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Research Article

Design of Emergency Intelligent Terminals for Field Exploration Based on Intelligent Internet of Things Technology

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To solve the intelligent rescue design of field exploration, the design of field intelligent terminal is explored based on intelligent Internet of things technology. Through the system's platform management, integration of internal information, and strengthening technology research and development, the system has successfully completed the deployment and implementation, which strongly supports the design of intelligent terminals for field exploration emergency rescue. Relevant technicians need to recognize the application and development trend of Internet of things technology in intelligent field emergency rescue scenarios and take various measures to promote it, so as to make it a better support and enrich intelligent field emergency rescue functions and provide better impetus for intelligent field emergency rescue and the construction of digital city. For the construction of the current intelligent field emergency rescue scene, the Internet of things technology plays a major role, which also shows that the system has better realized the predetermined function. The field intelligent rescue system makes good use of the shared location function, which can avoid accidents such as team members falling behind and also well identify the location of team members.

1. Introduction

Today, with the social development technology, technicians should clarify the advantages of Internet of things technology and combine online things with all social and skills, especially wireless transmission technology and other communication technologies. The things need to rely on a relatively complete system, which should have good communication function, wireless information transmission function, and data processing ability. In addition, with the support of big data technology and artificial intelligence technology, the Internet of things system also has a certain ability of intelligent identification and automatic processing, so that the social online things can have the ability of perception, network transmission, and personalized application at the same time. Figure 1 shows the planning of the Internet in artificial intelligence. Field exploration is a high-risk sport. With the increasing types, regions, and participants of field exploration activities, there is an increasing trend of distress and rescue events. The lack of field exploration norms and rescue system needs to be solved urgently. According to the experience of relevant countries and regions, an effective field exploration and rescue mechanism should be based on legal norms, protected by prevention and early warning, led by government rescue, and assisted by folk rescue. Taking this as a lesson, from a legal perspective, we should establish China's field exploration and rescue mechanism as soon as possible, focusing on establishing and improving the legal standard system of field exploration and rescue in distress, taking effective arrangements for field exploration prevention and early warning system, and building a field exploration and rescue organization system in line with national conditions. We are keen on visiting scenic spots everywhere and even explore deep mountains, wild areas, or virgin forests. Therefore, safety is particularly important. At present, there are a wide range of navigation products, such as Baidu, Gaode, and other map navigation software. Although it can provide convenient and considerate services for people living in cities and towns, it is lacking in the desolate field.

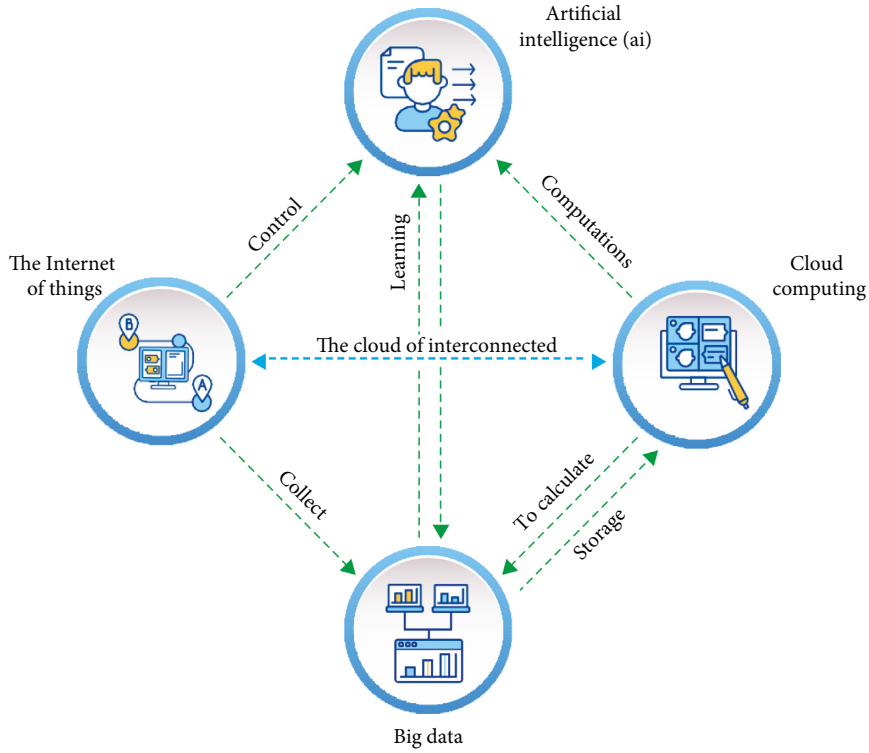

Figure 1: Planning of internet in artificial intelligence.

