Regards to "fireman"

—— He Caiquan

November is a special month which had the most festivals in Chinese lunar calendar of the whole year. With so many solar terms festivals, I am most interested in "119 National Firefighting Day". Since 1992, China's Ministry of public security has issued a notice to designate November 9 as the national firefighting day. On this day, enterprises and institutions will carry out fire drills of different types or kinds, to improve everyone's fire fighting awareness and comprehensive ability of self-rescue and escape.

I have been engaged in the firefighting industry for more than ten years and regard myself as a loyal "firefighter". Today, I'd like to share my personal understanding of fire protection, and welcome any comments.

Firstly let's look at a set of heartbreaking data:

1. On May 12, 2018, a fire broke out in building 19, phase II, Hengda Mingdu community, Qingjiangpu District, Huai'an City, Jiangsu Province. Although this fire was successfully extinguished and 36 trapped people were rescued without any casualties, a fire rescue soldier who fell from a building died unfortunately in the process of rescuing the masses.

2. On March 30, 2019, a forest fire broke out in Li'er village, Yalongjiang Town, Muli County, Liangshan Prefecture, Sichuan Province, resulting in the heroic sacrifice of 27 forest fire rescue soldiers and 3 local firefighters. Their average ages are only 23 years old, of which the oldest is 38 and the youngest is only 18.

3. On March 30, 2020, a forest fire broke out in Xichang City, Liangshan Prefecture, Sichuan Province, resulting in the heroic sacrifice of 18 forest fire rescue soldiers and 1 local firefighter.

4. On November 15, 2010, a fire broke out in an apartment in Jing'an District, Shanghai, resulting in 58 deaths and 71 injuries.

5. On April 22, 2021, a fire broke out in the workshop of Shanghai Jinshan Shengrui Electronic Technology (Shanghai) Co., Ltd. Two fire rescue soldiers and six enterprise related personnel died.

This is only the tip of the iceberg of China's domestic fire accident data. There are countless fire events in the whole international community... Fire means personnel sacrifice and property loss.

How to effectively reduce the fire incidence and losses caused by fire, I have the following thoughts:

Secondly as the leader of the fire product unit and the QC quality director (hereinafter referred to as the "producer"), we must strictly abide by the relevant regulations and technical requirements corresponding to all kinds of fire-fighting facilities and equipment products, and fully review and verify all kinds of test data, such as, firefighter's combat clothing, positive pressure fire air respirator, fire hose, fire water gun, fire extinguisher, fire door, alarm detector, sprinkler, fire hydrant, etc. Because all fire fighting and rescue and life and property protection are inseparable from the reliability, fire resistance and integrity of these most basic fire-fighting facilities. Otherwise, extremely heavy casualties and immeasurable economic losses will be caused due to the product quality of various fire-fighting facilities and equipment, and endless pain will be left to the society.

Thirdly, as the person in charge of fire control and fire manager of the enterprise (hereinafter referred to as the "manager"), they shall strengthen the work safety of the enterprise and prevent and reduce production safety accidents in strict accordance with the fire control law of the people's Republic of China, the work safety law of the people's Republic of China, order No. 61 of the Ministry of public security of the people's Republic of China and other relevant regulations. At the same time, the heads of EHS department, operation management department, property management department and other relevant departments of all enterprises shall apply for sufficient funds for maintenance and rectification of fire-fighting equipment, and comprehensively formulate and implement the fire safety management system. Don't procrastinate with various seemingly reasonable reasons when finding problems. Here, I sincerely advise you not to take chances, because there are no small things in fire control.

Meanwhile as the project leader and executor of professional technical service units such as construction, maintenance, detection, evaluation, training, consultation and management of various fire-fighting system facilities (hereinafter referred to as "maintainer"), they must strictly abide by relevant regulations and technical requirements such as design, acceptance, maintenance, detection and evaluation of various fire-fighting facilities. At the same time, we should constantly improve our professionalism, professional ethics and professional and technical ability. When we are on the project site, we must have the ability to find, solve and prevent problems, have a dedicated, tireless, serious and responsible attitude, and have the courage to write and report, trace management and clear responsibilities. Because our kind of personnel is the last and most difficult, bitter and important level to maintain and guard the integrity and effectiveness of fire-fighting facilities, our persistence is also the most meaningful level.

