



The Development of Smart Home Disaster Prevention System

Zhan-Ping Su¹, Chin-Chia Hsu², Zhen-Yu Wu³, and Chia-Hui Liu⁴(✉)

¹ Department of Business Management, Chungyu University of Film and Arts,
New Taipei City, Taiwan

² Department of Leisure Sports and Health Management, St. John's University,
New Taipei City, Taiwan

³ Department of Information Management, National Penghu University of Science
and Technology, Penghu, Taiwan

⁴ Department of Applied Mathematics, Chinese Culture University, Taipei, Taiwan
ljh34@ulive.pccu.edu.tw

Abstract. Building smart home within Internet of Things (IoT) technology can bring residents living convenience. A smart home infrastructure needs to be built with the Internet of things and wireless network. In this article, using the raspberry Pi to build a smart home disaster prevention system. The system functions proposed in this article are: 1. Real-time monitoring of home environment and safety issues, 2. Indoor temperature and humidity sensing, 3. Pot temperature and humidity sensing, 4. Disaster detection, 5. Fish tank water level detection. The proposed method helps to provide a comfortable home environment. It also reduces the damage caused by home disasters. Using the concept of home automation, we propose the smart home disaster prevention system which can reduce the pressure on residents to maintain the home environment.

Keywords: IoT · Smart home · Disaster prevention system

1 Introduction

To improve the living quality of life, we can build smart home within Internet of Things (IoT) technology. It can bring residents living convenience. It monitors remotely any data or home appliances in the home by anytime, anywhere. A smart home infrastructure needs to be built with the Internet of things and wireless network. In this article, using the raspberry Pi to build a smart home disaster prevention system. This article uses various sensors such as flame sensors to monitor various dangerous areas in the home to avoid fires. The system functions proposed in this article are: 1. Real-time monitoring of home environment and safety issues, 2. Indoor temperature and humidity sensing, 3. Pot temperature and humidity sensing, 4. Disaster detection, 5. Fish tank water level detection. The proposed method helps to provide a comfortable home environment. It also reduces the damage caused by home disasters. Users can check the changes of the

home environment through the proposed platform, which helps to adjust the energy-saving appliances in the home. Smart homes are based on the technology of the IoT, wireless networks and Internet. It can control lights, windows, temperature and humidity, audio-visual equipment and home appliances. It can further monitor environmental factors in the home. These factors are carried out through relevant algorithms. According to the analysis, the home environment can be controlled at the optimal temperature and humidity through home appliance control. In recent years, the government has raised the green energy requirements. Smart home system can monitor the use of home appliances in the home for power control. As aging society comes, smart homes also need to be included in disaster prevention monitoring, such as: Kitchen smoke, temperature, etc., to ensure that elderly people forget to turn off the fire source to cause a fire when cooking. Many families now have fish farming or potted plants, and smart homes also need to monitor fish tanks and potted plants. Smart homes mainly focus on improving the quality of living. Using the concept of home automation, we propose the smart home disaster prevention system which can reduce the pressure on residents to maintain the home environment.

2 Related Works

In [1], it mainly proposed that smart electric lamps need to be judged together with the external environment and sunlight in order to reduce the waste of electricity, and the smart power management system needs to be common to different household appliances. In [2], it mainly proposes a network security mechanism to ensure smart appliances, it was attacked by hackers, which led to accidents. In [2], it mainly proposed identity verification and private encryption mechanism of messages, so that legal users can access and control home appliances. In [3], algorithms are mainly used to judge households. The temperature fluctuation is reasonable, and the fire detection is further conducted through the algorithm. In [4], mainly judge the indoor and outdoor ventilation status, and further start the relevant home appliances, so that the temperature of the home can be reduced to the most suitable state. In [5], mainly design the distribution of sensors and servers, and need to consider the use of electricity and the network to reduce the waste of electricity in smart home appliances. In [6], the security of smart home networks is mainly proposed. Since smart homes mainly use Wi-Fi networks, Wi-Fi networks will have security problems. Therefore, the literature [6] mainly uses 4G mobile communication for network connection. The literature [7] mainly proposes energy theft detection. The literature [7] mainly uses algorithms to estimate the household electricity consumption compared with the electricity consumption of electricity meters. To determine whether power has been stolen.

