International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 05 | May 2020 www.irjet.net p-ISSN: 2395-0072

Wireless Communication Systems and Health monitoring system For Mine Areas

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ABSTRACT: *Environment monitoring is important for the safety of underground coal mine production, and it is also an important application of Wireless Sensor Networks (WSNs). We put forward an integrated environment monitoring system for underground coal mine, which uses the existing Cable Monitoring System (CMS) as the main body and the WSN with multi-parameter monitoring as the supplementary technique are proposed and analyzed. Using gas sensor and temperature sensor we get the gas and temperature level of that place. Using heart rate sensor we get the present health update of the worker. Here we used nRF to send the data to the control Unit.*

***KEYWORDS*--- Mine Environment Monitering, Wireless RF communication, Mine areas, Mine Employees Health management.**

1. INTRODUCTION

The environment in underground mines is harsh and inhospitable. Temperature and pressure readings are always on the higher side. As we move closer to the earth's crust, the temperature and pressure increase. Periodic measurement of temperature, pressure and humidity is necessary in order to assess the mining environment. Measurement of these parameters using conventional wired method is unreliable and requires periodic maintainance. A portable wireless indicator for measurement of these parameters is useful in the underground mines. Using this indicator, the operator can communicate with multiple transmitters much more efficiently. There Wireless sensor networks are widely implemented in underground mines. A underground mobile wireless mobile sensor network (UMWSN) is proposed. ZigBee based communication system is one of the popular methods in 2.4 GHz frequency channel category for underground mines. During landslide or damage of nodes in underground mines, the underground wireless sensor network may suffer significantly. This is due to change in concentration in the communication medium. A portable wireless indicator is useful to the operator to communicate with multiple transmitters and this does not suffer any problem related to network damage. In polling multiple access method , one receiver sequentially communicates with multiple transmitters. Using this efficient method, the proposed portable wireless indicator can find out the status of multiple transmitters easily. This paper provides a design of a universal portable indicator, which can communicate with multiple transmitters. This indicator uses 433 MHz wireless communication channel as a communication medium. The indicator or receiver is made to communicate with three different transmitters of pressure, temperature and humidity. If the Identifiers (IDs) of the transmitters are known the operator can communicate with the transmitters easily. The paper provides a design of a Wireless communication and health monitoring system in mine areas, which can communicate with multiple sensors. This ardinuo uses NRF wireless communication as a communication medium. The indicator or receiver is made to communicate with three different transmitters of pressure, temperature and humidity. If the Identifiers (IDs) of the transmitters are known the operator can communicate with the transmitters easily.

2. EXISTING SYSTEM

In mine, the wired communication technique is used for monitoring. There is no wireless technology is available for monitoring. There is no wireless system for data transfer. It is not possible to monitor there sources.High cost and more time consumption

3. PROPOSED SYSTEM

Schematic diagram of the proposed communication system for humidity and temperature transmitter is shown in Fig. 1. The schematic diagram of the proposed communication system for pressure transmitter is shown in Fig. 2. The schematic diagrams can be divided into three different parts such as (a) temperature sensors, (b) Heart Beat sensor and (c) gas sensor. Here we proposed an advanced communication device for the coal workers. In this project we placed some sensors and controllers to monitor the environment. Using gas sensor and temperature sensor we find the gas level of this place and the atmospheric temperature respectively. Heart rate and body temperature sensor give the health status of the worker. Here we used some switches. Using this switched we send the emergency and some important predefined messages. This data will send to the control unit using NRF. PLX-DAQ

is a tool where we can store the values of each sensors in rows and columns.

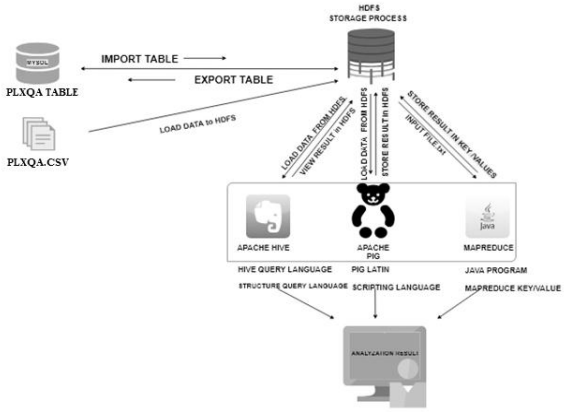

Figure.1.System Architecture

3.1APACHE HIVE

Apache Hive is a data warehouse software project built on top of Apache Hadoop for providing data query and analysis. Hive gives a SQL-like interface to query data stored in various databases and file systems that integrate with Hadoop. Traditional SQL queries must be implemented in the MapReduce Java API to execute SQL applications and queries over distributed data. Hive provides the necessary SQL abstraction to integrate SQL-like queries (HiveQL) into the underlying Java without the need to implement queries in the low-level Java API. Since most data warehousing applications work with SQL-based querying languages, Hive aids portability of SQL-based applications to Hadoop. While initially developed by Facebook, Apache Hive is used and developed by other companies such as Netflix and the Financial Industry Regulatory Authority (FINRA). Amazon maintains a software fork of Apache Hive included in Amazon Elastic MapReduce on Amazon Web Services.