Lastly, the fire rescue department and other government regulatory departments (hereinafter referred to as "supervisors") as fire fighting, supervision and law enforcement play a more important role. The whole process is inseparable from their supervision from building site selection, initial construction, completion acceptance, operation supervision, cooperative drill, ordering rectification, administrative punishment, etc. There are also our most lovely people - firefighters. Whenever there is a fire, we don't know their names, only their unified pronoun "firefighter". In the face of the fire, they rushed to the fire again and again to save lives and property. They are not limited to urban fire fighting and rescue. They shuttle through the places where we need them most in our daily life - fire elimination, rescue and relief of various natural disasters, inspection of fire safety facilities and publicity of fire safety knowledge. At the same time, they also participate in rescue work, road rescue, ambulance rescue and elimination of various potential safety hazards, Firefighters are like the "patron saint" around us.

I have watched a documentary film on the leakage of Chernobyl nuclear power plant that shocked the world hardly. Every time I watch it, I have different feelings. The lack of professional skills or professional ethics of personnel in each post will bring unpredictable consequences. For example, the weak professional ability and blind command of the engineer on duty, and the irresponsible panic and concealment of the on-site leaders may directly or indirectly lead to the casualties of the on-site front-line technicians and fire rescue team members.

According to my understanding and analysis of the conclusions of each fire incident investigation and handling report, all our fire incidents are inseparable from the sense of responsibility and mission of the four kinds of people including the "producer", "manager", "maintainer" and "supervisor". If the "producer" cannot produce qualified fire-fighting products (to withstand the bottom line of quality), if the "manager" cannot effectively implement the system and provide special maintenance funds (to withstand the doubts of the leaders), if the "maintainer" cannot truly and effectively feed back and find the problem status and emergency repair treatment (to withstand the professional examination), if the "supervisor" doesn't care (to resist the principle of law enforcement). How dangerous and terrible our daily life will be. Therefore, in this special month, we pay tribute to all "firefighters" in different posts again. It is because of your constant persistence and protection that we can make our life more secure.

I am proud to be a "firefighter" very much.

Shanghai Telling 3rd quarterly meeting in Suzhou 2021yr

October 24-25, 2021yr, Shanghai Telling Safety Technology Co., Ltd. (hereinafter referred to as "Shanghai Telling") held the third quarterly meeting in Suzhou, Jiangsu province successfully. During the whole two days, nearly 70 participants shared their views about the growth of Shanghai Telling, including the changes of internal and external economy environment, how to be an ever-learning organization, the operation analysis of different departments and branches, as well as the problems encountered in last quarter. Below are the details.

Singing the National Anthem of the people's Republic of China.

At the beginning of the conference, Mr. Zhang Qing, the chairman of the board, gave an opening speech. Mr. Zhang reviewed the 3rd business growth, especially the development of Suzhou Telling. Meanwhile Mr. Zhang explained how to lead a team to success. We can only go further when we do our job step by step.

In order to create a learning company culture, Mr. Zhang awarded a scholarship to Li mingyu personally, who was admitted to the graduate student of China University of mining and technology, majoring of resources and environment. He encourage us to keep laering, to combine the theoretical learning and practice, strive to learn professional knowledge, improve knowledge structure and improve business level.

As schedule, Mr. Hu Ming, general manger of Telling, analyzed the operation of the company in the third quarter, put forward the triangular model of Shanghai Telling's value network, and required all employees to focus on four points "professionalism, focus, execution and client-centered".