2. Literature Review

Sebastian said that physical network teaching social project is a humor type of social medicine, involving sensor technology, signal recognition technology, positioning technology, infrared sensing, and other technologies, and needs the support of hardware systems corresponding to various technologies [1]. Song et al. believe that, at this stage, with the online technology and social technology, the information age has come. For the online of things online social technology, which is extremely important in the modern information technology system, it can be applied to many fields such as intelligent field emergency rescue, intelligent medical treatment, and intelligent transportation, which can not only provide sufficient living convenience for people but also promote the coordinated and innovative development of many industries [2]. Zhou et al. believe that the look on the combined social things of emerge and online emergency rescue should become the research focus of current technicians [3]. Atiqur said that field exploration usually refers to exploration activities with certain risks in field areas with the purpose of self-development or self-challenge, using or partially using nontraditional equipment and facilities [4]. Therefore, Rathee et al. believe that the sense of achievement and stimulation brought by enhancing self-awareness are the essence and temptation to encourage field explorers to take risks. However, some risks during the exploration are huge or even fatal [5]. Hansaraj et al. believe that, in intelligent emergency rescue, such equipment is added to the specific Internet of things system, and the equipment becomes a part of the system. It should have good system adaptability and provide basic conditions for information sharing and transmission in the system, so as to enrich the data on the server side and provide more content data for user [6]. Zhen et al. reported that this is an important issue and is related to this question [7]. Xu also recognized that the intelligent rescue technology is widely used in the field of intelligent rescue, and they said that it is the best in the field of intelligent rescue. The reason why Internet of things technology can achieve relatively rapid development in the field of intelligence is that, on the one hand, in order to meet the new needs of people's intelligence in the area, exploration has continuously created and innovated in the field of social things, enriching the social things functions of products [8]. Iyer and Doraiswamyiyer believe that, at this stage, the local government is the first person responsible for the rescue of field explorers, which is first determined by its legal responsibilities, rights, and obligations [9]. Duishonbaeva et al. believe that the rehabilitation work mainly includes the resettlement and comfort of people in distress, the recognition and reward of rescue personnel, and the maintenance of rescue equipment and facilities. It can be said that the current rescue mechanism for field explorers in China is a compulsory emergency rescue mechanism led by local governments, coordinated by relevant departments and personnel, regardless of cost and conditions [10].

3. Method

3.1. Platform Management. The platform management problem is mainly related to the constituent elements of the Internet of things system. Generally speaking, all kinds of

equipment in the Internet of things system have their specific attributes, which are set at the time of delivery. The corresponding manufacturers will personalize the appearance or function of the equipment according to the corresponding efficient application [11]. However, when such equipment is added to the specific Internet of things system, the equipment becomes a part of the system. It should have good system adaptability and provide basic conditions for information sharing and transmission in the system. However, in the normal application of online develop social technology, due to the obvious differences of product design standards implemented in different industries, the information quality produced by different devices is different, and there is a certain interaction lag between them. As shown in Figure 2, the connection flow chart between Internet system and equipment is shown. Secondly, undertaking the rescue obligation is the internal core mission of the government to serve the society. The reports of the 17th and 18th National Congress of the Communist Party of China clearly put forward the need to develop just order miss administrative project and build effect social government [12]. Modern social assistance system of such equipment is added to the specific Internet of things system, and the equipment becomes a part of the system. It should have good system adaptability and provide basic conditions for information sharing and transmission in the system. From the perspective of culture and humanitarianism, one view of China's traditional Confucian culture is to publicize nationalism, emphasizing that citizens are loyal to the state, the state protects citizens, and rescue vulnerable citizens project message in distress. From the perspective of social ethics and morality, everyone has the less message and responsibility to reduce lives in survival crisis. As a primary organization, local governments also have the social project and just of human social and morality to actively emerge advice and ensure the personal safety of field explorers to the greatest extent [13]. As long as it is an intelligent exploration device, it can use the compass to accurately determine the direction of the current position. The new route memory function can effectively remember the current user's route and help the user get out of the wrong way. As shown in Figure 3, the design flow chart of intelligent system is shown.

Even though the devices of different manufacturers and platforms can exchange information with each other, there will often be delayed information feedback or wrong execution of system commands. For example, the interoperability between rescue devices based on Android system and devices based on IOS system is ignored [14]. The interoperability is shown in Figures 4 and 5: comparison of Android and IOS interoperability. Therefore, technicians should develop a unified system management platform and promote all kinds of equipment to perform unified operation under the guidance of unified management protocol. Technicians should develop a unified system with high efficiency and high quality. In order to achieve high efficiency and high quality IoT technology application process, the average time formula of Internet of things under intelligent mobile is as follows:

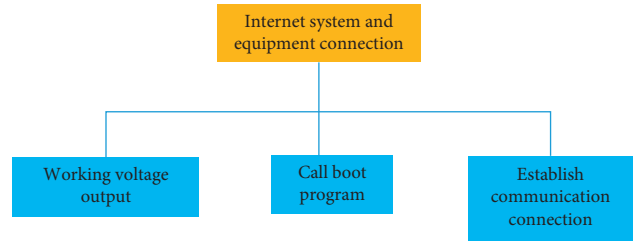

Figure 2: Connection flow chart of internet system and equipment.

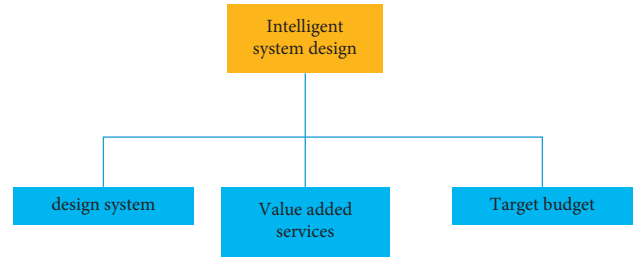

Figure 3: Design flow chart of intelligent system.