3 The Proposed Scheme

This paper proposed a smart home disaster prevention system based on the IoT and wireless networks. In addition to improving the quality of family life, it also performs disaster detection functions. The functions of the smart home disaster prevention system are as follows: 1. Real-time monitoring of the home environment And safety issues, 2.

indoor temperature and humidity sensing, 3. pot temperature and humidity sensing, 4. disaster detection, 5. fish tank water level detection. From the experimental results, the proposed system is implemented. It can also improve the quality of life.

3.1 System Model

The function diagram of the system is shown in Fig. 1. The proposed system controls the equipment through Bluetooth and relays and construct an IoT environment within wireless networks. The main functions of this article are indoor temperature and humidity detection, watering prompt, abnormal gas concentration sensing and fish tank reminders for adding water. The system proposed in this article is based on normal sensors. Therefore, the price is reasonable and easy to deploy the system. In addition, this system can detect whether there is a disaster through abnormal gas concentration sensing and flame sensor to ensure the safety and life of the family quality.

3.2 The Proposed Scheme

This article mainly uses Bluetooth and relays to control home appliances. The functions are: 1. Real-time monitoring of home environment and safety issues, 2. Indoor temperature and humidity sensing, 3. Pot temperature and humidity sensing, 4. Disaster detection, 5. Fish tank water level detection. The temperature and humidity sensors are installed in the system, if the temperature and humidity are higher than the threshold, household appliances that can adjust the temperature and humidity will be activated. In addition, a soil sensor is installed in the pot to detect the temperature in the soil. When the humidity is too low, the sprinkler system will be activated. In this paper, a flame sensor and abnormal gas concentration sensing will be putted in the hazardous area. When the sensor is activated, an alarm will be issued to inform the residents of the danger of disaster. The fish tank is equipped with a water level sensor. When the water level is lower than the standard, it will send a prompt message to inform the user that water needs to be added. The method in this article mainly uses the parity sensor, which can mainly popularize the system in various households. The development process of this article is shown in Fig. 1.