Subsequently, Gu Tianfu, executive deputy general manager of QEH (Shanghai) Consultancy Services Co., Ltd., Zhang Lian, executive deputy general manager of Shanghai Telling Suzhou Branch, and Wang Guanghua, head of Shanghai Telling rail business department, discussed the business data of the first three quarters, the problems existing in the company, the specific ideas for completing the tasks of the whole year, compliance construction ,standardized delivery, etc.

Tang quan, deputy director of the Shanghai Telling Safety Research Center, gave a speech on the topic of "Exploring the development direction of integration of security and fire protection ", shared the situation of the world's leading security companies, the integration of different security fields, and the " Integration of security and fire protection ".

Wu Haitao, head of the quality supervision department and senior engineer, shared his views on responsibility overview, performance, continuous improvement and work planning. He said that Shanghai Telling has always insisted and lead a compliance operation, and employees in Shanghai Telling can work at ease.

Huang Yaoan, the head of the engineering department, Zhao Jianxiao, the Hangzhou subway project manager, Yuan Qiang, the Chengdu project manager of the rail business department, and Shao Chao, the Suzhou project manager of the subway business department, respectively summarized the personnel status, project overview, cost control and other aspects of the project, and put forward deficiencies and improvement measures.

Xu Lian, Dou Aihua, Ding Xiaoer from Shanghai Telling business department, Hu Yang from QEH Consultancy Services business department, Zhang Shuxin and Dong Ping from Shanghai Telling Suzhou Branch business department shared their work overview in the third quarter, difficulties and challenges encountered in their work, sprint plan in the fourth quarter, and experience in their work.

Zhang Jize, He caiquan, deputy operation directors of Shanghai Telling, Wu Maolong, Zhang Hailong, Li Huangling, Chen Hanwen, Zhu Caiwei, Zhang Jiahua, project leaders of Shanghai Telling, and Chen Weidong, Li Xiang, Cha Jianfeng, Li Guilin, Zhu Zhihai, project leaders of Shanghai Telling Suzhou Branch, respectively, reviewed the team situation in the third quarter, the work of win-loss in the third quarter, and the safety and quality of project delivery, and the fourth quarter planning.

Two honored guests, Mr. Ye longchuan, an expert in the field of fire protection, and Li Dong, chairman of Shenzhen ZhongRH Management Consulting Co.,Ltd., made important sppeches, sharing the professional technology of fire protection system, the development prospect of fire protection industry and talent developing.

All team members of Shanghai Telling will strengthen confidence, work together, forge ahead and strive to practice the mission of "firefighter"!

Experts from Shanghai Disaster Prevention and Relief Research Center to visit Shanghai Telling to promote the "Integration of security and fire protection" program

Recently, the experts form Shanghai Disaster Prevention and Safety Strategy Research Center (hereinafter referred to as "Research Center") visited Shanghai Telling Safety Technology Co., Ltd. (hereinafter referred to as "Shanghai Telling") and gave a promotion on the "Integration of security and fire protection" program.

During the meeting, the head of marketing department of Shanghai Telling gave an introduction of Shanghai Telling's business scope and development history to the visiting team of the Research Center. Mr.Hu, general manager of Shanghai Telling, highlighted to the visiting team that Shanghai Telling has noticed many clients had demands regarding of the fire protection and security management during the past years' of work. If fire protection service and technical defense services can be integrated together, they can provided a better service to the clients and reduce their management costs.

The expert of the Research Center said that in past years, together with the rapid development of IoT technology, cloud computing technology, edge computing technology, and 5G communication technology, fire protection technology has applied from security technology in sensing technology, equipment performance, system functions, and platform architecture. The latest development results have presented a brand-new development situation in terms of data collecting and processing, alarm linkage strategies, innovative application models, etc. The overall structure of fire protection technology has upgraded towards "Integration of security and fire protection". Shanghai Telling can work together with these problems during the social development, innovate a more flexible systems and mechanisms to help the public to solve their bottle-neck.

Before the meeting ending, the coming team visited the Shanghai Telling's IoT monitoring room and shared their views openly.

