The Design and Realization of Fire Evacuation and Rescue Applet

Zhang Yansu†, ‡, Gao Pengcheng‡ and Yang Chenying‡

†China People’s Police University, Langfang, Hebei, 065000, China
‡cppuzys@126.com

Abstract. With the vigorous development of new media technology, wechat applet is in the stage of blowout development. Based on wechat platform, and combined with the public’s cognition of fire safety knowledge, the fire evacuation and rescue applet is designed by wechat developer tools, cloud computing platform and other tools. The applet includes many modules such as evacuation plan display, fire plan display, fire tips, plan inquiry, fire publicity video and hidden danger report and so on. In the event of a fire, the applet can enable the public to acquire the knowledge of fire safety precautions and evacuation paths of the places where they are located timely. Also, the applet can help commanders get the fire emergency plan at the first time, have a preliminary understanding of the driving route, water source information and the basic situation of the unit on the way if reinforcements are needed in other district. So the fire evacuation and rescue applet can provide a timely and effective way for the public to popularize fire common knowledge. All of these functions can enhance people’s awareness of fire safety and reduce losses in case of fire.

1. Introduction
With the maturity and popularization of 5G technologies, new digital media is changing people's lifestyle step by step. The vigorous development of new media platforms urges the public to accept the new mode of acquiring knowledge based on new media platforms gradually. As one of the new media platform, wechat applet is in the stage of blowout development, and is gradually building and improving the unique applet ecological chain[1]. At the same time, with the advancement of intelligent fire control work, fire control work involving the public has an increasing demand for new media, such as online publicity, online political work, education and teaching, etc. It is imperative to carry out firefighting work with the help of applet and other new media platforms[2].

This design can combine the knowledge of fire evacuation and rescue with wechat applet to build a platform for ordinary citizens to acquire the knowledge of fire evacuation and escape from the fire environment quickly. The implementation of Fire Evacuation and Rescue Applet can provide a timely and effective way for the public to acquire fire knowledge, meet the public's need to acquire fire knowledge efficiently at anytime and anywhere, which can strengthen the public’s awareness of fire safety, and reduce the losses caused by fire.

2. System analysis
2.1. System analysis
In recent years, with the development of firework, most of people have certain firefighting knowledge.
They maintain escaping knowledge in case of fire. Also, they can learn the using of fire equipment and the escaping route of a location. The limit of fire publicity platform made it is impossible for the public to study fire knowledge deeply and obtain escaping method immediately. Moreover, District fire station only has the contingency plan of their own areas. But the fire rescues often involve many adjacent fire stations. Fire stations outside the jurisdiction cannot grasp the fire plan information at the first time and they are unfamiliar with ground information or water information either. All of these restrictions can delay the reinforcing time and affects the decision of commanders on fire direction and personnel allocation, resulting in the reduction of the efficiency of fire reinforcement[3]. So a wechat applet can be designed to help commanders get the fire emergency plan at the first time, have a preliminary understanding of the driving route, water source information and the basic situation of the unit on the way to reinforcements. Through the above analysis, the applet needs to achieve the following functions:

1. Display of evacuation plans of various scenes and fire prevention plans of key units according to different categories;
2. Query the evacuation plans and fire prevention plans respectively;
3. User authorization login when needed;
4. Fire hazard feedback. Unauthorized users can view feedback information, and authorized users can report feedback information;
5. Propagandize the fire fighting knowledge, precautions and conventional fire management methods.

2.2. Database requirement analysis

2.2.1. Data dictionary. The plan mainly includes the unique identification of the unit, the name of the unit, the picture of the unit, which kind of scene the unit belongs to (scene division number), and the link of the plan details page. The hidden trouble report feedback information mainly includes unique identification, ID, input content, user avatar, user nickname and the proposing time of the hidden trouble. In order to realize the hidden trouble reporting function smoothly, the user information needs to record the unique user id, user name, user avatar and the first login time. Through the above analysis, the data dictionary is designed as follows:

1. Plan: include No., unit name, unit picture, unit location, skipping link, unit scene.
2. Fire tips: include No., information name, skipping link.
3. Hidden danger information: include No., user avatar, user name, user id, reporting time, content.
4. User information: include No., user avatar, user name, user id, first login time.
5. Video information: include No., video name, skipping link.

2.2.2. E-R diagram. Analyzing the relationship between different entities in the fire evacuation and rescue applet, the overall E-R diagram of the applet is designed, as shown in Figure 1.
3. System design

3.1. System function design
The functions of the Fire Evacuation and Rescue Applet include the display of plan by category, the reporting of hidden danger, information search, video display and so on. The plan display function is divided into three parts: evacuation plan, fire plan and fire tips. That is, the display module of evacuation plan needed by ordinary people when escaping from a fire, the display module of fire plan needed by commanders and soldiers when preparing to put out the fire, and the fire tips module can improve the public awareness of fire protection. The search function can realize evacuation plan and fire plan searching respectively, which is easy to find relevant contents. The video display function can display the firefighting contents in the form of text and video. The applet mainly realize the evacuation and rescue and fire plan display, through video search and hidden danger report and other subordinate functions increase the practicality of the applet[4]. The functional module structure diagram of fire evacuation and rescue applet is shown in Figure 2.