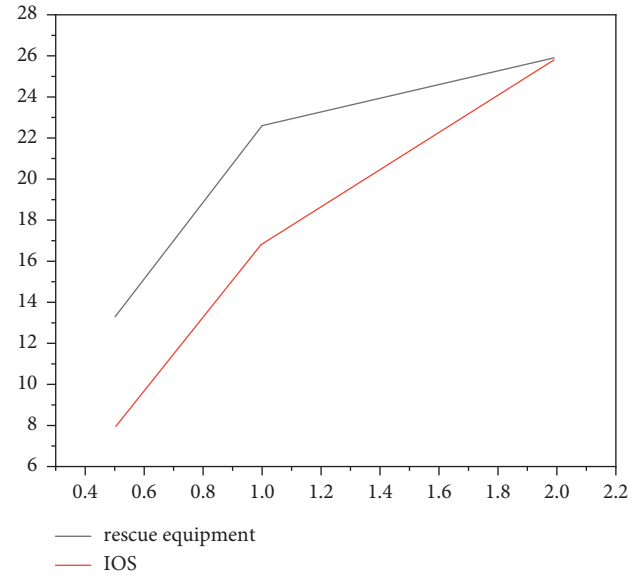

Figure 4: Interoperability between rescue equipment and IOS system equipment.

$$T = a + b\log_2\left(1 + \frac{D}{W}\right), \tag{1}$$

T represents the average time required to complete the movement (in some cases, MT can also be used to represent the movement time), a represents the start or stop time of the operation, b represents the movement or operation speed, D represents the distance from the starting point to the end of the target, and W represents the width of the target [15].

Starting from the input terminals a and B of the Internet of things, the logic formula of the output terminal is expressed in logic formula one by one, and

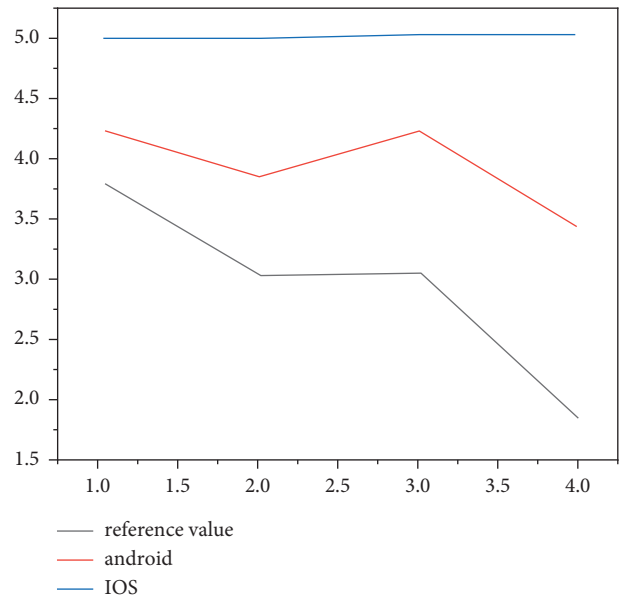

Figure 5: Comparison of interoperability between android and IOS.

$Y = \overline{\overline{A+B} + \overline{A+B}}$ is obtained. Then, the formula after exchange is

$$Y = (A+B)(\overline{A}+\overline{B}). \tag{2}$$

According to the input layer of IOT technology, the output formula of IOT intelligent design terminal can be as follows:

$$E = \frac{1}{2}(d-o)^2 = \frac{1}{2}\sum(d_k - o_k)^2. \tag{3}$$

3.2. Integration of Internal Information. With the support of Internet of things technology, many aspects including commodity supply, production, logistics, and demand have been effectively integrated, which can form a complete industrial supply chain, improve the service quality for customers based on clarifying the relationship between supply and demand, and ensure customers' product satisfaction [16]. At the long medicine time, things information management system can accurately control the market in many aspects, including raw materials, products, and finished products, avoid the uncertain factors in the relationship between supply and demand on the basis of timely taking risk control measures, and establish an enterprise interactive mechanism to achieve the timely communication of market information, promote the closer integration of supply chain links, and ensure the service quality of logistics. Finally, promote the long-term development of the whole online development project reducing unnecessary enterprise capital waste and cost waste [17].

Although most field exploration will not bring direct economic benefits to the territorial Government, as an increasingly prosperous special outdoor activity, it has comprehensive economic benefits. From the perspective of rights and obligations, local governments also have the obligation of management to undertake the rescue work of field explorers. Figure 6 shows the crisis management module. The intelligent rescue system is based on the open-source mobile application platform. In order to realize accurate positioning and navigation, Baidu API, cloud database, etc. are adopted, combined with software and hardware to realize the functions of real-time monitoring direction, human body temperature, ambient temperature, positioning and navigation, route memory, sharing location, and scenic spot information [18]. It is mainly aimed at people who like to carry out field activities. It can help users monitor their own situation and positioning information in real time and can effectively avoid accidents such as team members' loss and disorientation. It is an intelligent navigation system with strong practicability and great market potential [19].