Shanghai Telling has been certified the first-grade security engineering enterprise qualification in October this year, with the business scope of: safety technology protection system design, construction, and maintenance etc. This certification support Shanghai Telling for the next step of exploring and advancing in the " Integration of security and fire protection" industry.

Awarding letter

Q&H (Shanghai) Consultancy Services Co., Ltd. (hereinafter referred to as "QEH Consultancy Services") is honored to win a praising letter from Shanghai Construction Group 7th Group Co., Ltd. (hereinafter referred to as "SCG 7th Group").

In August 2021yr, Q&H Consultancy Services and SCG 7th Group signed a contract regarding of the "Pudong New Area Youth Activity Center and Group Art Management Project". Q&H Consultancy Services is responsible for the pre-completion inspection of the project's fire protection system.

The inspection team include Cao Yang, Hu Yang, Wang Wei, and Xu Mingqing etc, deal with the project more seriously. They took the initiatives even on weekends. Despite the complicated demand, the large work load, the tight working schedule, and the high temperature on-site, the team overcame all these challenges and performed more than 15 on-site inspections before the project closing. Finally, they assisted the SCG 7th Group project team to successfully complete the inspection, ensuring the Center opened on time. The inspection team won the leadership's unanimous praise from SCG 7th Group.

Bid Winning

In October 2021, after several rounds of bidding with strong competitors, Shanghai Telling Safety Technology Co., Ltd. (hereinafter referred to as "Shanghai Telling") successfully won the fire alarm project in the production area of Anhui Huadian Lu'an Power Plant Co., Ltd.

This is the first project Shanghai Telling delivered in electric power industry, which means a new step Shanghai Telling's business have developed into. Additionally, this is the great recognition by Shanghai Telling's brand. Shanghai Telling will keep working hard to deliver a best security service for the client's production safety.

Wang Shen won the Outstanding Performance Award in Hangzhou MTR

The maintenance department of Hangzhou MTR Co., Ltd. awarded Wang Shen, an employee of the Telling Hangzhou Metro Project, Outstanding Performance Award.

Wang Shen is hardworking, and always takes a positive attitude towards any challenges. Personally, he keeps learning. For those projects he delivered, no matter what problems arise, he will study hard and find all kinds of ways to solve the problems. As a technical backbone, he is fully responsible, hands-on work, he also strives to cultivate newcomers, to share his skills to partners; he unites colleagues, treat people sincerely, follow with company arrangements. Wang Shen's excellent professional spirit has won unanimous recognition from colleagues and clients.

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Design of intelligent optimization algorithm in intelligent fire detection system

Wang Wei, Li Dong, Hu Ming

Abstract: In the framework of the concept of "Smart Fire Protection", this article analyzes the development direction of artificial intelligence fire detection system in view of the defects and deficiencies in the traditional fire monitoring system and the algorithm used in the fire detection system. A functional realization method based on intelligent optimization algorithm design that can be used in the intelligent fire detection system.

1 Introduction

"Smart Fire Protection" is an important part of the concept of "Smart City". It is an intelligent fire digital platform supported by modern information and communication technologies such as mobile computing, intelligent identification, intelligent processing and virtual simulation, and it is based on digital geographic information, combined with mobile positioning system, digital communication technology and computer software platform. It can provide services for urban fire prevention and control, emergency command team management and other work with the function of intelligent collection, summary, analysis, release and decision-making of information such as fire equipment, emergency plan, fire water source and fixed fire-fighting facilities [1]. Among them, intelligent identification and processing is the core technology of fire monitoring and fire equipment linkage function in intelligent fire protection system. This paper mainly discusses the design of intelligent optimization algorithm used in intelligent identification and processing technology in fire detection system. The implementation of this algorithm needs to rely on many new technical preconditions such as advanced sensor technology, big data technology, cloud computing technology and Internet of Things technology. These technologies are also an integral part of the concept and connotation of intelligent fire protection.

