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A Semi-Autonomous Coal Mine Monitoring Security System Based on Wireless Control Using RTOS

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ABSTRACT

Novel coal mine administration framework to tackle the ongoing observing and profoundly effective safeguard issues of underground work stages. In this paper proposing a robot that has the fitness to identify the covered mine and let the client control it remotely to stay away from others conscious causalities. The robot is outfitted with exceptional wheels controlled by H-Bridge module, enabling it to move in every single conceivable bearing. In this venture we concentrate on the security of people and the robot; the robot is outfitted with unique range sensors that assistance in staying away from the snags in the field by extraordinarily recognizing the position of obstructions. For the manufacture of the venture, a unique model made of lightweight temperature safe metal is utilized on which every one of the articles is conveyed. Gas immediate, mischance help ask for, video gushing and voice declaration are the extra components of this framework. Advance, a remote ZigBee is added to the robot, which gets the constant estimations of flame, temperature. ARM microcontroller charges the robot. The camcorder connection to the gadget will transmit the picture in the Motion-JPEG arrange alongside a speaker who will enable us to send the crisis charge with the assistance of the voice message device. The application firmware keeps running on top of a RTOS to deal with multitasking prerequisites of the framework. This strategy has a down to earth profit if diminishing the quantity of causalities, after the execution of the procedure; the robot can be controlled productively with slightest buffering time.

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1. INTRODUCTION

Creation level of mines is still low, especially since of late, catastrophes of mine happen every now and again, which prompts awesome loss of ownership and life. Wellbeing is the real issue of mine which has bit by bit turns into the engaged issue of the country and society worry on. The fiascos of coal incident are because of the many-sided quality of mine condition and the assortment of work state of mine, so it is essential to screen mine workplace [1]. Nature inside any mine is hazardous. To test and gather data on the different hubs is troublesome for mine venture [2]. The outline of checking framework for mine wellbeing developed microcontroller and remote sensors and system can be utilized to defeat these issues. A reasonable, adaptable, persistent observing arrangement of underground digger's assurance and security turns into an important assignment [3].

A microcontroller based framework is utilized for gathering and putting away information and settling on choice as needs are, founded in which the digger is educated through various alert tone and also voice framework [4]. The voice frame with both amplifier and speaker changed over into advanced flag and adequately discuss remotely with the ground control focus PC structure. The correspondence framework is

stable in light of ZigBee, IEEE 802.15.4 standard [7]. This is utilized for transmission between the equipment circuit fitted with the excavators and the ground control focus PC framework through a few switches [5].

Conventional mine is checking frames tend to be wired system structures, which assume a vital part in mine protected generation. Because of constant broadening of abusing territories and expansion of profundity in mine, it is important to screen daze regions, where heaps of shrouded perils are available [6]. Additionally, it is poorly designed to lay links which are costly and devour time. To tackle above issues, the proposed mine security observing framework in light of remote sensor system can enhance the level of checking generation wellbeing and decrease mishap in the mine [8].

2. WORKING PRINCIPLE

The framework structure is created utilising two remote sensor hubs, one is a settled centre, and another is a portable information procurement sensor hub. These hubs are utilized to screen the different ecological parameters inside the underground coal mine.

