginning in December 2019, a new type of coronavirus pneumonia (hereinafter referred to as COVID-19) broke out around the world and spread rapidly, forming a major epidemic crisis at

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the "pandemic" level. [1] Big data analysis not only provides a full sample, correlation and systematic research thinking for risk disaster crisis management, but also provides scientific and objective methods and technical support for corresponding decision-making [2]. It is widely used in China's anti-epidemic actions.

How big data technology plays an important role in the management of major public events and crisis around the world, many experts and scholars have conducted a lot of research. The main results of the application of big data in epidemic research include Google's successful prediction of the United States using big data search keywords in 2009. The outbreak of winter influenza, and the judgment is very timely, more than a week earlier than the data of the US Centers for Disease Control and Prevention [3]. Polgreen used Google log keywords to build dengue transmission models in Bolivia, Brazil, India, Indonesia and other places, and the predicted values of the model had good correlation with the actual monitoring data [4]. Bio.Diaspora uses big data to successfully predict the next area where the Ebola virus may detonate [5]. James et al. based on the mHealth strategy through the big data analysis of crowd flow signals for relief assistance, needs assessment and disease monitoring, which is very beneficial Control of the Ebola outbreak in West Africa [6]. The big data model was used to predict the epidemiological impact of influenza in Vellore, India [7]. Geographic Information Systems and big data are applied during the period of the studied pandemic in different countries [8]. Although China has already applied big data in medical treatment, from the perspective of the current COVID-19 outbreak, the function of big data is still weak. The study of application of big data technology in various provinces and regions in China, and use the observation method to observe the effect of the use of big data technology in the COVID-19 epidemic, was combined with case study method to study some typical cases. Finally, based on the experience summary method, the application of big data in the prevention and control of major epidemics is discussed and prospected.

1. Existing applications of big data in the prevention and control of COVID-19

Big data supports continuous improvement of clinical diagnosis and treatment. One of the keys to the prevention and control of major epidemic diseases is timely and effective diagnosis and treatment of patients, and the key to diagnosis and treatment is to discover the symptoms and mechanisms of epidemic diseases, and then prescribe the right medicine. However, once a new epidemic disease occurs, human beings do not have sufficient scientific knowledge about it, nor do they have symptomatic treatment drugs, and can only adopt evidence-based medical methods through previous similar virus treatment experience and potentially effective treatment methods and drugs. , continue to improve treatment methods and discover effective treatment plans, and

constantly propose better diagnosis and treatment plans. The utilization of clinical case and drug big data can support the continuous improvement of clinical diagnosis and treatment.

Big data effectively supports epidemic investigation. Major epidemic outbreaks often occur in community clusters, and the virus is transmitted through social contact between infected people and susceptible people in public places such as public transportation, hospitals, cultural entertainment, tourism, and commerce. One of the key links of prevention and control is to investigate and find infected persons and close contacts in communities, units and public places, and to break the chain of virus transmission in a timely manner. During the period of the new crown epidemic, the prevention and control strategy of big data is to prevent internal proliferation and external output. To screen and comprehensively analyze the effective information provided by the parties or insiders, not only can the data information of the parties be accurately grasped, but also the epidemic situation can be effectively handled. Accurate investigation work to achieve early detection, early reporting, early isolation, and early treatment.

Big data remote diagnosis and treatment. The occurrence of major epidemics will lead to large-scale patient treatment and social medical consultation needs. The limited supply of medical resources and the huge demand for diagnosis and treatment of patients have caused serious social conflicts, especially the shortage of high-level infectious disease, respiratory, and critical care experts, and the services of hospital medical staff cannot meet social needs. Big data helps medical institutions to carry out online remote consultation, online consultation, home medical observation guidance, diagnosis and treatment training and other services, forming an "online and offline" multi-space, multi-dimensional and comprehensive treatment of infected patients. Ningxia gave full play to the advantages of the national "Internet + medical and health" demonstration area, relying on the remote imaging diagnosis platform, opened a national COVID-19 special channel, and made full use of national expert resources to provide DR/CT film sources suitable for suspected COVID-19 patients. Conducting consultations adds another "sharp weapon" to the fight against the epidemic.

Big data supports the allocation of anti-epidemic materials. The key to the prevention and control of major epidemics is to ensure the timely and effective supply of protective materials. However, news release channels are scattered and public credibility is low, and the epidemic prevention and control agencies cannot effectively monitor donation information, and donors cannot track donation results. become one of the most important social issues. In the stage of rapid development of the epidemic, there has been a delay in the distribution of epidemic prevention materials in Hubei Province, especially in Wuhan City, and the blockage can be effectively cleared through big data-related technologies. Based on historical material data, big data analysis is carried

out to help relevant departments predict future material demand, and scientifically plan the next stage of resource supply and allocation. It only greatly shortens the time for material distribution and reduces the consumption of human, material and financial resources.

