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COAL MINE DETECTION MONITORING AND COMPUTING USING IOT

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Abstract- *The safety in the mining process is needed to save the number of human's life. The coal mining is deployed in the areas where the large amount of coal is extracted. So at the period of mining the monitoring of the various parameters using the sensors. In this paper they propose the monitoring of the light detection, leakage of the gas, temperature, humidity. The sensors are connected to the controller. When the sensor range is exceeded above the threshold value the buzzer will be ON to give the alert message. LDR sensor is used which can sense the presence of light. All the sensor data are updated in the IOT. The WIFI module is used in transmitting and receiving the data in the clouds. The data are plotted in the form of graph at each interval of time the cloud data is get updated. The data communication to the cloud occurs at the baud rate of 115200. This method can helpful in saving the employees in the danger situation.*

Keywords-- *Transceiver, WI-FI, Transmission time, Accuracy.*

I INTRODUCTION

In future technology the internet of things can plays a vital role. The world is get ruled by the advance technology like IOT. IOT is the vast platform in which enormous amount of data can be stored. The data are allocated and classified in the database. The data are get updated at each interval of time in the cloud. The cloud can communicate the data to the user at faster rate within the certain period of time. The commonly used internet of things technology in the embedded system is the think speak. The thing speak is the web portal which has the user ID and password for each one. The person should login with the own user ID. Inside the thing speak the data are showed in the form of graph. For each sensor the individual graph are generated. The data communication to the thing speak is made through the ESP8266 WIFI module. The WIFI module has the transmitting and receiving pin which can helps in the transferring of the data to the cloud. The ESP 8266 is interfaced with the controller. The sensors used in the coal mine detection are LDR, temperature, humidity, leakage of gas. The parameters can be monitored by the sensors. All the parameter are maintained a threshold value when the sensor value goes above the threshold value the buzzer will be on it will act as the alert message. The data communication to the controller is takes place at a specific frequency of about 9600 baud rate, where as the data communication to the cloud is made at the frequency range of about 115200 baud rate.

The sensor can helps in safety of the workers in the coal mining region. At the region of the coal mining there are lacks of safety any things will be happen at any time. So by implementing the proposed method it will save the life of the human. The sensors are connected to the digital pins of the controller the data are transmitted as 0 and

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1. The battery of about 12v is used in the movement of the robot which can be operated by the switch. Once the switched is get operated the power supply is fed in to the controller it will operate the sensor.

Each set of frequency is put forwarded in this method for the varying range depends upon the environment. The environmental characteristics have been monitored at each period of time. So this method can faces the several challenges in the surrounding environment created at the time of coal mining. In future the technology has been improved by the use of robot which can able to perform all the activities will be performed by the human.

II LITERATURE SURVEY

L. S. Hao et., al., proposed the mine detection in the underground layer can be analyzed through the radio frequency signal. The antenna is placed in the transmitting and the receiving area. If the antenna fails to connect or the frequency is not better it fails to form the data path. So in this paper they propose the pluggable based low frequency antenna. The antenna in involve in three different sets of frequencies in the range of 12 MHz, 24 MHz and 45MHz. Due to the presence of various ranging in the frequencies it will solve the current problem of the small detection range. The existing antenna is flat surface so the efficiency in data transmission is less. The novel approach of the new antenna is designed as the plate type structure so the frequency interaction is more and the wave interference is reduces. The depth measurement is about 35 m and the exact location is also analyzed. The diameter is about greater than above 5 m. The maximum depth measurement is about 85 m. [1]

Zhi Min Liu et., al., proposed during the mining process the data signal is not properly propagates to the other medium. The medium is get disturbed by the noise surrounding the environment in coal roadway. So the detection of the weak IP signal is not able to fetch properly. Several researches are made in the measurement of the accurate IP signal. In this paper they propose the dual frequency induces polarization method (In short from is declared as IP). So the detection of the weak induces polarization the mechanism of receiver is used in the mining process. The prototype design the model of RC (Resistance-Capacitance) which can detects the IP parameters and the IP signals are processed by this way. During the signal processing the curve is generated and it gets compared between the experimental and theoretical calculation of apparent frequency and apparent phase difference. From the prototype is phase angel is greater than the amplitude in the receiver prototype. The dual frequency IP instrument which can measures the amplitude of the signal propagation. [2]

