A Research on An Intelligent & Automatic Help Seeking System

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Abstract. The safety of all the factories and families should not be ignored. In this paper, in case of emergency, people in factories or at home can still send out a distress signal through voice without mobile phone, so as to ensure the safety of people and facilities. The authors have developed a smart home help for the elderly device based on communication, intelligent manufacturing, materials and digital simulation technology. The main purpose is to solve the problem that when the elderly are alone at home, they can make an emergency call for help through this system when they encounter sudden accidents. This technology is also very suitable for the safety of factories and other scenes.

1. Introduction
The intelligent & automatic help seeking device in this paper originated from a group of enthusiastic and caring young people. With China entering an aging society, the number of elderly people over 60 years old is increasing rapidly, and the number of "empty nesters" living alone and widowed is also growing at an unprecedented rate. In 2020, the number of empty nesters in China has reached 100 million, and these empty nesters have many potential safety hazards in living alone, such as fall, fire, gas poisoning. The research and invention of the ‘Intelligent & Automatic Help Seeking System’ (IAHSS for short) is to solve the problem that when the elderly are alone at home, when they encounter sudden accidents, although the elderly can't move, they can still make a sound. It has positive social significance and broad economic prospects. Such as in a factory, if an employee can't get a mobile phone due to sudden illnesses or emergency, his/her body can not move, but can still make a sound, the IAHSS in the factory can be activated by voice control to send out a distress signal, so as to ensure the safety of factory property and employees.

2. Cases & Schemes
First of all, let's read a domestic tragedy on June 28, 2019 as follows.
2.1. Cases
Since people's living standards have improved, many people will choose holidays to travel to relax. On June 23, a tragedy happened in a community in the north of Xi'an city. A couple went out and came back. After opening the door, they found that their mother died of sudden illness and their child died of starvation. It happened in Xi'an. The couple went on a trip and told their mother and children before they left. Then they called back on the June 16th without reply. After that, they didn't care too much and continued to enjoy their holiday. On the 25th, when they returned home with the hope that they would see their be-loved baby and mother, but the scene in front of them made them cry bitterly.

According to the investigation, the cause of the death of the old lady may be cerebral hemorrhage or sudden myocardial infarction, while the child is only 1 year old, since the couple left home for more than 10 days, and they could not get through when they called on the date June 16th. For such a long time, the one-year-old baby was also starved to death.

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2.2. Schemes
There might be 3 schemes to avoid the above tragedy.

(1) Scheme 1: from the perspective of traditional Chinese culture, people should follow the principle of "when you go out or come back, you must let your parents know", keep contact with their parents in time, and entrust their relatives or neighbors to take care of them in case of any abnormality, so as to avoid similar tragedies.

(2) Scheme 2: when the old lady falls down in an emergency, but she can get a phone or touch other rescue devices (there are many similar household emergency alarms at present), she can send out help signals and avoid similar tragedies. However, if the old man can't move, he can't be rescued.

(3) Scheme 3: when the old lady falls down in an emergency, but her hands, feet and body can't move, but she can make a sound. The voice control device of this project will send out a help signal, which can also avoid similar tragedies. Note: it is necessary to develop a voice controlled help seeking device like IAHSS!

3. Innovativeness
Many home devices now have voice control functions in recent years, such as mobile phone voice intelligent search, Baidu voice map, Xiaomi voice speaker and so on. These devices are composed of home devices, transceivers, intelligent switch panels, speech recognition devices, signal processors and controllers. Speech recognition devices receive speech signals from different home devices through transceivers. After recognition, the recognized signals are processed by signal processors and independently controlled by intelligent switch panels connected with controllers. However, after consulting Baidu intelligent voice platform and Himalayan intelligent voice platform, they all replied that they had not officially developed voice help devices yet.

The patent agency of Rongjiu in Liuzhou city was commissioned to check the novelty. Two public intelligent voice monitoring systems retrieved from the domestic patent platform are as follows:

(1) An intelligent voice monitoring system and method (invention) cn201610697351.1
(2) Voice monitoring alarm method and system (invention) 201811624228.2

4. Results
The IAHSS takes "elderly people’s treasure - a family security system" (which has registered software copyright in China, Registration No. is 2020SR0304037) as an example, which can be widely used in various scenes.
4.1. Operating environment
The IAHSS is a set of software running in the environment of Linux embedded operating system and windows 10, 64 bit operating system. In order to achieve the original design purpose and play its maximum function, the host equipment must meet the following basic conditions:

- CPU: arm above 1.5GHz
- Memory: 1024 MB, 2048 MB recommended
- Hard disk: more than 20GB of free space is required on the system drive
- Display: 7-inch and above HD display, screen resolution above 1024 * 768, 1024 * 768 is recommended (color set to 256 colors or higher)
- Mouse: Microsoft Mouse
- Touch screen: capacitive multi-point touch screen

4.2. System software and development language
This software uses Python language to develop under Windows system, python language syntax is elegant, no special symbols such as braces, semicolons and so on, which represents a minimalist design idea; Python has high portability, which can be transplanted to most platforms, such as windows, MacOS, Linux, andorid, IOS and so on; the program written in Python language does not need to be written To compile into binary code, you can run the program directly from the source code. Compared with most computer programming languages, they are compiled. Before running, you need to compile the source code into a binary code format that can be executed by the operating system. The compilation process of such a large project is very time-consuming. Python is inside the computer, and the Python interpreter converts the source code into It is called the intermediate form of bytecode, and then translates it into the machine language used by the computer and runs it. Python language has strong scalability. In the process of Python project development, python can be written in a mixed language, such as C language and Java language, in addition to using Python language itself. Python also has rich and powerful third-party libraries, such as developing web and crawler Scientific calculation, data statistics and so on, which is also the reason why we choose Python language for programming and development.

4.3. Software function
The IAHSS has a background service system by writing in the emergency contact number, binding the system, double clicking the software icon and clicking start, the software automatically turns to the background operation. When the old man's treasure family security system picks up the voice signal for help through the far-field microphone array and recognizes it. After the old man's treasure family security system confirms the set key words for help, the old man's treasure family security system will automatically send the help information to the emergency contact's mobile phone through SMS in the background, and will also automatically dial the voice call to the emergency contact's mobile phone.

The default key word is help. Before starting the software, you need to fill in the emergency contact number correctly and completely. If you do not fill in the correct information and call for help, you will not be able to send out. After clicking the start button, the software will automatically minimize to the background of the system and run automatically.

4.4. Appearance
The first generation of the IAHASS has been successfully debugged. See the figures below for details.
5. Conclusions
Relying on the "intelligent materials and digital simulation studio" of Liuzhou Vocational and technical college, members include teachers and enterprise experts with professional background from the College of mechanical and electrical engineering, College of electronic information engineering, and College of environment and food engineering. At present, they have obtained one software copyright of Intelligent & Automatic Help Seeking System software (family security system), registration number: 2020SR0304037, and the software platform development is completed on September 5, 2019. The electronic module and mechanical module have been basically developed and improved, and can be used in various scenarios, including the safety protection of lithium battery factory.

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