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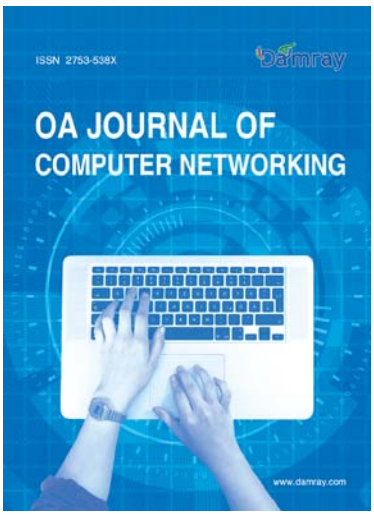
Emergency Broadcasting System Based on Cable Digital Network and Communication 4G Network



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Qingming Li

VES Technologies Corporation Limited, China.

Abstract

Emergency broadcasting refers to the most effective means for the government and relevant departments to convey early warning information or appropriate post-disaster response information to the public when major natural disasters, emergencies, public health and social security and other emergencies occur, and it plays an important role in the field of communication. With the rapid development of science and technology, cable digital network system and mobile communication 4G network has been widely used in all aspects of people's work and daily life, therefore, through the use of cable digital network system and mobile communication 4G network to carry out the construction of emergency broadcast command system is also an inevitable trend. Based on the significance of the emergency broadcasting system construction, this paper analyzes the design and characteristics of emergency broadcasting system in digital networks and the 4G network era, and further reflects on the importance of emergency broadcasting.

Keywords

Disaster warning, Emergency Broadcasting System, Cable digital network, Communication 4G network

Introduction

Emergency broadcast refers to the means by which relevant departments convey early warning information or post-disaster response information to people in the event of a major public safety crisis. With the occurrence of various disasters and public events in recent years, people's need for timely and accurate emergency warnings and emergency situations is increasing, which also means that the government needs to provide more public services, such as the timely release of emergency response, rescue information, emergency rescue and so on [1]. Therefore, relevant departments should actively build a public emergency public service system, improve public emergency public facilities, and timely and accurately transmit early warning and emergency information in natural disasters, endangering public safety and other emergencies to ensure public safety and people's lives and property safety [2]. Therefore, the emergency broadcast

system is an important part of information dissemination, it must assume responsibility so that it can fully play its role in emergencies.

1. The significance of building an emergency broadcasting system

1.1 Construction of urban-rural integration

For the emergency broadcast system covering counties, towns and villages, the county-level broadcast control center, on the one hand, undertakes the task of receiving the deployment orders conveyed by the municipal level, and on the other hand, it is also responsible for the selective decentralization of tasks to the village broadcast control center [3]. It plays a transitional role and is the core management control platform of the whole system. An important condition for the urban-rural integration is to achieve full coverage of urban-rural network. In this context, the establishment of an emergency broadcast system, both to promote the party and the state policy, but also for the majority of rural people to provide services for the people; at the same time, it is also possible to improve the comfort of urban and rural residents by broadcasting weather forecasts, seasonal scientific knowledge, and expert lectures on increasing economic income, thereby reducing the loss of urban and rural population and achieving integrated urban and rural development.

1.2 Construction of the emergency broadcasting system

In recent years, due to some changes in the ecological environment, resulting in some areas because of the climate there have been many natural disasters, such as summer drought, hail, mudslides, winter snowstorms, extreme cold, and other bad weather. Even in some mountainous areas, geological disasters such as landslides and ground subsidence have occurred [4]. When these disasters occur suddenly, in order to enable people to make emergency response and preventive measures as soon as possible, emergency broadcasts are needed to release this disaster information quickly and effectively. In addition, in the face of some urgent public safety incidents, emergency broadcasting can also timely spread the solutions of relevant departments to people, giving people the greatest sense of security. At the same time, relevant departments will quickly complete the scheduling of all parties to avoid greater panic and loss.