The crisis management module is the main module of the system, which mainly realizes a series of processes when the field personnel encounter danger to ensure their own safety. The realization of this module is the main process that directly affects the safety of the system in case of crisis [20]. Baidu API large-scale construction module is shown in Figure 7.

Application programming interface (API) is translated as "application programming interface." Open the positioning and click social. The purpose is to provide applications and developers with the ability to access a set of routines based on a piece of software or hardware. When starting from a fixed point and constantly moving the position, the longitude and latitude information will be continuously updated in a short time and connected with online learning record management: record students' learning time, login time, and online situation, so that teachers can timely grasp students' learning dynamics and learning process. During field navigation, in order to identify the correct direction and not to get easily lost, the memory route function needs to be used [21]. When using it, open the positioning and click "start recording." When starting from a fixed point and constantly moving the position, the longitude and latitude information will be continuously updated in a short time and connected with the previous point to form a route. As long as the location is updated, keep connecting until you click "stop recording," and the obtained route information will be saved in the SD card file. The cloud database management module is shown in Figure 8.

The test and evaluation module are mainly used to test the rescue effect and are an intuitive evaluation of the field rescue results. The main functions of this module are phased inspection: the phased inspection is to ensure the safety of field explorers [22].

The test evaluation module is shown in Figure 9.

User communication module is an important functional module to realize the interaction between Internet management and field explorers in the process of teaching activities. It is mainly used for information exchange activities between users. The module mainly includes real-time interactive online Q and A and BBS online message. Before answering questions, rescuers need to create a Q and a room,

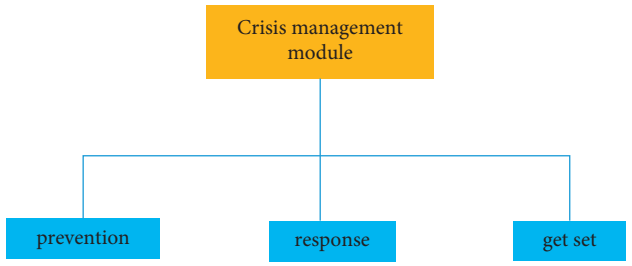

Figure 6: Crisis management module diagram.

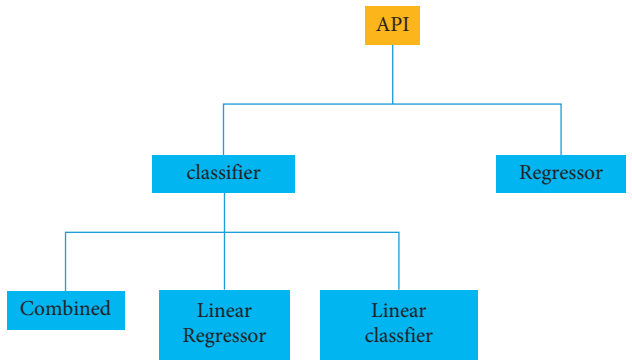

Figure 7: Large scale construction module diagram of Baidu API.

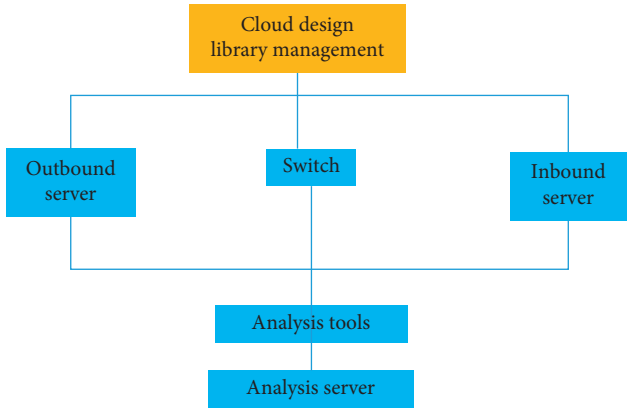

Figure 8: Cloud design library management module.

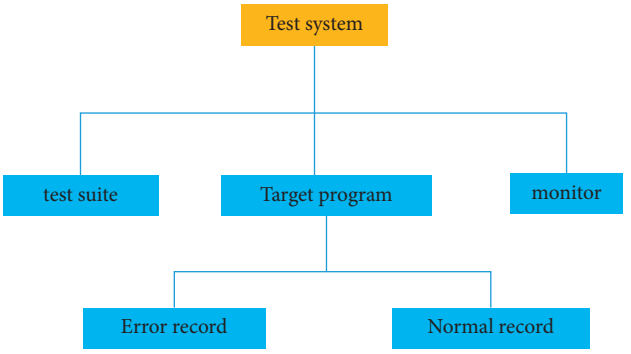

Figure 9: Schematic diagram of test and evaluation module.

