



Intelligent Service Platform for Epidemic Prevention and Control Based on Big Data Technology

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Abstract. The intelligent service platform for big data technology is a new approach to infectious disease management. It aims using big data technology. It integrates epidemiological, clinical and laboratory information as well as social network analysis tools, so as to detect and prevent the epidemic as early as possible by predicting its occurrence or spread to public health authorities. The project aims to develop an intelligent service platform to support the rapid collection of big data from various sources such as health departments and other relevant institutions across China, so as to promote the management of epidemics. It will also provide real-time information sharing between local governments and other relevant parties. In addition, it will provide customized services for local governments, such as epidemiological forecasting tools and national systems for monitoring disease outbreaks throughout the country.

Keywords: Intelligent service platform · Big data technology · Epidemic services

1 Introduction

At present, with the spread of COVID-19 variant strains, the epidemic situation across the country is grim. Although the spread of COVID-19 has been basically curbed, the prevention and control situation is gradually improving, and all parts of the country are accelerating the resumption of production. However, the epidemic prevention work cannot be slackened. Markets, hospitals, office buildings, construction sites, communities and other places are densely populated and highly mobile. In the face of large-scale infectious diseases epidemic, the society is still in the process of exploration, and there are also difficulties in epidemic prevention in today's society: artificial body temperature detection is easy to be infected: during body temperature detection and introduction, artificial contact body temperature detection is insufficient in protection, and front-line supervisors have a high risk of exposure to viruses, and can not grasp the health status of residents in real time [1]. High cost of health search: when registering for community access, residents fill in the registration manually, which is easy for people to gather,

manual registration errors occur frequently, and information distortion is difficult to trace. When viewing the health code, the lawless personnel muddle through through the screenshots of other people's QR codes, which can not be found in time, and is likely to lay hidden dangers for the outbreak of the epidemic.

The regional access module of the intelligent epidemic prevention solution is composed of face recognition and temperature measurement equipment. The non sensing access can realize non-contact screening in airports, stations, subways, schools, office buildings, communities and other scenarios, realize high temperature, non mask abnormal event alarm, health code exception and personnel recognition, quickly identify personnel information and register temperature measurement, reducing the possibility of epidemic transmission. At the same time, it provides background records, which can be intelligently analyzed for easy management once exceptions are found. At the same time, it can store and display the real-time information of the correspondents, so that the managers can know the regional situation in time, making the city more convenient and safe.

2 Related Work

2.1 Scientific and Technological Warfare Methods

Community epidemic prevention has played a huge role in this war without gunpowder smoke, and measures such as closed management, access control, temperature measurement and disinfection have effectively curbed the spread of the epidemic. However, behind this, there are problems such as the lack of community manpower and materials, the difficulty in implementing management measures, and the lack of personnel information collection. In order to solve these problems, we have developed a community epidemic prevention and control platform by relying on cloud platform, 3D visualization, mobile applications, intelligent temperature/face/ID card recognition equipment and other technical means, providing a comprehensive and effective information management tool for the community, and helping the community achieve the community epidemic prevention and control information management [2].

At present, community management and control mainly focus on crowd monitoring, body temperature monitoring and community environment disinfection and sterilization. It mainly relies on the way of requiring the quarantined to sign a commitment, consciously isolate at home, and social health workers to monitor at home. With the increase of people returning to Shenzhen, the spread of the epidemic is on the rise, and the original management and control mode and means urgently need the intervention of new means [3]. The world's leading intelligent location service provider has made use of its own technical advantages to urgently customize and develop the "intelligent epidemic control platform". Through high-precision indoor positioning technology and the building capacity of the prevention and control system, it has realized the real-time location information and health status reporting of isolated people at home, and technology has assisted in the meticulous, efficient and low-risk management of epidemic prevention. It is currently the largest indoor geographic location information platform in China, and has the large-scale indoor positioning capability, and the positioning can be accurate to the indoor meter level. It truly realizes the efficient control of isolated

personnel without contact or less contact in the process of epidemic control through technology [4]. Compared with the traditional man to man management, the intelligent epidemic control bracelet has effectively improved the management efficiency of community grid administrators by more than 10 times, saved at least 10 times more social resources, and greatly reduced the probability of community grid administrators being infected and the probability of epidemic spreading. Figure 1 below shows the epidemic situation database information.

