

COAL MINE SAFETY AND HEALTH MONITORING SYSTEM

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ABSTRACT

The application of wireless sensor network in coal mine safety intelligent monitoring system is proposed, this paper discusses the principle.

The wireless sensor network advantages and the design basis of wireless sensor network in intelligent monitoring system of coal mine safety. Based on the current situation and existing problems of the low level of intelligence of coal mine safety monitoring system, the design scheme and monitoring mechanism of coal mine safety intelligent monitoring system are proposed, and the feasibility of wireless sensor network in the application of coal mine safety intelligent monitoring system is discussed.

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Keywords

coal-mine safety, wireless sensor network, existing system, monitoring mechanism, advantages and disadvantages of coal mine monitoring system

1.INTRODUCTION

Wireless sensors are widely used in industrial automation detection and monitoring because of their advantages such as low power consumption, small size and free from space restrictions. The network formed by the combination of wireless sensors as terminal nodes and computer control platform is widely used in many industries. This paper first introduces the characteristics of wireless sensor network and its application. An analyzes the current situation and requirements of coal mine safety monitoring system.

Finally analyzes the development and design implementation of wireless sensor network in coal mine safety monitoring system.

2.RELATED WORK:-

- 1.Coal mine operatives detonate charges and use cutting equipment to extract coal from coal faces, build and dismantle roof and wall supports in underground coal workings, and transport coal and other material from the coal face.
- 2.IOT based coal mine safety monitoring and alerting system project is proposed for the purpose of implementing security and detection of hazards inside a coal mine. The transmitter module has temperature, smoke, and methane sensors installed in it. The transmitter module also carries an LCD and an RF transmitter
3. Over time, monitoring provides the operator with a history of the stability of the mine opening, allowing for the installation of additional support where needed or the removal of personnel and equipment from potentially hazardous situations.

4.The extraction of coal from the field is known as coal mining. Coal is used as a fuel in the steeland cement industry to extract iron from ore and to manufacture cement. Every parameter in the underground mining industry must be controlled on a regular basis, including methane gas, high temperatures, fire incidents, and so on. The level of safety in coal mines is still poor, resulting in fatalities. A coal mineshaft salvage action is profoundly perilous because of various elements.

5.The disasters happening in coal mine are due to the complexity of mine environment and the variety of work carried out in coal mine, so it is very necessary to monitor the working environment of coal mine. To get over this problem, Nevon projects has proposed a wireless sensor network' s application in coal mining safety system Coal mining is the process of extracting coal from the ground. Steel and cement industries use coal as a fuel for extraction of iron from iron ore and for cement production. Underground mining industry comes to the category, where each and every parameter such as methane gas, high temperature, fire accidents and so on has to be monitored regularly. Safe production level of coal mine is still low, disasters in coal mine occur frequently, which lead to great loss of possession and life.

3. EXISTING SYSTEM

In this paper, real-time monitoring and collection of data and information of down hole operation area are sent to ground monitoring center through the optical fiber backbone network.It integrated the telemetry and control technology, sensor technology, embedded computing technology, distributed information processing technology.Its a simple operation, but maintenance is high.High cost for spending in purchasing the cables.

3.PROPOSED SYSTEM

In this proposed system, we are used three type micro-controllers. They are ESP8266, Arduino Uno and NODE MCU.The ESP8266 are used to Monitoring the coal mine parameters at the different places. Which they are worked as transmitter side with wireless network.An Arduino Uno worked as base station. Which is collect an information from ESP8266.

In additionally, the NodeMCU are used to send the information of Coal mine parameters to IOT through the controller.At the same time, the values are displayed in the LCD display.

In this system we are monitoring the temperature level, Gas level and Light density level. Separate batteries are used to provide the power supply to the each one micro-controllers.

4. BLOCK DIAGRAM AND WORKING:-

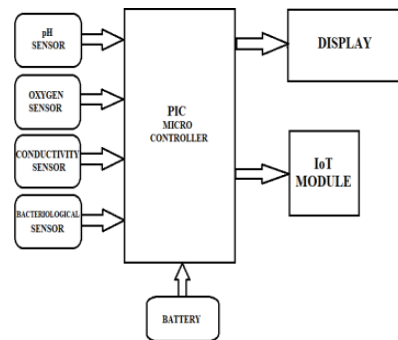


Fig 4. Block Diagram

Esp8266Sensor.

The Esp8266 is a low-cost, low-power, WiFi-enabled microcontroller that can be used for a variety of sensor application

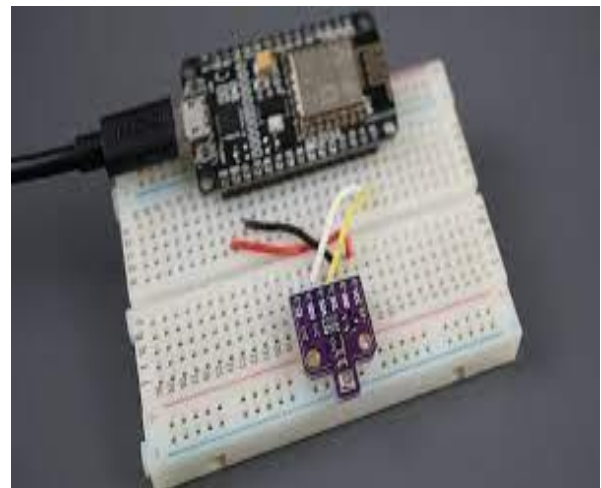


Fig 4.1 ESP8266Sensor

TEMPERATURE SENSORS:

The ESP8266 can be connected to sensors to measure temperature and humidity. This data can be transmitted over WiFi to a server or displayed on a local web page.

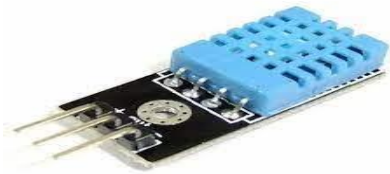


Fig 4.2 Temperature Sensor

4.3.LIGHT SENSORS

The ESP8266 can be used with light sensors to detect the amount of light in a room. This can be used to automatically adjust the lighting in a room or to trigger an alarm if a room is too dark.



Fig 4.3 Light Sensor

GAS SENSORS:

The ESP8266 can be used with gas sensors such as the MQ-2 to detect the presence of various gases. This can be used for safety applications, such as detecting the presence of carbon monoxide.



Fig 4.4 Gas Sensor

ARDUINO UNO

The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms.



Fig4.3 Arduino Uno

LITHIUM BATTERY

A lithium-ion (Li-ion) battery is an advanced battery technology that uses lithium ions as a key component of its electrochemistry. During a discharge cycle, lithium atoms in the anode are ionized and separated from their electrons. It is a soft, silvery-white alkali metal. Under standard conditions, it is the least dense metal and the least dense solid element.

4. CONCLUSIONS

In view of the problem that the mine safety monitoring system information is not deeply mined at present, this paper puts forward the application of data mining technology in this system, puts forward an intelligent monitoring coal mine safety based on wireless sensor, obtains the instructive information for the mine production management, and provides effective decision-making information for the management. Wireless sensor network (WSN), as a well-developed new technology for coal mine safety monitoring and observation, has gradually matured in the process of coal mine safety monitoring and management, and has made great progress and achievements. But wireless sensor network application in coal mine monitoring system in our country is still in its infancy, and its application range is extended to as much as possible in the field of industry, thus strengthen the wireless sensor network in all kinds of effective application in the process of coal mine safety monitoring.

In mining, exploration and other fields of industrial survey to bring more convenience to people, at the same time save a lot of man power and time investment, improve work efficiency.

5. REFERENCES

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