D.M. Donskoy et., al., proposed in the underground soil region number of communication lines and material are buried inside the soil. The material such as pipes, containers The innovative technique for detection of artificial objects, such as mines, pipes, containers, etc., buried in the ground. The technique has been introduced to protect the material in the underground. The shell is involved in the mine which it contains all the material, and the mine shell is contact with the soil. It can withstand the mechanical pressure or work over the shell. With the help of the technology the buried material it is insensitive to the rocks, metal, bricks. The experimental result is made with the mechanism of the non linear behavior of the soil mine interaction. The line mine technique has been applied in the for the material in the underground soil. The basic studied is made over the different surfaces in the soil. [3]

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Chen Hong et., al., proposed in coal mine water level sensor are mainly get affected by the errors generated and the complex environment which can creates the disturbance in the mine. So the false alarm is get generated. The accuracy in prediction of the fault in the coal mine water level sensor is getting affected. So in this paper they propose the cluster analysis of the coal mine water level sensor. By the extraction and the filters the main elements of the fault information to evaluated the accurate sensor fault data. The sensor which can generate the false is analyzed with the help of the fault detection method which can further help in evaluating the fault information in the mine water level sensor. The experiments are made using the proposed method to check the efficiency and the simulations are carried out it can overcome the error signal generated by the surrounding environment. The time and accurate estimation of the mine water level sensor are perfect; it can improve the operating efficiency. [4

Limei Cai et., al., proposed during the mining in the specific area there is several dangerous areas in the underground. So the secured system is used at the period of underground mining. For the automatic monitoring of the coal mine area in the underground an algorithm is proposed. The fuzzy detection method which is the combination of the Gaussian model is used. The underground danger areas are monitored by the camera and the images are extracted. The images are subjected to the algorithm in which the pixels are modeled by the combination of K Gaussian distributions. Each Gaussian distribution has the specific mean value; the group of mean value can formulate the background images. Based upon the result of the coal mine videos fuzzy rulers are designed. This method is compared with the segmentation of the various sets of images based on the 2D entropy and the subtraction based on cluster of Gaussian model. The proposed method is implied in experiment which can remove the interference and detects the mining region even though they have the same background images. This method has the minimum number of calculation is suite for the underground coal mine. [5]

Hilal Soydan et., al., proposed the majority of the land area is consumed for the mining. So all the cultivatable lands are getting destroyed. During the period of the 1985 the activity of the mining was started and the work is continued for the past 20 years after the certain period the mining is stopped. The rights of the mine were passed to the private companies. They came with the thought of no coal production. The concession was cancelled on March 2009. So the process of the mine is get continued but the occupy limited areas of land and the afforest ration of the land is limited. The survey is made before he period of mining and the after the mining and the impacts of the environment are monitored at the mine field. The change in the land due to operations of the mining in the period of 1985 – 2005. After that Lnadsat ETM image is selected. The classification is made based upon the Bayesian theorem. The maps are monitored to analyze the difference in land use and the land cover changes. [6]

Bao Nisha et., al., proposed most of the land areas are occupied by the private companies for the mining purpose. They can destroy most of the cultivatable lands. So in this paper they iNpropose the use of the remote sensing data for monitoring the coal mine. The Landsat and HJ-1 images are used for the digital data analysis in the period of 1975 to 2010. The images are analyzed for the various features such as change in land use and the estimation of the vegetation cover. The map can be derived by the use of the interpret method during the period 1975-2010. Between the range of the year the percentage of the cultivatable lands are about 65%, 36% of vegetation and 12% of soil were changed to the coalfield. Based on the calculation the total lands are get destroyed for the mining is about 5679.97 hm2. The reclamation of the land is made in the year 1993; the area is about 1178.32 hm2.

The remote sensing data can be monitored which can creates the map with the information of about surface mining on land over. [7]

P. Jagerbro et., al., proposed several mining work are takes place in the different parts of region. There are several risk will undertaken in the mining surface due to the dangerous underground surface, so in this paper they proposes the multisensory technique method for the mine surveillance. The GPR is implied for the data fusion of type ERA and the proximity sensor is used for the mine detection of type Schiebel. The first stage is the data fusion it can runs in three stages, the sensor data are collected and converted to the preferred type. The data about the test measurements of the buried materials such as the wax, stone, metal etc. For the measurements the MD/GPR method is used for the product probabilities. The measurements points are updated along the scanning of MD/GPR method by the use of the Bayesian fusing method. The comparison is made using the single sensor and the two sensor results. The detecting object of both metal content and the shell material in mine. By implementing the system the false alarm is totally reduced. [8]

