

Epidemic-proof smart dorm system based on STM32

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Abstract: With the frequent occurrence of public health incidents in recent years, the health and safety management of dormitories, as the main place for students' daily life, has received increasing attention. In order to more effectively respond to public health emergencies and protect the health and safety of student rest areas, a hardware point cloud interconnected dormitory monitoring and early warning design scheme is proposed by combining IoT technology and image processing recognition technology. This paper designs a smart epidemic prevention dormitory system based on a micro-controller, focusing on monitoring and controlling the dormitory environment, including temperature, humidity, air quality, and lighting, providing real-time monitoring and alarm functions. The integration of IoT, image processing, and micro-controller technology in the system makes it a solution for dormitory management, providing a comprehensive and efficient way to monitor and control the dormitory environment.

Keywords: Smart dormitory, Internet of Things, Embedded System, Real-Time Operating System, Feature Detection

1. Introduction

With the frequent occurrence of public health incidents in recent years, the invasion of viruses and bacteria into the human body has caused epidemics that pose a threat to the health and safety of all humanity. Since the COVID-19 epidemic, the unknown epidemic caused by viral and bacterial infection has made us more afraid. How to prevent the unknown epidemic has become another important problem that people face. Dormitories, as the main place for students' daily life, are also a key area for the breeding and transmission of infectious diseases. People's attention to health is increasing. Campuses are important places with high population density, and epidemic prevention work in student dormitories is particularly important.

In today's society, smart dormitory systems are gradually becoming an important part of improving the quality of campus life^[1]. With the development of Internet of Things (IoT) technology, the intelligent management of student dormitory environments has gained widespread attention^[2]. Traditional dormitory management methods typically rely on manual inspection and maintenance, which are inefficient and prone to errors^[3]. In contrast, smart dormitory systems integrate various sensors and control modules to achieve automated environmental monitoring, device control, and security management, significantly improving management efficiency and dormitory safety^[4].

The goal of this study is to design and implement a smart epidemic prevention dormitory system based on STM32 micro-controller. By integrating various sensors and communication modules, the system aims to achieve intelligent monitoring and control of the dormitory environment to prevent unknown epidemics. This article will provide a detailed introduction to the hardware design and software implementation of the system.

2. Core Control Board and Module Integration

This system takes intelligent dormitory as the research object, which uses STM32F103 as the main control system to control other modules, among which there are ESP8266 WIFI module, GY-906 infrared temperature measurement module, RC522 swipe card module, resistive serial screen, environment detection module (temperature, humidity, smoke, etc.), and disinfecting module (nebulizer, etc.). At the same time, V831 is used for face detection and the processed data is sent to STM32F103 through the serial port, and the corresponding modules are controlled according to the face data information it sends. The specific hardware system design is shown in Figure 1