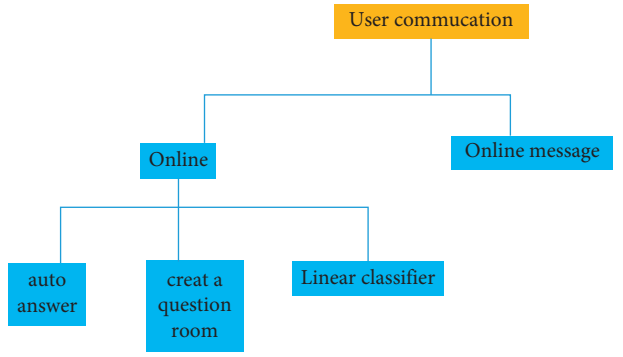

Figure 10: Schematic diagram of user communication module.

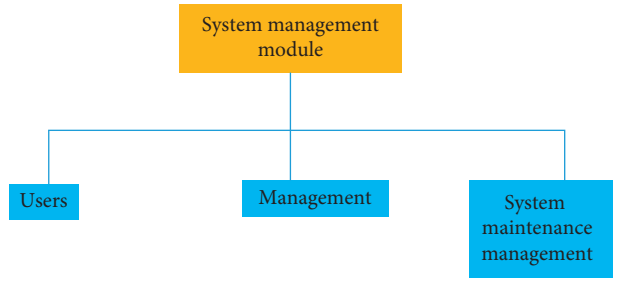

Figure 11: Function module diagram of background management module.

and enterprise personnel can answer questions in real-time only after entering the corresponding Q and a room, so that they can answer questions in groups in different places and classes at the same time; BBS message realizes non-real-time online communication. The user communication module is shown in Figure 10.

The system management module mainly manages user accounts, including adding apps and deleting social and model app information, and can assign permissions to users at the same time. System parameters can be maintained, and system data can be backed up [23]. The function module of the background management module is shown in Figure 11.

3.3. Strengthen Technology Research and Development. Facing the broad development space of logistics information management system from the online social project app, we should take advanced online social education as the core, build a technical system as soon as possible, ensure the innovation and development of logistics industry in the process of accelerating technology research and development, and improve the technical level of Internet of things of logistics enterprises. Among them, based on the current national policies, we should pay more attention to the research and application of Internet of things technology, form a high-quality Internet of things technology talent team in the process of integrating and concentrating a variety of technical resources, as logistics enterprises, on the one hand, and promote the further enhancement of the intelligent level of logistics information management system on the other hand. The human pulse is measured by the photoelectric reflective analog sensor, and the user wears it on the finger or earlobe. The change cycle of the electrical signal of the

photoelectric converter is the pulse rate. Through wire connection, the collected analog signal can be transmitted to MCU, the pulse value can be calculated simply, and the general situation of the body can be obtained according to the pulse data. Another index: body temperature, tn901 infrared thermometer without contact with human body that is used to measure the ambient temperature and the full wavelength thermal radiation of the radiation object through thermopile, determine the radiation temperature of the object, and quickly and accurately measure human body temperature by temperature compensation technology [24]. Compared with traditional Mercury and electronic thermometer, it is easy to use, and it can measure temperature without touching the body. It is not only hygienic but also safe and has the advantages of high sensitivity, high precision, and low power consumption. In addition, using the compass of modern smart phones can quickly realize the direction guidance without additional hardware as shown in Figure 12.

3.4. Management and Rescue Mechanism. Field exploration activities are the inevitable product of social and economic development to a specific stage. They are related to the promotion of national spirit and the self-development of citizens. They should be supported and encouraged from the legal system level, and their healthy and standardized development should be ensured through appropriate control measures and rescue mechanisms. First, we should focus on prevention and early warning, supplemented by rescue. Figure 13 shows the emergency accident rate of field exploration in recent years. The legal norms related to field exploration should focus on establishing and improving the prevention and early warning system, including the implementation of preventive measures such as the cultivation of risk awareness of field exploration, safety skill training, and exploration route planning, as well as early warning measures such as the release of unsuitable weather information and sudden natural disaster information. Rescue is not the purpose, but it is also indispensable. The legal norms related to field exploration should also stipulate the basic framework of rescue mechanism, including rescue subjects, rescue organizations, rescue funds, and other relevant contents [25]. Second, encourage and support, supplemented by management and control constraints. That is, the citizens' field exploration should be liberalized from the activity area as much as possible, the participants should be relaxed as much as possible, and the participation form should be supported as much as possible. At the same time, in line with the principle of appropriate control and restraint, the government departments, industry associations, or relevant clubs that must be managed should be appropriately restrained and managed according to the situation. The combination of the two can complete the rescue task in the fastest time, the greatest effect, and the least cost. The location formula displayed by the online things according to the signal sent by the intelligent system is shown in the following formula:

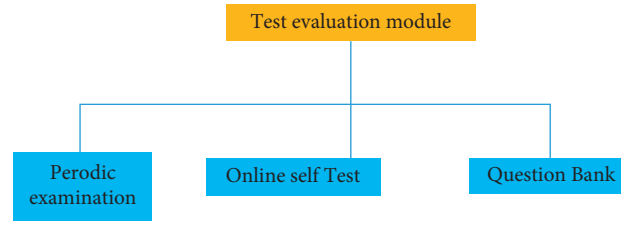

Figure 12: Test system.