1.3 Conveying political information

Nowadays, the international and domestic situation is complicated and changing. For the people, it is of great significance to understand the current situation in a timely and rapid manner, to receive the overall arrangements of the party and the government, to work together, and to fight poverty. In this regard, the transmission of emergency broadcast information fast, broad, conducive to listening, can play a huge role [5].

2. Technical principle

At present, all counties and cities have built a cable TV network based on fiber coaxial hybrid network, referred to as HFC network. The signal transmission and reception of the emergency broadcasting system are completely based on the existing cable TV network without any modification. Broadcast signal into the cable television network only need a coaxial cable, and in order to ensure the safety of emergency broadcast system, manageable, controllable, we use FM subcarrier + addressable technology to achieve emergency broadcast.

(1) FM radio subcarrier technology, namely FM-SCA technology, is a kind of FM multiplex broadcasting technology. It uses the same FM carrier frequency to transmit another or more sets of language or data programs that are different from the original radio programs, so as to realize the function of " having a station in the station " or " one main and multiple deputy. " At present, SCA broadcast has been widely used to transmit ' weather forecast ', ' stock market ', ' traffic information ' and other digital control services.

The main technical advantages of FM-SCA are that it does not occupy additional network resources and frequency resources, does not occupy existing bandwidth, and does not require any changes to the original transmission network and transmission frequency. It uses the frequency modulation main channel to transmit audio, and the sub-channel 67 KHz transmits the digital control signal [6]. The sub-channel signal is modulated on the original frequency by frequency modulation with the audio signal, and then transmitted through the cable TV network. That is to say, as long as the cable TV network to reach the place, our broadcast signals and digital control signals also arrived at the same time, the real emergency broadcast.

(2) FSK (Frequency-shiftkeying), frequency shift keying modulation technology, it is the use of baseband digital signal discrete value characteristics to key carrier frequency to transmit information of a digital modulation technology. FSK is an earlier and widely used digital modulation method in information transmission. Its main advantages are mature technology, good anti-noise and anti-interference performance. At present, it has been widely used in medium and

low speed data transmission.

We use FSK technology to transmit the addressable digital control code stream of the broadcast. The digital control code stream is actually the command command of our emergency broadcast system. This command signal is modulated on the 67KHz subcarrier by FSK technology [7]. 67KHz subcarrier and audio signal mixed together again, in the form of frequency modulation on the original carrier frequency, through the cable TV network transmission. If it is to be mixed into the optical fiber network, we can add another photoelectric conversion module, and then combine with the cable TV optical fiber signal.

3. Design of Emergency Broadcasting System Based on Cable Digital Network and Communication 4G Network

3.1 Basic structure of the system

The emergency broadcasting system based on the wired digital network and the communication 4G network mainly uses the broadcast control center of the city/county level as the information sending point to spread the broadcast control platform in the whole connected area of the township, and then the information is processed, produced, audited and dispatched by each broadcast control platform. After the 4G network is introduced to the terminal of the masses, the controllability of the emergency broadcasting system and the traceability of the information are finally realized, which provides a guarantee for the broadcast of emergency broadcasting information.

3.1.1 Dissemination of county / municipal emergency information by wired digital network

In the emergency broadcast system covering the whole area of counties, towns, and villages, the broadcast control center at the county level should not only receive the information conveyed by the higher level in time but also be able to accurately publish it to other areas at the county level. In other words, the broadcast control center at the county level plays a very important transitional role in the whole broadcast system. In addition, in daily radio programs, can also quickly switch to the emergency channel, and timely release of early warning information.

3.1.2 Information dissemination through 4G networks at all levels upon receipt of emergency information

After receiving the emergency information of the higher level through the wired network, the township/village broadcast control center should be able to process the information such as decryption and decoding in time, and then use the 4G network to release the information to the villagers according to the emergency situation of the early warning, so that the villagers can quickly take preventive measures to reduce unnecessary losses [8].

