ISSN: 2664-9640

A new water waste collection and water quality testing device

Yipeng Zang, Hao Liu, Longxi Yan, Yitong Wang, Chao Zhang

College of Physics and Electronic Engineering, Taishan University, China

Abstract

The water rubbish collection and water quality testing device based on stm32 microcontroller and GPRS communication technology has technical functions such as rubbish collection, oil film adsorption, water quality testing and data statistics. The device mainly consists of two parts: rubbish collection and water quality testing. The rubbish collection part can realize the collection of floating rubbish on water; the water quality testing part can realize the real-time monitoring of water quality and environmental information such as PH value, water temperature and turbidity through sensors and upload to the server to realize the analysis and protection of water resources.

Keywords

Microcontroller, water waste collection, water quality detection, GPRS communication technology.

1. Introduction

With the development of industry and society, the problem of water resources pollution is becoming more and more prominent, and the pressure on water resources per capita is increasing. Water quality testing and water waste collection and disposal have become an essential part of the process. The existing traditional water waste collection methods often require a lot of human and material resources are no longer adapted to the development of society, and the demand for its key technologies cannot be met. Therefore, in view of the problem of water pollution, this paper designs an intelligent water waste collection and water quality detection device, which mainly uses STM32 as the main control, the water pump provides suction for the bin, so that the surrounding water flow continuously enters the inside of the bin, and the floating rubbish enters the bin at the same time with the water flow to achieve the collection of water waste. The water pump provides the suction for the collection of floating waste on the water and uses the siphon principle to drive the floating waste into the bin through the water flow.

1 Overall system design

In this paper, a water waste collection and water quality testing device is designed, which mainly uses the stm32 main control, GPRS communication module, water quality testing sensor and terminal display modules. The water waste collection part can realize the collection and treatment of floating waste and oil pollution on the water; the water quality detection part can realize the real-time monitoring of water temperature, PH value, water turbidity and other parameters that affect water quality. The system will also record the historical data of water quality changes, so that users can have a more intuitive and detailed understanding of the water quality changes in the basin during a certain period of time. The system uses stm32 as the main control chip, through the Internet for data transmission, to complete the water waste collection part of the working state and the water quality changes and other information for real-time monitoring and feedback.