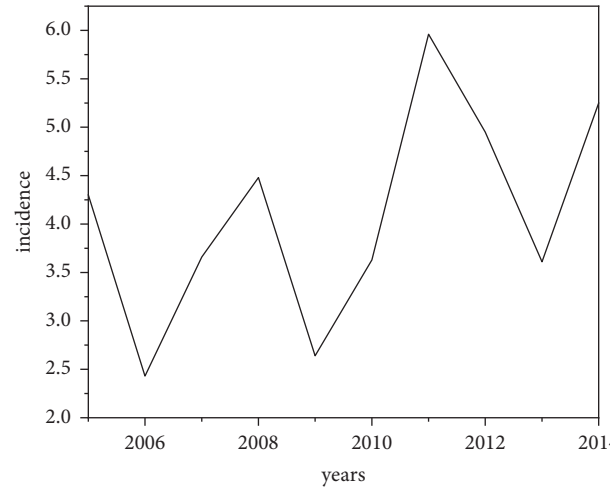

Figure 13: Emergency accident rate of field exploration in recent years.

$$V_i^d = Wv_i^{d-1} + c_1 r_1\left(p\text{best}_i^d - x_i^d\right) + c_2 r_2\left(g\text{best}^d - x_i^d\right). \quad (4)$$

Among them, C_1 and C_2 are individual learning factors. During the d-th iteration of V_i^d, that is, the i-th speed of the Internet of things, during the d-th iteration of X_i^d, the i-th position is expressed, $p\text{best}_i^d$ is the best position up to the d-th iteration, and $g\text{best}^d$ is the position of all personnel up to the d-th iteration. As shown in Figure 14, system quality management flow chart is shown.

3.5. Standardize Personnel Behavior. First, establish and improve the approval or filing system for specific exploration activities. Necessary preconditions can be set for administrative approval or filing, such as requiring field explorers to submit the exploration qualification or experience certificate of the leader and its members, exploration equipment, experience certificate of guides or collaborators, and the proposed travel route. If the examination and approval or filing department considers that the conditions are not met, or the degree of danger is too high, it can require field explorers to improve the conditions or change the route to reduce the possibility of risk in advance. The equipment and success rate of emergency rescue are shown in Figures 15 and 16. Professional qualification management can improve the risk identification and response level of field explorers, such as establishing and improving the professional

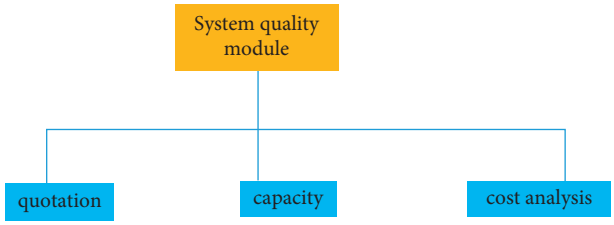

Figure 14: System quality management flow chart.

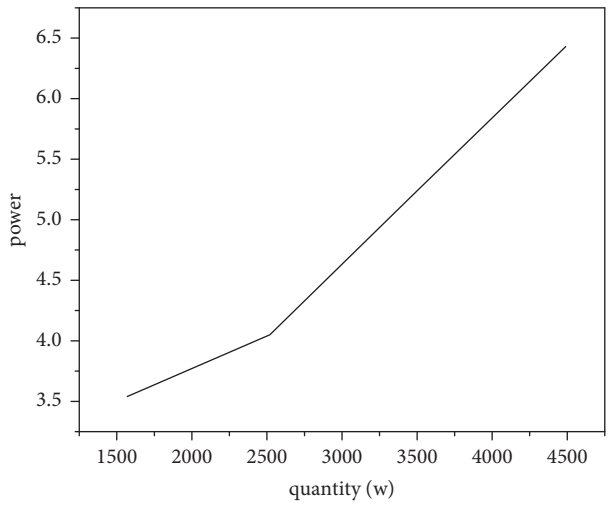

Figure 15: Number of IOT devices used in field exploration.

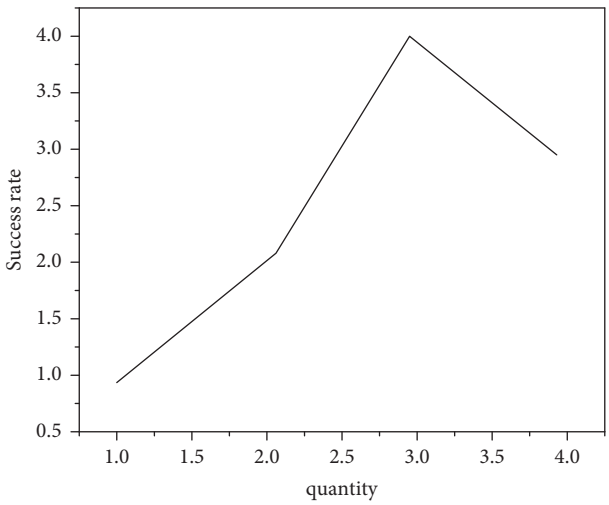

Figure 16: Success rate of intelligent emergency rescue.

qualification management system of exploration leaders, alpine collaborators, and divers by specifying physical fitness, skills, qualifications, and other conditions. Third, establish and improve the punishment system for illegal exploration [26]. Punishment is not an end, but it is an effective management means. In order to standardize the exploration behavior of field explorers in China, appropriate administrative penalties for violations should be set. Explore and establish a "blacklist" system for field exploration, implement blacklist management for field exploration organizers and their participants who do not report for approval and filing according to the regulations and change the approved route or behavior without authorization, give certain restrictions in terms of qualification access, fee payment, training, and education, and impose a lifelong ban for serious cases. When the project's requirements are all met, relevant data can also be considered to be included in the national personal credit investigation system to increase its violation cost.