3.1.3 Broadcast terminal

After receiving all the emergency information at the village level, the village broadcast control center needs to spread the information according to the actual situation of the village. However, due to the large distribution range of each village, the use of wired digital network transmission is not only costly, but also the scope of transmission is limited. Therefore, the use of 4G network for the terminal receiving devices, the use of 4 G network for information receiving and dissemination can also be more rapid, and the scope can be involved relatively wide.

3.2 System design

The emergency broadcasting system includes: a county management platform, township platform, village platform, and receiving terminal. First of all, the city/county broadcast control center should have a broadcast management platform, information access, safety supervision, telephone call center, SMS voice access, transmission signal processing, network management monitoring, and wireless backup channel. Secondly, the township broadcasting control platform is constructed. The platform mainly includes an audio coding controller, microphone, sub-control platform, and other equipment. Finally, a village (community) broadcast control platform was established. The main function of this platform is to integrate the existing network resources of each township and use the 4G two-way network to realize the two-way communication between the village and the front-end computer room.

4. Characteristics of the emergency broadcasting system based on wired digital network and communication 4G network

Emergency broadcast system uses ' cable digital network + 4G network ' mode. Focus on the realization of upper and lower system linkage, platform interconnection, emergency instructions and emergency broadcast information content and transmission standardization, security, terminal control and other key technologies. In the construction of the system, it is necessary to build a multi-level management and control platform for the relevant functional departments of

the city and government, towns (streets) and villages (communities). In order to ensure the unity of the linkage inside and outside the system, it is necessary to interact with the provincial emergency broadcasting system and the local emergency information release system [9]. It can receive emergency information release instructions from provincial and local (emergency office, meteorological bureau, public security, three prevention, water conservancy (flood control), civil air defense, agriculture, forestry, public security, environmental protection, transportation, prevention and treatment of cult offices and other relevant departments), and can achieve three-level platform linkage and terminal controllability.

4.1 Having a telephone call center

In the emergency broadcast system constructed by the wired digital network and the communication 4G network, the telephone can be used to call the center system, and the call center can receive multiple telephones at the same time, which makes information dissemination more effective. In addition, it can also trace the origin of the call and confirm the legitimacy of the call source, so as to ensure the accuracy of emergency information and reduce some unnecessary panic and waste of manpower.

4.2 Accessible by SMS

First of all, the emergency system also has the function of short message access emergency broadcast, which realizes the legal short message content of the receiving source, and the emergency broadcast system constructed by the 4G network can also realize the transformation of the short message content [10]. The text content can be quickly converted into voice after encoding and transmitted to the broadcast system to realize the rapid broadcast of information. secondly, completing the identity authentication of the mobile phone number or password permission, and broadcasting the emergency short message after the password verification; again, to achieve information filtering, receive and identify legitimate short messages, and cut off illegal short message playback; finally, the realization of all the SMS emergency broadcast recording and storage, record access to the phone number, access time, SMS content.

4.3 Terminal diversity

In addition to the basic broadcast function, the device can also be connected to LED large screen, a digital TV set-top box, and other terminals, so as to achieve seamless docking with text, pictures, and video, to facilitate the government's emergency publicity work. All the terminal devices have 4 G listening ability, and the intelligent sound column can also integrate modules such as CM / E0 C / ONU + WIFI, and can be modularized as needed.

5. Conclusion

In summary, according to the scheme, the main coverage network cable digital network jointly built by the province, city, and county is sent to the broadcast control platform at the township and village level by the broadcast control platform at the township and village level through coding and multi-channel transfer equipment. After demodulation, the 4 G mobile communication network is used to realize the broadcast coverage of each village so that people can understand the relevant policies and information in time. The emergency broadcasting system based on a wired digital network and communication 4G network has the characteristics of low cost, wide coverage, real-time and effectiveness, which is worth promoting in the construction of emergency broadcasting.

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