3.2. Database Design
According to the actual requirements analysis of the applet, the six tables are designed, such as evacuation plan table and fire plan table, etc. The design structure of evacuation plan table is shown in Table 1.

Table 1. Evacuation plan table structure

| column    | explanation | types | Not Null |
|-----------|-------------|-------|----------|

Figure 1. the E-R diagram

Figure 2. Function module diagram
4. System Realization

4.1. Plan display module
The evacuation plan display module and the fire plan display module are the core function modules of the applet. The types of plan are divided according to different scenes. The scene of the evacuation plan includes schools, large-scale commercial complex, hospitals, hotels and other categories. Also, the scene of the fire plan includes schools, large-scale commercial complex, hospital, oil depot, chemical plant and other categories.

The evacuation plan is composed of three subfunctions, namely, evacuation instructions, attention points and detail diagram. Evacuation instructions provide evacuation route and evacuation site after escape; Attention points include building features, floor distribution and other important information. Detail diagram include floor plans and the unit's location information. All of these information can help trapped people find evacuation routes and shelters quickly[5].

The fire plan includes simulation of disaster level, description of disaster situation, force deployment, combat deployment, precautions and so on. Combat deployment includes road map, vehicle deployment diagram and combat deployment diagram. The fire plan is consistent with the latest plan of the detachment, so as to ensure the authenticity and effectiveness of the plan. All of these information can help the fire fighters arrive at the fire scene as soon as possible and have a preliminary understanding of the site environment, so as to ensure the smooth implementation of firefighting and rescue work.

4.2. Fire tips module
The fire tips module mainly displays the common knowledge of fire prevention, including fire prevention at home, how to correctly and effectively dial 119 and other common fire problems in daily life. Common sense of firefighting close to life can effectively improve the overall fire quality of the public, and ensure that the public can deal with fire calmly, improve the efficiency of firefighting.

4.3. Fire publicity video module
The fire safety video module displays the evacuation guidelines of various scenes in the form of video. It includes science popularization videos of fire knowledge, fire evacuation education videos in key places, fire prevention publicity videos, etc. The videos can display the firefighting knowledge more intuitively. Video introduction is helpful to learn and understand video content more effectively.

4.4. Information search module
The plan information of the unit can be found in the module, and all contents of the category will be displayed when searching for null value. This function is implemented through regular expressions to realize fuzzy query. The patterns defined by regular expressions can describe input keyword information in a predictable sequence of characters.

| id  | No.  | string | primary key |
|-----|------|--------|-------------|
| name| unit name | string | yes         |
| location| unit location | string | yes         |
| picture| unit picture | string | yes         |
| skiplink| skipping link | string | yes         |
| scene| unit scene. | string | yes         |
4.5. Hidden danger reporting module
The hidden danger reporting module helps the public to report the hidden danger of fire around them, aiming to find out the hidden danger of fire and deal with it in time. This module includes two parts: authorized login and reporting information. Unauthorized users can only view reported risk information. Authorized users can view and fill in the reporting information[6]. The hidden danger reporting is convenient for fire personnel to deal with the reported content as soon as possible.

5. Conclusion
Through the fire evacuation and rescue applet, the general public can acquire the evacuation plan, fire knowledge, fire publicity video and other fire knowledge more timely and effectively, fire commanders and fighters can get the fire plan of various key units in the first time. This applet considers the disposal scheme under fire situation from the two perspectives of ordinary people and fire rescue personnel, in order to popularize fire knowledge, reduce fire hazards, improve the rate of escape and the efficiency of fire disposal. All of these modules can reduce the losses of life and property caused by fire. The implementation of the applet is conducive to promote the construction of intelligent fire control, expand the application platform of intelligent fire control, effectively promote the development of firefighting work, and realize online intelligent fire dispatching as soon as possible.

Acknowledgements
This paper is supported by the project of “Research on application of Fire fighting Communication Equipment based on virtual reality technology” (Project Number: ZQN2017066).

References
[1] Hou Chunjun. 2018 Research and Analysis on the Promotion Strategy of WeChat applet. Office Informatization, vol 23 pp 32-33.
[2] Jiang Xueyun, Sui Hulin and Ma Qingbo 2013 Research on integrated Application of Fire information System. Fire Science and Technology. vol 4 pp 406-410.
[3] Zheng Yanlin and Li Zhidong. 2015 Research on command Capacity Building of Grassroots Fire Commander. Journal of Armed Police Academy, vol 10 pp 37-41.
[4] Liu Yujia. 2017 System implementation and prospect analysis of WeChat "applet" development. Information communications, vol 1 pp 260-261.
[5] Huang Xinyan. 2017 Flex layout container and element attribute technology in WeChat applets development. Information and Computers, vol 14 pp 78-80.
[6] Zhu Yuexing, Chen Kai, Guo Youda and Gu Yonghao.2018 Applet Development and its Open source Ecology, Application Case Analysis. Wireless Internet Technology. vol 17 pp 34-37.