2 Development status of fire detection system

At present, there are the following types of fire detection systems in the domestic automatic fire alarm system:

2.1 Single sensor alarm

Single-sensor alarms are temperature-sensing detectors or smoke-sensing detectors, which realize fire judgment through threshold comparison. Initially limited by the level of technology, the stability and sensitivity of the detector were relatively poor, and the false alarm rate was high. With the advancement of technology and the improvement of equipment accuracy, fire detection can be realized, but the fire parameter is single, and the false alarm and false alarm rate are high.

2.2 Multi signal data fusion processing detector

In order to solve the problem of false alarms and false alarms of single-signal detectors, combined with the current technical level, multiple fire reference indicators, such as temperature, smoke, toxic gases, etc., were added to the fire detection system to perform fusion calculations of multiple parameters. It aims to improve the reliability of fire detection and reduce the false alarm and false alarm rate of fire alarms. However, to realize this technology requires hardware with high-speed processing speed, and the hardware level at that time could not meet the requirements. Until the 1980s, the development and application of high-speed chips solved the above problems, but there were still problems such as imperfect hardware and software system configuration, weak anti-interference ability, and high maintenance costs [2].

2.3 Artificial Intelligence Fire Detector

In the 21st century, artificial intelligence technology has come into people's vision, and fire detection and alarm has also developed into an era of intelligence. In order to improve the accuracy and reliability of the fire detection and alarm system, people use artificial intelligence algorithms to intelligently analyze and process multiple fire parameters, and also incorporate big data technology, Internet of Things technology, cloud computing and high-speed wireless communication technology.

3 Development status of fire detection algorithms

With the development of the software and hardware of the fire detection system, the algorithms used in the software system are also in continuous development. The fire detection algorithm has gone through the following stages:

3.1 Threshold method

Threshold is the earliest and most commonly used fire detection information processing algorithm. This algorithm compares the fire signal detected by the fire detector with a preset threshold to judge the fire situation. When the output value exceeds the preset threshold, it is determined that a fire occurs. This calculation is simple and easy, but it has low anti-interference ability and intelligence, and has the problems of high false alarm rate and missing alarm rate.

3.2 Analogy method

The algorithm describes the characteristics of fire signal with mathematical expression, and judges the fire through the change trend of its function image. This algorithm can filter interference and increase the early warning process, so as to improve the reliability and effectiveness of fire detection system.

3.3 Intelligent algorithm

Intelligent algorithm is the development trend of fire detection and alarm technology in the future. It uses neural network and fuzzy mathematics as the basic algorithm. The system has self-learning ability, parallel processing ability, anti-interference ability and fault tolerance, thereby improving the reliability of the system. However, a large-capacity computer is required for calculation and a large amount of raw data is required.

4 Demand analysis of fire detection system in smart fire protection system

The occurrence of fire is random, and it is a gradual process. It is affected by many factors around the environment, which is a very complicated process. Therefore, it is necessary to select appropriate fire detection technology to improve the accuracy of detection, realize early warning, and minimize the loss of fire [3].

According to the data source of fire detection, fire detection can be divided into two parts, fire sensor detection and fire image detection.

Different monitoring areas have different characteristics. Fire sensor detection and fire image detection learn from each other to realize joint fire detection, avoid missing and false alarm, and realize early alarm. According to the development of fire detection technology at home and abroad and the demand for fire detection accuracy, this paper uses intelligent optimization algorithm to realize joint fire detection through the combination of fire multi-sensor detection and fire image detection.

