OVERVIEW

With the vivid development of web, telecommunication and sensors technology, devices now can obtain different kind of data with low-cost sensors and share the data between devices easily and fast. These new generation devices are called smart device. They are electronic devices, which can autonomously connect to and interact with its users and other devices via different wireless technology, for example, Wi-Fi, Bluetooth. Smart home system is also a smart device and able to acquire environment information of dwellings with different sensors, analyse these data automatically and control home appliances wirelessly. With these functions, smart home can be context-aware and optimize users’ comfort according to the condition of the home. For enhancing the quality of users’ life, smart home system must have a fast response to users’ condition. However, the software in smart home is the main pain point.

An inefficient design of the software in smart home system result in a slow response to users’ needs, becoming an obstacle for improving the quality of life.

Moreover, the price of smart home devices nowadays is relatively high. A cheaper smart home device should be developed and it is beneficial for promoting the smart home technology.

Finally, in order to improve the public’s ease of using smart home devices, fewer setup steps should be developed for the smart home system. A faster, easy-to-use and cheaper design for smart home is needed.

OBJECTIVES

• Efficient software includes efficient backend and frontend system, reducing the response time of the smart home system.

• Plug-and-play setup process means that the system can be used after network cable and power are plugged into the system.

• The components we use in this project will be as cheaper as possible, reducing the cost to a reasonable level.

SYSTEM DIAGRAM

RESULTS

Figure 1: The system diagram of the smart home system

Figure 2: The system diagram of the ESP8266 part

Fast responding software

All the functions of the whole smart home system, including controlling the appliances and reading data from sensors, successfully fulfill the requirement, which is responding within 3s. Although the network quality of the user will affect the result, all the functions are able to respond in no time.

User-friendly

The system of Raspberry pi functions normally after plugging the network and power cable. Although the ESP8266 is not able to set up automatically, the universal access to the system still works after setting up the ESP8266.

Lower cost

The whole smart home system in our group includes the hub, sensors and controller. It is compared with the similar products, Samsung SmartThings. Samsung SmartThings costs $2007 HKD. My smart home costs $1078 HKD, which is almost two times cheaper than both products.

Figure 3: The screenshot of Telegram user-interface