3.2APACHE PIG

Apache Pig is a high-level platform for creating programs that run on Apache Hadoop. The language for this platform is called Pig Latin.Pig can execute its Hadoop jobs in MapReduce, Apache Tez, or Apache Spark. Pig Latin abstracts the programming from the Java MapReduce idiom into a notation which makes MapReduce programming high level, similar to that of SQL for relational database management systems. Pig Latin can be extended using user-defined functions (UDFs) which the user can write in Java, Python, JavaScript, Ruby or Groovy and then call directly from the language.

3.3MAP REDUCE

MapReduce is a programming model and an associated implementation for processing and generating big data sets with a parallel, distributed algorithm on a cluster.

A MapReduce program is composed of a map procedure, which performs filtering and sorting (such as sorting students by first name into queues, one queue for each name), and a reduce method, which performs a summary operation (such as counting the number of students in each queue, yielding name frequencies). The "MapReduce System" (also called "infrastructure" or "framework") orchestrates the processing by marshalling the distributed servers, running the various tasks in parallel, managing all communications and data transfers between the various parts of the system, and providing for redundancy and fault tolerance.

4. MODULE DESCRIPTION

4.1PREPROCESSING

In this module, analyzing the data with different kinds of fields in Microsoft Excel then it converted into comma delimited format which is said to be CSV (comma separator value) file and moved to MySQL backup through Database. Here by getting historical data we have to convert those historical batch processing data from (.XLSC) format to (.CSV) format and by taking backup of all those data in MYSQL Database to avoid loss of data.

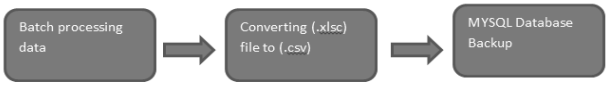

Figure.2.Preprocessing

4.2STORAGE

In this module we are getting all those backup data which we have stored in MYSQL and importing all those data by use of sqoop commands to HDFS(Hadoop Distributed File

System).now all the data are stored in HDFS were it is ready to get processed by use of hive.

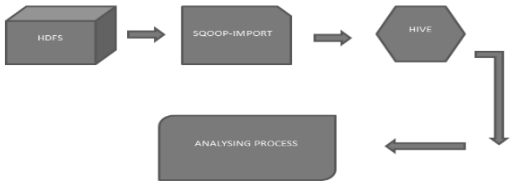

Figure.3.Storage

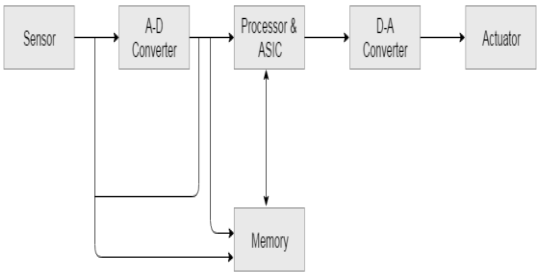

Figure.4. Embedded System

4.3ANALYSIS QUERY LANGUAGE (HIVE):

In this module we are getting all those data from HDFS to HIVE by use of sqoop import command .were hive is ready to analyze. Here in HIVE we can process only structured data to analyze by extracting only the meaningful data and neglecting unclenched data we can analyze the data in more effective manner by use of hive.

5. SYSTEM IMPLEMENTATION

5.1SYSTEM IS IMPLEMENTED IN EMBEDDED C

Embedded C is most popular programming language in software field for developing electronic gadgets. Each processor used in electronic system is associated with embedded software. Embedded C programming plays a key role in performing specific function by the processor. In day-to-day life we used many electronic devices such as mobile phone, washing machine, digital camera, etc. These all device working is based on microcontroller that are programmed by embedded C. The Embedded C code written in above block diagram is used for blinking the LED connected with Port0 of microcontroller

5.2EMBEDDED SYSTEM

Embedded System is composed of hardware, application software and real time operating system. It can be small independent system or large combinational system. Our Embedded System tutorial includes all topics of Embedded System such as characteristics, designing, processors, microcontrollers, tools, addressing modes, assembly language, interrupts, embedded c programming, led blinking, serial communication, lcd programming, keyboard programming, project implementation etc a system.

5.3SOURCE CODE

```
#define gas 3

#define temp A0

#define DHTTYPE DHT11

#include<DHT.h>

#include<LiquidCrystal.h>

LiquidCrystal lcd(8,9,10,11,12,13);

DHT dht(temp,DHT11);

unsigned int temp_state;

void setup() {

 // put your setup code here, to run once:

Serial.begin(9600);

lcd.begin(16,2);

dht.begin(9600);

pinMode(gas,INPUT);

pinMode(temp,INPUT);

lcd.clear();

lcd.setCursor(0,0);

lcd.print("HEALTH MONITORING");

lcd.setCursor(0,1);

lcd.print("SYSTEM");

delay(1000);

}
```

```
void loop() {

 // put your main code here, to run repeatedly:

  temp_state = dht.readTemperature();

 Serial.print("TEMP: ");Serial.println(temp_state);

 lcd.clear();

 lcd.setCursor(0,0);lcd.print("TEMPERATURE:
");lcd.print(temp_state);
```

6. CONCLUSION

In this paper, we presented a study on PLXAQ System data is to help and analyse. In Hadoop Ecosystem, we analyze the communication data for mine area data with best possible route alterations and dosage levels. In our future proposal, we will use Spark for real-time data for high speed processing of data.

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