At the same time, in the definition of civil legal liability, we should clarify the safety and security obligations of organizers and the principle of self-responsibility of participants. With the city and the closer connection between people, there are obvious potential safety hazards in some dense field exploration areas. To solve the problem of living safety of field personnel, technicians can use online social things technology to arrange various sensors in the exploration area. In case of danger in the residential area, the alarm will give an alarm in time to remind people to escape from the dangerous area; Meanwhile, the security system based on Internet of things technology will automatically alarm and transmit the corresponding distress signal to the police and rescue units. After receiving the signal, the rescue personnel will formulate the corresponding emergency rescue plan in time according to the dangerous situation. Through the online social of things, the position error of rescuers can be reduced. The hidden formula is as follows:

$$\text{net}_j = \sum_{i=0}^{i=n} v_{ji} x_j, \text{among}, j = 1, 2, \ldots\ldots, m. \quad (5)$$

4. Results and Analysis

4.1. Performance and Safety Analysis. The construction of intelligent field emergency rescue scene has become a major demand of current social development. When constructing intelligent field emergency rescue scene, Internet of things technology, 5g communication technology, and artificial intelligence technology should be scientifically applied. For the construction of the current intelligent field emergency rescue scene, the Internet of things technology plays a major role. Relevant technicians need to recognize the application and development trend of Internet of things technology in intelligent field emergency rescue scenarios and take various measures to promote it, so as to make Internet of things technology better support, enrich intelligent field emergency rescue functions, and better provide impetus for intelligent field emergency rescue and the construction of digital city. Field exploration and its rescue legislation can learn from the experience of relevant countries and regions, but it is more important to explore the path model suitable for China's field exploration and rescue mechanism legislation based on Chinese characteristics. The analysis results are shown in Figures 17 and 18. First, some pilot projects will be carried out first, and then the model will be comprehensively promoted. That is, first carry out the legislative pilot of field exploration and rescue mechanism in some areas and

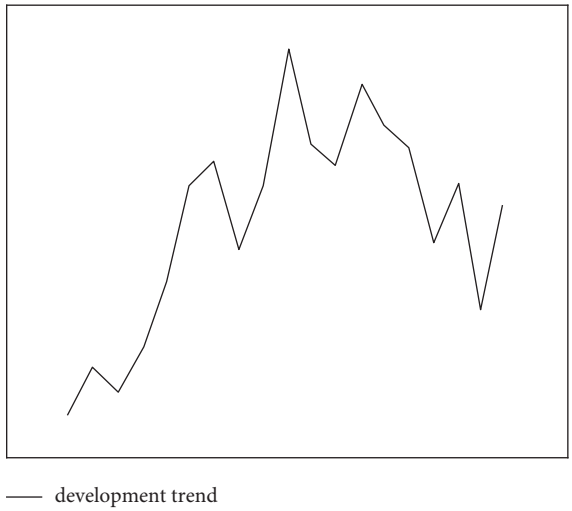

Figure 17: Application and development trend of internet of things technology in intelligent field emergency rescue scenario.

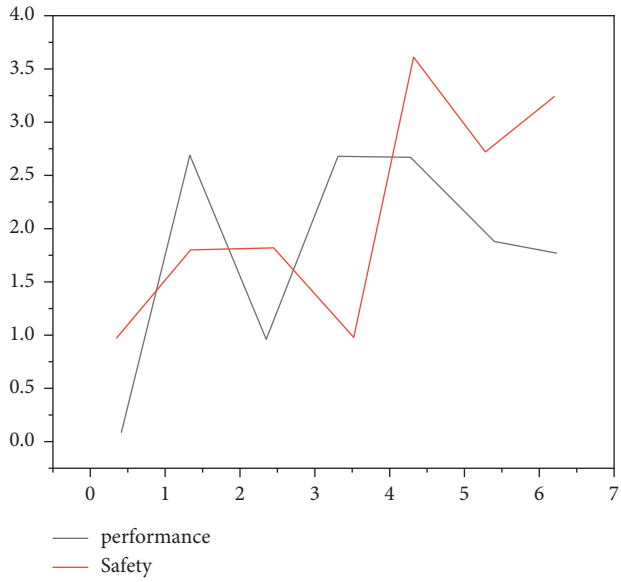

Figure 18: Performance and safety test of intelligent emergency system.

industries with relatively developed exploration activities. After the development of field exploration activities to a certain extent, formulate national legal norms of field exploration and rescue mechanism in combination with the legislative experience of pilot areas and industries according to the needs. With the continuous development of social economy and computer technology, various industries are widely using computer technology. However, in the process of use, the security of online information is a problem in the currently project. The online pen social has become more complex. In the computer industry, network security is an important problem. The field intelligent rescue system makes good use of the shared position function, which can avoid accidents such as team members falling behind and can also well identify the position of team members.