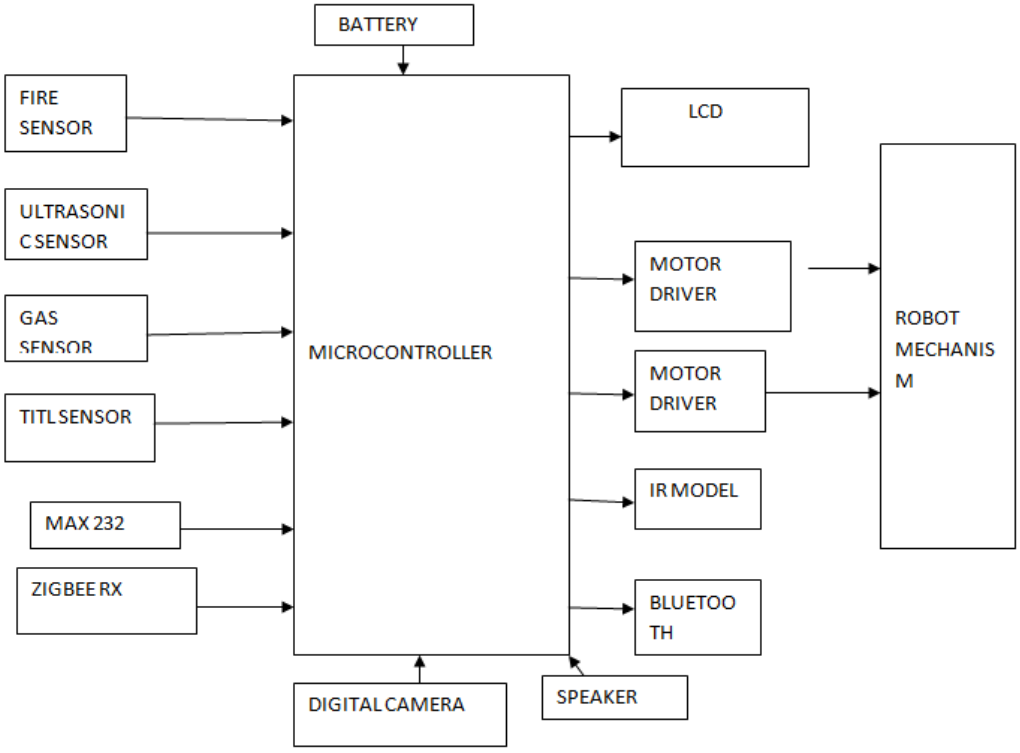

Figure 1. Coal Mine Monitoring System

The framework will be as a wheeled vehicle after that distinctive sensors are joined. Right off the bat, the correspondence between the base station and the mining area is accomplished through remote ZigBee [9]-[10] innovation. The fire sensor will help us to distinguish any upheaval of the fire in the working range; gas alarm is being made conceivable with the utilization of gas sensor. If there is a temperamental temperature which endures in the work region, then the accompanying can be related to the assistance of temperature sensor. If there should arise an occurrence of an avalanche, the tilt sensor will educate the framework.

The accompanying data from the sensors will be given to the base station structures, which will alarm the office to send prompt offer assistance. The robot can powerfully decide the position of the snag utilizing the ultrasonic sensor. Aside from this there is a camcorder connection which will live stream the pictures to the base station. The speaker will enable us to send the crisis summons with the assistance of voice message instrument. Every one of these must be constant, in this way the framework utilizes RTOS for the handling of the flag transmission.

3. RESULTS AND DISCUSSIONS

This stage contains a plan of sensor hubs which are in charge of the accumulation of ecological parameters and sending the gathered information. Testing the yield of various sensors will be conveyed by considering gas sensors, temperature and dampness sensors, and so on. The equipment structure of the remote sensor arranges hub is as appeared in the information obtaining module is utilized for detecting, gathering data and changing over to advance signs. The remote correspondence module is essentially in charge of speaking with different hubs.

Figure 3. Hardware Implementation of Coal Mine Monitoring System

4. CONCLUSION

In this application checking of the underground coal mine framework in light of wired and also remote system so the critical issue of correspondence data transmission, consistent observing and wellbeing have been comprehended before the dangers happen. If there should arise an occurrence of the debacle, the framework will find the mineworker's which are caught inside underground coal mine. This will comprehend the time taken for protect work since it is computerized increment life security of rescuers and coal excavators. Portal hub will speak with PC through serial correspondence. Door centre is an excellent hub in sensor arranges which is in charge of the communication amongst PC and sensor organizes. It is arranged close ground observing focus. The proposed framework can lessen the mishaps and perils which happen in various sorts of mines. Natural parameters like temperature, mugginess, gas can be observed and controlled with the assistance of remote sensor systems. This framework is not so much cumbersome but rather more exact than conventional wired structure.

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