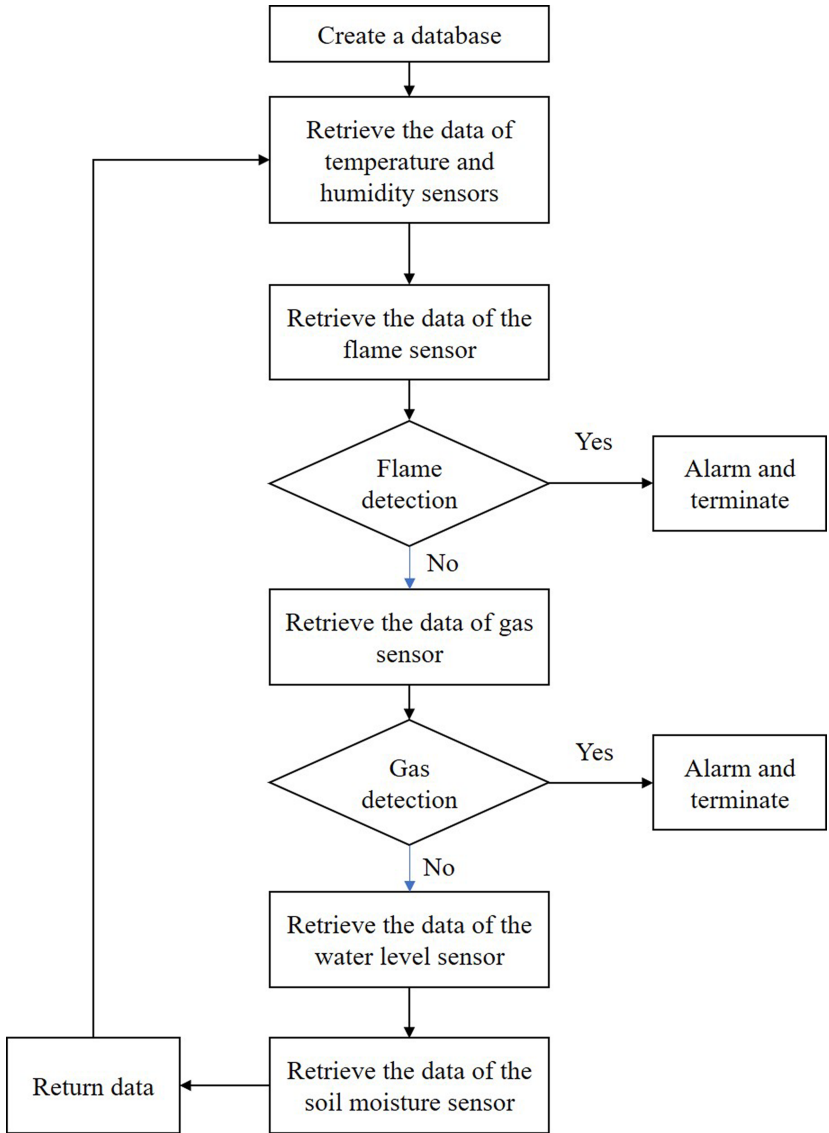


Fig. 1. Development flow chart

4 Experiment Result

There are the proposed system development and testing, as shown in Figs. 2–5. Figure 2 is the environmental numerical values. Figure 3 is the Bluetooth relay. Figure 4 is the remote control. Figure 5 is the physical test.

	ID	Humidity	Temperature	Liquid	Mositure	Fi
	Filter	Filter	Filter	Filter	Filter	Fi
1	1	30	24	736	31	0
2	2	30	24	741	383	0
3	3	30	24	664	656	0
4	4	31	24	703	369	0
5	5	30	24	696	401	0
6	6	30	24	699	366	0
7	7	30	24	734	109	0
8	8	59	30	876	105	0
9	9	60	30	635	94	0
10	10	60	28	872	118	0
11	11	60	28	810	126	0
12	12	60	28	892	100	0
13	13	60	28	637	122	0

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Fig. 2. The environment data

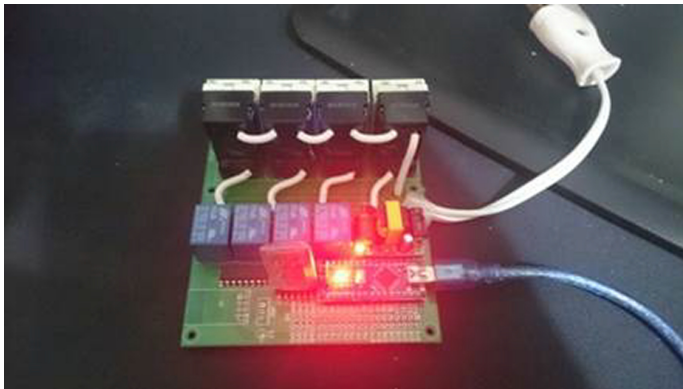


Fig. 3. Bluetooth relay



Fig. 4. Remote control

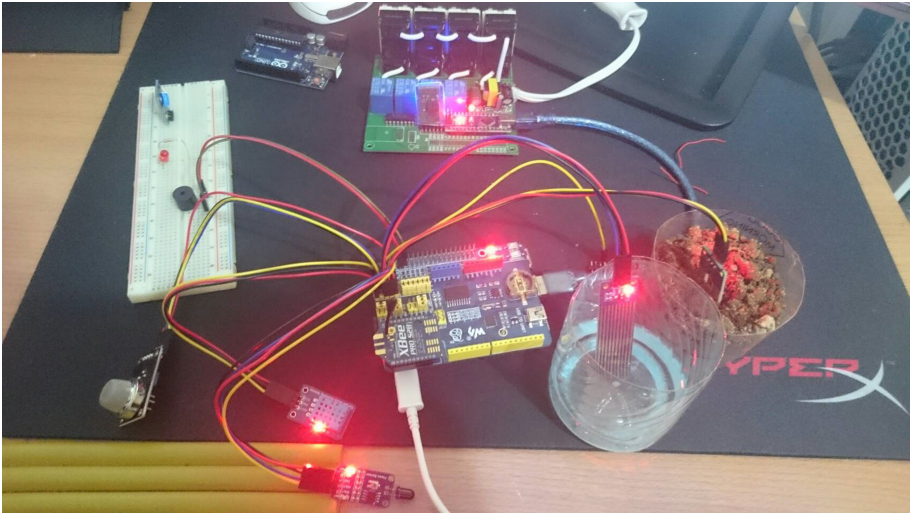


Fig. 5. Physical diagram

5 Conclusion

The system proposed in this article already has temperature and humidity, flame, gas and other sensors. Environmental monitoring of home and integration of mobile devices makes the system monitoring more intelligent. In addition, we also combine Chinese voice synthesis system, let users embrace more functional choices, to provide the safe monitoring for the home environment. The system proposed in this article is mainly based on parity. In the future, the system will be productized and can be introduced into various households.

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