5 Intelligent algorithm design of intelligent fire detection system
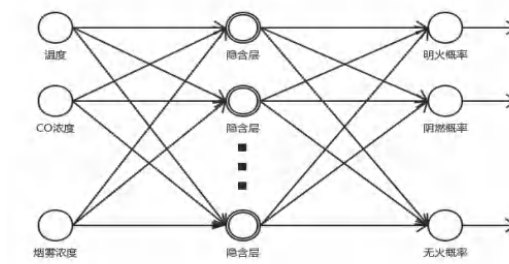
Among the algorithms used in intelligent fire detection systems at home and abroad, the typical neural networks are BP neural network and RBF neural network. BP neural network uses error back propagation gradient descent algorithm as a learning method, and is a multi-layer acyclic feedforward neural network. RBF neural network is a neural network that uses a local receptive domain to perform function mapping. Compared with RBF neural network, BP neural network has the characteristics of higher generalization, fewer hidden neurons, and lower time complexity. Therefore, this article uses BP neural network for algorithm design.

But at the same time, BP neural network has the shortcomings of slow convergence speed, has fallen into local optimum and poor robustness. Therefore, this paper uses genetic algorithm to optimize it.

5.1 Multi-sensor detection system algorithm

For a multi-sensor detection system, first, observe the surrounding environment from the perspective of multiple sensors, use different methods to extract feature vectors of environmental information, and use the feature layer fusion method to perform feature associations on different features of the same environmental information, and get the results based on multiple sensors. Feature fusion feature [4]; Then, use the neural network optimized in Figure 2 above to identify and calculate the fusion feature of environmental information; finally, according to the recognition and calculation results, determine whether a fire has occurred.

5.2 Image detection system algorithm

The initial fire flame has the characteristics of bright light, special color, flicker and so on. For the image detection system, firstly, use the fire image detector to capture the image information of the fire scene in time; then, use the image algorithm of the image detection system to preprocess the image age information to accurately extract the physical characteristics of the initial fire scene, such as flame size, motion characteristics, flicker, persistence, area characteristics, frequency domain characteristics, etc. [5], and encode the physical characteristics; finally, use the optimized neural network in Figure 2 to perform parallel calculations on multiple physical characteristics of the fire, and get probability of fire.

5.3 Design of intelligent algorithm for joint detection based on fuzzy inference

In order to further eliminate fire false alarm and missing alarm, it is necessary to comprehensively consider many factors such as fire multi-sensor detection results, fire image detection results, protection level and duration. Therefore, fuzzy logic reasoning is used for in-depth exploration to reduce the fire alarm rate.

First, the calculation results of the multi-sensor detection system algorithm and the image detection system algorithm are turned into fuzzy variables, that is, they are fuzzified to form the premise fuzzy variables, which are used as the input of fuzzy inference to prepare for the fuzzy judgment; then, according to the fuzzy variables of premise fuzzy logic relations are used for reasoning, and it is judged whether the premise fuzzy variable can constitute a conclusion fuzzy variable, that is, whether it can meet the output requirements, that is, whether it meets the requirements of the fuzzy set of fire alarm [4]; finally, the conclusion obtained by fuzzy inference is fuzzy. The variable becomes a certain amount of output, that is to say, the fuzzy variable of the conclusion obtained by fuzzy inference becomes the certain amount of output of the real fire alarm.

6 Conclusion

In recent years, a large number of new technologies and products have been applied and promoted in the field of fire protection, including some relying on popular technologies, such as big data, cloud computing, artificial intelligence, Internet of things, etc. Through the application of these technologies, the traditional mechanism of fire early warning, rescue and fire extinguishing has been fundamentally changed. Starting from the intelligent detection technology, this paper puts forward the idea of using the intelligent optimization algorithm as the main principle of its software operation, hoping to provide some help to the hardware and software engineers engaged in the field of intelligent fire protection.
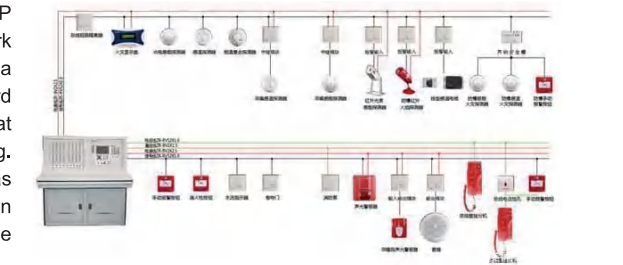
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