

中文题目：煤矿井下探测机器人远程监控系统设计

外文题目：Design of remote monitoring system for
underground exploration robot in coal mine

摘要

煤矿井下的安全问题是目前的煤矿工作中的主要问题。所以做好易燃气体和有毒气体泄漏的检测工作显得十分重要。所以对井下的环境进行实时监测，对井下的情况进行判断对井下安全作业有着至关重要的作用。

本文设计了的基于物联网的煤矿井下远程无线监控机器人，能够对环境信息进行采集，可通过上位机进行查看。本设计采用了开源的 NodeMCU 物联网平台通过可燃气体传感器 MQ4 和大气压力传感器 BMP180 以及温湿度传感器 DHT22 进行读取，对井下环境气体中的温度、甲烷含量以及气压进行检测并通过 WIFI 进行传输。采用海康威视的摄像头采集图像。通过对海康威视 SDK 的二次开发在电脑上进行显示数据。机器人的运动模块驱动双电机可以控制机器人行进。

采集的环境数据与视频流显示在上位机上。达到了对井下环境信息的采集和无线传输并显示。完成了设计指标。

关键词：气体检测；远程监控；单片机；无线传输

Abstract

The safety of underground coal mine is the main problem in the present coal mine work. Therefore, it is very important to do a good job in the detection of flammable gas and toxic gas leakage. Therefore, it is very important to monitor the underground environment and judge the underground conditions

This paper designs a remote wireless monitoring robot based on the Internet of things in underground coal mines, which can collect environmental information and be viewed by the upper computer. This design adopts the open source NodeMCU Internet of things platform to read the combustible gas sensor MQ4, the atmospheric pressure sensor BMP180 and the temperature and humidity sensor DHT22, to detect the temperature, methane content and pressure in the downhole environmental gas and transmit it through WIFI. Hikvision's camera is used to collect images. Display data on the computer through secondary development of hikvision SDK. The dual motor driven by the robot's motion module can control the robot's movement.

The collected environment data and video stream are displayed on the upper computer. The underground environment information is collected and displayed wirelessly. Design indicators have been completed.

Key words: gas detection; Remote monitoring; Single chip microcomputer; Wireless transmission

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