Weijie Zhang et., al., proposed in each coal mining area the geologic set of excavation is hidden in the each faces. The real time technology is used in the coal mines in the road ways by the use of the Dual frequency Induced polarization method. The ideal detection method is employed in the excavating of the geological prediction in the road way. The several nodes are used in the transmitting the data and receiving induced polarization information is the real time. Based on the current intensities and nodes we can able to scan the geological data before excavating the faces. The faces are at various angles and depths. The amplitude can be changed depends upon the depth. This paper can enlargers the concern in the integration of the road header machine. [9

Zhongfei et., al., proposed the miming concept is mainly approached in the defense area to protect the solider in the border line. In this paper they propose the mining technique in the land defense. The intelligence military surveillance the cluster of video data is automatically collected to target the moving objects. To overcome this problem a solution is proposed in this paper for the qualitative approach for the automatic motion detection problem. The surveillance of the video is much faster than the real time performance. This method is completely based on the linear system control which is called as the QLS. The QLS can be focused on the necessary things it saves the computation of minimum and the efficiency is about maximum. The QLS method can shows the effective mining performance by reaching the maximum efficiency. The data of the underground layer can be monitored at each period of time with the regular interval. So the security is also high. [10]

III PROPOSED METHOD OF COAL MINE DETECTION MONITORING AND COMPUTING USING IOT

The main of this paper is to propose the safety in the coal mining method. The environmental characteristics can affect the various parameters in the coal mining region. The parameters change can affect the safety. The temperature sensor, humidity sensor, gas sensor which can measure the parameters. Radio Frequency Identification reader gets the information from RFID [11]. Each sensor has the threshold value when the sensor value exceeded the threshold value the buzzer will on and the sensor data can be updated in the IOT using the ESP8266 WIFI module.

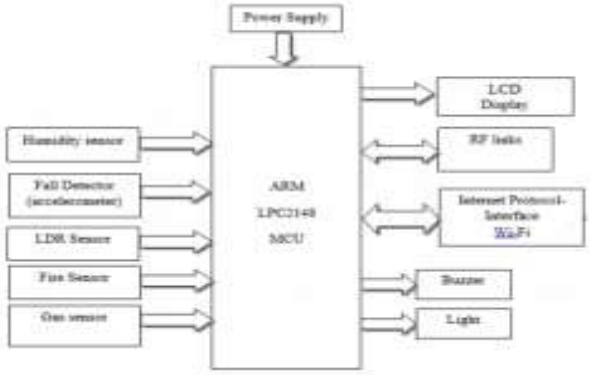

Figure 1: Block Diagram of Coal Mine Safety System

IV RESULTS AND DISCUSSIONS

The connections are given as per the block diagram. Here we are going to use sensors such as Temperature, Pressure, Gas, and Humidity. All the sensors are connected to the microcontroller and power supply is given. Each and every time all the values are been tabulated and temporarily stored in the microcontroller. From the micro controller the datas are been shared to the cloud with the help of WI-FI module attached to the system. And thus all the parameters can be checked in any particular time with the criteria of larger distance. The following diagram represents the parameter values tabulated

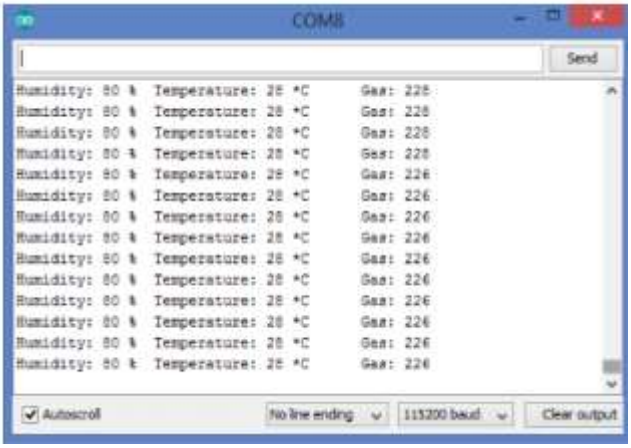

Figure 2: Monitoring of sensor values

V CONCLUSION

Smart health monitoring and controlling system of a coal mine we have designed. As we are using the latest technology of WI-FI we can monitor and access the entire work from any place. All the values of each parameters

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are been tabulated and can be viewed in each and every possible ways. In future we can design this coal mining safety with the help of PLC (Power Line Communication) method where the data's are been monitored through current.

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