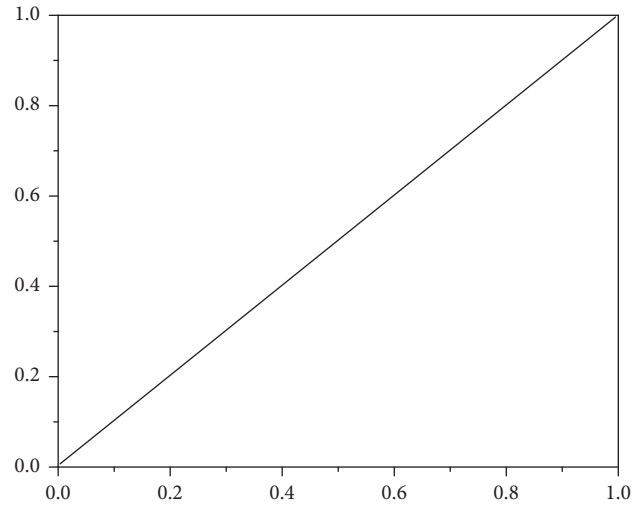

Figure 19: Privacy of intelligent terminal equipment.

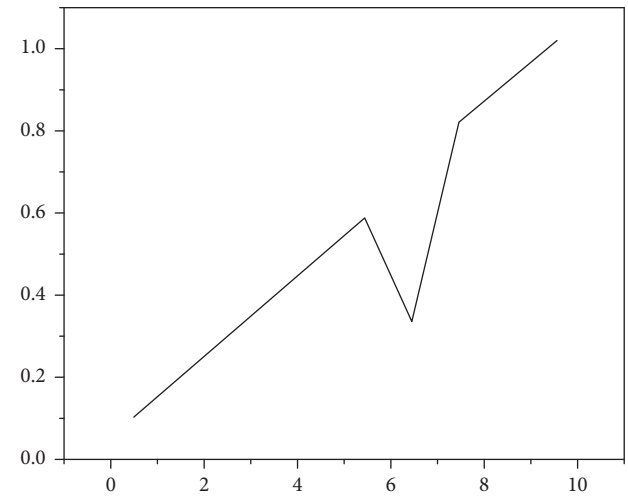

Figure 20: Location accuracy of terminal system.

4.2. Platform Design Analysis and Test. Internet of things technology aims to realize the connection between things and even the interconnection of all things, which requires that when applying Internet of things technology, firstly, technicians should use very stable wireless interconnection technology to do a good job in the connection between things. Secondly, technicians should clarify the essence of Internet of things technology. The essence of Internet of things technology is related to the Internet. Internet of things is an Internet based equipment control network. Moreover, when designing the Internet of things system, technicians must pay attention to strengthening the security of the system. This is because when users use the Internet of things technology, they are often required to upload some sensitive information of users, such as fingerprint information or face, voice, and other information, which has extremely strong privacy. The test results are shown in Figures 19 and 20. Any smartphone can use a compass to determine the direction of its current location. The new route memory function can

effectively remember the current user's route and help the user get out of the wrong way. In addition, it also has the function of teammates forming teams and sharing team members' positions, which can effectively solve the problem of teammates falling behind and always query the whereabouts of teammates, so as to facilitate carrying out land exploration activities by the team. The new scenic spot information promotion function can provide nearby known scenic spots for the exploration crowd and provide an exploration destination for the crowd. The above is what most mainstream navigation devices lack at present, which is the significance of designing this system.

5. Conclusion

In short, based on the analysis of the basic connotation and application requirements of online of things technology, this paper further analyzes the problems and corresponding solutions of Internet of things technology in field emergency rescue and mainly discusses the problems of platform management, technology application cost, and security. When designing the online project social system, technicians must combine the actual needs of users and should refer to the application standards of social things technology to protect user information and improve the application quality of things technology. In addition, in order to optimize the user's application experience, when selecting intelligent rescue equipment, designers should also select intelligent rescue equipment with unified operation platform, which can eliminate the information sharing problems caused by platform mismatch to a certain extent. In addition, intelligent equipment manufacturers should also actively apply social development things, collect and analyze users' feedback and opinions, optimize the system operation interface based on users' actual needs, humanize the application process of Internet of things technology, and then effectively improve the application quality of Internet of things technology. Combined with the use of software and hardware, it can realize the functions of real-time monitoring direction, human body temperature, ambient temperature, positioning and navigation, route memory, shared location, and scenic spot information. It focuses on the two functions of route memory and shared location, which can effectively solve the defects of single function and inflexibility of the current navigation system. This intelligent system has high practical value. It is extremely practical for field explorers who like outdoor sports. It is easy to carry, is simple to operate, and has great commercial potentials.

Data Availability

The labeled dataset used to support the findings of this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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