2. Insufficiency of big data application and prospect of improvement measures

In addition to the continuous development, improvement and innovation of big data application technologies in the fields of COVID-19 prevention and control, virus traceability, and resource allocation, there are still many new fields of application that need to be continuously developed. One of these field is collecting a large amount of important data, including various types of people (diagnosed, suspected, fever pending, observation) and the number of four types of patients in provinces, cities, counties (districts), townships (towns); all hospitals, specialized hospitals and the number of beds, the number of used beds, the number of vacant beds, the number of dynamically predicted shortage beds, the number of doctors, nurses, management, and service personnel, the inventory of major therapeutic drugs, the number of demand, the number and demand of major medical protective materials and equipment, and important materials in short supply, demand, production, procurement, transportation, configuration information, etc. The other fields are establishment an emergency management platform through big data, Internet, and cloud platform technologies, the formation of a digital combat map, solving the problem of "data silos", and enabling information to be interconnected.

Big data supports social governance during the epidemic. With the help of artificial intelligence, big data and other technologies to realize the visualization of epidemic data, it helps local governments to accurately grasp the dynamics of public sentiment and public opinion, and to discover and evaluate social governance risks. With the help of data mining technology and visualization technology, through traffic and telecom big data, e-commerce big data, and other means to accurately manage social-related issues. Big data also promotes social governance from static management to fluid governance. With the accelerated spread of the epidemic, the expansion of joint prevention and control information sharing channels, and the diversification of anti-epidemic information sources, social governance during the epidemic has become highly complex and highly uncertain.

Big data helps the nation's health. The prevention and control of major epidemics requires the use of big data to support emergency management such as patient admission, isolation of close contacts, and public health consultation on epidemics. A large number of AI intelligent and innovative medical products have not only effectively helped the front-line patients in the epidemic,

but also protected the health of medical workers to the greatest extent. Remote control of equipment and big data diagnosis and treatment play a role.

Big data is used for socio-economic recovery in the post-pandemic era. From the epidemic to the end, and the social and economic system from emergency response to gradually returning to normal, big data is a key support tool for social and economic recovery. Education makes full use of big data and Internet technology to launch online classrooms and education on the cloud, implement 24-hour cloud services for government service matters in many provinces, use big data and cloud platform systems to provide various government services for the masses, and implement “home-based, online-based, To achieve administrative approval and government services, and to ensure the great social and economic recovery after the epidemic.

Conclusions and comments

Big data has great value in epidemic prevention and control. It can not only conduct AI mining, analysis, evaluation, prediction, and early warning of data such as population flow, search, medical care, society, and economy, but also predict the future through trend analysis, and formulate countermeasures to prevent diseases. In the early days, it can also intelligently dispatch personnel and materials, and identify the authenticity of news information. The precise governance driven by artificial intelligence brings huge benefits to the society, but also has huge risks [9]. There are also some challenges in the application of big data in epidemic prevention and control [10].

The accuracy of big data results needs to be further improved. The accuracy of current big data in epidemic prevention and control is not high enough. In addition to the imperfect benchmark data set, it is also affected by big data mining technology. At present, the data collected is limited, and the disease system constructed based on epidemiological data is not perfect. To assist clinical medical treatment, epidemic prevention work, and scientific research, it is necessary to further improve data collection technology and improve system data. Moreover, there are more than one source of epidemiological information, and the data format is not uniform, and the data needs to be converted, identified, cleaned, and classified in real time. It is necessary to integrate various data and information, focus on the integration of multidisciplinary knowledge and the analysis of strong correlation between data and results, establish more professional epidemiological research guidelines, and combine the principles of evidence-based medicine to improve the use of big data in epidemic prevention and control. Accuracy of treatment and prediction.

Data openness and privacy protection need to be further strengthened. The openness and security and privacy protection of related big data need to be further strengthened. From the perspective of supervision and technology, the following improvements can be made to gradually

realize the open sharing of more data without exposing personal privacy. We can start from the following aspects:

1. Encourage collaboration among various institutions and hospitals, allow data openness, and combine unrestricted data and non-specific data to form an open and public "big data" ecosystem;
2. Clarify data access rights and issue privacy and data ownership policies to ensure that all users can access data normally and realize data sharing under the premise of cyberspace security;
3. Strengthen the research and development of new big data processing technologies, make full use of artificial intelligence, cloud computing, 5G technology, and integrated processing technologies to develop new big data solutions for epidemic prevention and control.

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ПРИМЕНЕНИЕ БОЛЬШИХ ДАННЫХ ДЛЯ УПРАВЛЕНИЯ СООБЩЕСТВАМИ В КИТАЕ ВО ПЕРИОД ЭПИДЕМИИ COVID-19

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Аннотация. В этой статье обсуждается и анализируется применение больших данных в эпидемии COVID-19 в Китае. Мы систематизировали области применения больших данных для профилактики и борьбы с COVID-19 в управлении сообществами, а также определили цели их использования в каждой из сфер. Затем мы выявили проблемы точности данных, фрагментации данных, раскрытия данных и недостаточной защиты конфиденциальности при применении больших данных для предотвращения крупных эпидемий и борьбы с ними. Наконец, было исследовано применение больших данных и выдвинуты эффективные предложения. Определены показатели, которые необходимо собирать и анализировать в дополнение к постоянному развитию, совершенствованию и инновациям технологий применения больших данных в сфере профилактики и борьбы с COVID-19. Мы также предлагаем ряд мер, которые могут помочь органам местного самоуправления определить динамику общественного мнения и общественных настроений, а также выявить и оценить риски социального управления.

Ключевые слова: большие данные; профилактика эпидемий; борьба с эпидемиями; COVID-19; предложения по использованию больших данных.

JEL коды: P32; C55.

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