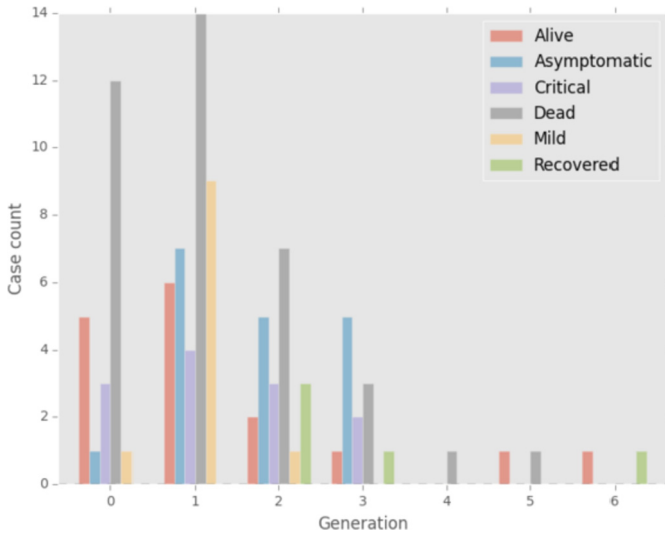


Fig. 1. Epidemic database information

The intelligent epidemic control solution (epidemic management system) can realize the functions of real-time monitoring of the position of the quarantined personnel, alarm of the isolation area, health sign monitoring, instant messaging, and equipment monitoring, and is applicable to the home isolation management of suspected patients in the community. It can effectively solve the lack of auxiliary decision-making means for governments at all levels in the process of epidemic control, the difficulty in confirming epidemic related information, and uneven regional control forces. Poor access to self isolated information. At present, the “Epidemic Management System” has been fully implemented. Up to now, thousands of isolated people have passed the product management in Shenzhen, where they can view the location and health status of the isolated people online at any time and anywhere, communicate the isolation status online, and achieve efficient synchronization of epidemic information and non-contact intelligent management.

2.2 Service Platform Indicators

These applications are obviously built on electronic information systems. Without the construction of information systems, these three types of electronic publishing platforms

will not have specific entities to rely on. Content is included in the form. Without form, there is no content carrier. Therefore, many scholars often regard system quality or system service quality as the primary indicator of the indicator system in the design of service quality evaluation indicators for websites or mobile application platforms. The service quality of the mobile application platform system will have a significant impact on user satisfaction, and then affect the user's evaluation of the service quality of the application platform. In the social platform, the connotation and concept of system service quality are basically consistent with the interpretation of other scholars in the service quality evaluation index system. System service quality is often reflected in system operation, interface design, use comfort and other aspects. In the specific social platform service quality research, other scholars' interpretation and index selection of system service quality are also applicable to this study. Both the aesthetics of the platform and the response speed of the system affect users' evaluation of their service quality. In this paper, the secondary indicators of system service quality specifically include stability, aesthetics, ease of use, responsiveness, and security.

3 Intelligent Service Platform for Epidemic Prevention and Control Based on Big Data Technology

The community platform is mainly composed of import and export monitoring system, mobile phone APP and large visualization screen. The community import and export monitoring relies on the original monitoring equipment of the community. The APP provides information reporting access for community staff and residents, and the visualization screen helps community managers understand the overall prevention and control situation. The combination of the three will help the community to quickly complete information collection, carry out patrols, rehearsals, isolation and other prevention and control work, start from the source link of personnel input to achieve intelligent and visual community epidemic prevention. In order to minimize the contact of personnel, we provide remote implementation services. We can quickly complete the deployment of a cell in 1–3 days through the “contactless” method and provide detailed operation instructions to ensure that users can become proficient after simple learning.

The rapid deployment of the platform takes into account the large differences in the informatization degree of each community, the different management levels and epidemic prevention strategies, but also the needs of the epidemic prevention platform. This set of community epidemic prevention and control platform provides two forms of standardized deployment and customized deployment. Standardize the deployment community, install the APP to achieve data entry, and realize the background data management and front-end visual situation viewing through the cloud platform. The system is developed using mainstream technology, cross platform and cross device, and can be quickly implemented in communities without information foundation. The system architecture is flexible. For communities that have deployed management platforms, it can be rapidly integrated and expanded, and has customized development capabilities such as APP page embedding and existing data on the big screen. The import and export monitoring system uses cameras, temperature measuring instruments, infrared thermal imaging cameras and other hardware equipment in combination with manual registration

and other methods to record the face recognition, body temperature and other information of the incoming and outgoing personnel. To ensure that the flow information and health information of the incoming and outgoing personnel are fully mastered. The large visual screen displays the real-time situation of community entrance and exit, mainly including personnel thermal imaging, community entrance and exit personnel information, real-time monitoring video and statistics of the number of people entering and leaving the community. It not only clearly shows the flow of people entering and leaving the community, but also helps managers quickly grasp the flow situation of community personnel through a large screen. Even in the event of an emergency, you can quickly call the real-time video of the camera to view the actual situation, to ensure that the event is resolved in a timely manner.

Provide information reporting access for ordinary residents, encourage residents to report their personal information on a regular basis, and build a strict information reporting system during epidemic prevention and control.

- Provide entry for reporting epidemic related events. Users can provide feedback and evidence when finding suspicious situations, which can be verified by community personnel
- Provide an entry for reporting the shortage of materials, timely collect the information of residents who lack materials, and serve as a reference for the situation of community materials, so as to facilitate unified deployment
- For the community that controls travel, residents can report daily access demand and each access situation, which is convenient for the community to issue passes and count personnel access data
- Provide other help information reporting entry and emergency contact number, users can ask for help with one click

This epidemic situation mainly involves various questions and answers on virus, prevention, development and other major scenarios. For the epidemic related natural language questions input by users, the key elements (concepts, entities, attributes, various operators, etc.) are identified, and the subgraph matching method is combined to transform them into computer understandable query intentions to obtain answers. The difficulty is that different users have different words, sentences and expressions. It is necessary to combine AI technologies such as knowledge mapping, deep learning and transfer learning to achieve accurate identification of users' intentions.

4 Conclusion

The deployment of the community epidemic prevention platform can not only help managers to grasp the epidemic prevention situation in the community at any time and anywhere, but also achieve efficient scheduling and command through docking with the APP. Provide internal information bulletin, education and publicity, external information release, data reporting, work plan and implementation, and help the community effectively and orderly carry out prevention and control work.

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