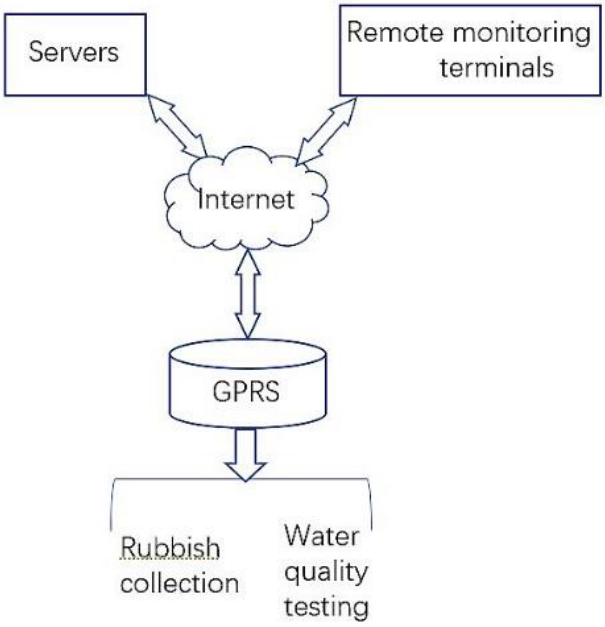

Figure 1 General framework of the system

2. System procedure flow

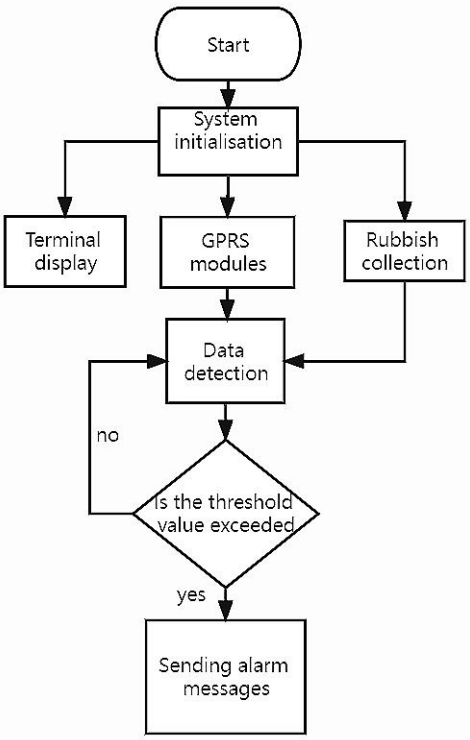

Figure 2 Program flow diagram

The main control of the project adopts the stm32 microcontroller with high compatibility and strong processing performance to drive each transmission module, so that each module cooperates with each other to complete the collection, processing and sending of data, while ensuring the stable operation of the system. The water waste collection part will be provided

by the pump to provide suction for the waste bin, so that the water flow continuously into the inside of the waste bin, the floating waste along with the water flow into the waste bin at the same time, to achieve the collection of water waste. The filter screen is designed with ultra-dense pores to collect floating waste and also to filter out oil and dirt from the water. The screen is removable for easy collection and maintenance of the equipment.

For water quality detection, we use modules such as turbidity sensor, PH sensor and temperature sensor to obtain the corresponding data. The signals collected by the sensors are processed by the stm32 microcontroller and uploaded through GPRS network technology. The cloud server stores and processes the data, and the user can view the processed data in the terminal device, which facilitates the real-time monitoring of the river water quality.

3. System hardware design

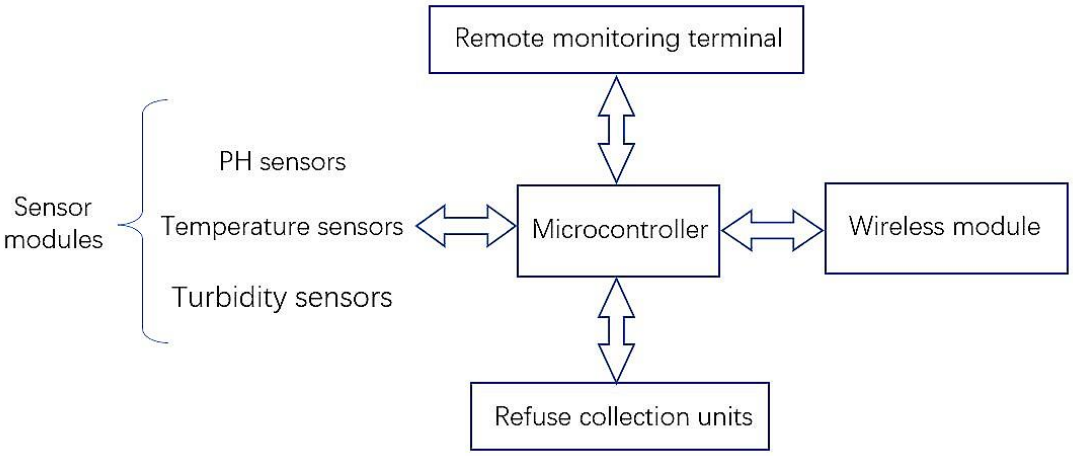

Figure 3 System hardware deployment diagram

References

[1] Shuyan Fan. Circuit design of serial communication interface between microcomputer and microcontroller [J]. Computer Products and Circulation, 2020 (08).
[2] Dianchen Wang. Research on the speed control method of DC motor based on STC microcontroller [J]. Computer Products and Circulation, 2020 (07).
[3] Yinghua Lu.Electronic System Design Tutorial, Second Edition, National Defense Industry Press，2015.