Intelligent Industrial Helmet

Kirubhananda K[1], Kishore V[2], Krithik B[3], Gokul LS[4]

[1,2,3]Undergraduate Student, Dept. of Mechanical Engineering,
[4]Professor, Dept. of Mechanical Engineering, Bannari Amman Institute of Technology, Tamil Nadu.

---***---

Abstract - *The goal of this study is to provide a solution to safety concerns in industries through communication and security monitoring. Worker's safety plays important role in the modern world industries; Our study has the potential to save the lives of industrial workers by using particular sensor that can be extremely beneficial to the industry's workers.*

This project focuses on a worker's health supervising system which is based on the cost effective IOT system.

Our project aims at developing a sensor network, realized real-time surveillance with early-warning intelligence on worker's health and be easily available for the help of workers in panic situation. Parameters are detected continuously on worker's health and if they cross the predefined limit, then the user gets information about all three sensors and it displays in control room and it will automatically updates the values.

***Key Words*: Arduino UNO, Node MCU, IOT, Sensors**

1. INTRODUCTION

Industries in every country, plays a mainly role to generate revenue for the country. Thousands of workers were killed every year due to many disasters takes place inside industries. These accidents are caused mainly due to the worker and their protective equipment. Especially developing countries face a poor safety system for industrial workers. Hence it requires a safety monitoring system provides safety factors and good decision-making basis for working environment. This paper provides a wireless monitoring system which provides a reliable communication even during disaster. The system has a centralized system which collects temperature, Heartbeat, MEMS, Gas sensor, Oxygen level and transmits it to the base station through Wi-Fi. Also, this system provides online monitoring by updating the values into a web server.

2. LITERATURE REVIEW

(1) Smart Helmet for Industrial Workforce Hema D1,Dr. PadmajaK.V2. In this paper, the impact when a construction worker involves in an accident without wearing helmet is veritably dangerous and the goods caused can be fatal. Multitudinous lives can be saved if exigency medical service can get information about the accident and reach to the scene on time. To resolve these current issues, developing a smart helmet is the stylish result which can minimize after goods similar disastrous events in future. The main purpose of a smart helmet is to ensure safety of the construction workers in the working surroundings. This is enforced by using prominent imminence causing attributes which are likely be by workers or the terrain, to address these enterprises alcohol discovery, position shadowing, fall discovery, SOS (accident identification) are used. In our design it's obligatory for a worker to wear helmet before engaging in any work at construction site. However, also the prototype automatically sends the information to the operation with their current position and health status, If worker is drunk or if any accident takes place. (2) IoT grounded Smart Helmet for Ensuring Safety in Diligence. Mangala Nandhini. V, Padma Priya G.V, Nandhini. S, Mr.K.Dinesh. Artificial safety is one of the main aspects of assiduity. Working terrain hazards include suffocation, gas poisoning and gas explosion. Hence air quality and dangerous event discovery is veritably important factor in assiduity. In order to achieve those safety measures, the proposed system provides a wireless detector network for covering real time situation of working terrain from monitoring station. It provides real time monitoring of dangerous feasts like CO, CH4 and LPG and also moisture. To overcome those dangerous situations, this system provides exigency alert to the monitoring station. Some workers aren't apprehensive of safety and they didn't wear helmet duly. For this purpose, a limit switch was used to successfully determine whether the workers had worn their helmet duly or not. The system uses Wi-Fi technology for transmission of data from working terrain to the monitoring station. There's an alert switch at working terrain for exigency purpose.

3. PROPOSED METHODOLOGY

- The proposed system used to monitor the employees' health condition.

- In emergency situation, the button is pressed alert message will send to the respective person mobile number.

- If any abnormalities detected in the worker or environment, automatically buzzer is turned ON.

- All the data are stored into the webpage and also continuously monitor the working environment.

4. EMBEDDED SYSTEMS

An embedded system is a special-purpose computer system designed to perform one or a few dedicated functions, often with real-time computing constraints. It's generally bedded as part of a complete device including tackle and mechanical corridor. In discrepancy, a general-purpose computer, similar as a particular computer, can do numerous different tasks depending on programming. This systems have come veritably important moment as they control numerous of the common bias we use. Since this system is made to specific tasks, design masterminds can optimize it, reducing the size and cost of the product, or adding the trustability and performance. Some bedded systems are mass- produced, serving from husbandry of scale.

5. SENSORS

Sensor detectors are most useful bias that are constantly used to descry and respond to electrical or optic signals. A Detector converts the physical parameter (for illustration temperature, blood pressure, moisture, speed,etc.) into a signal which can be measured electrically. In this design we've chosen Temperature detector, Gas detector and Twinkle detector for the getting real- time values.

5.1 TEMPERATURE SENSOR

The LM35 series are largely perfection IC temperature detectors, whose affair voltage is linearly commensurable to the Celsius temperature. We can measure temperature more directly than a using conventional thermistor. The detector circuitry is sealed and not subject to oxidation. The LM35 generates advanced affair voltage than any other thermocouples and may not bear that the affair voltage be amplified.

Fig.1 LM35 Sensor

5.2 GAS SENSOR

Ideal gas detector for use to descry the presence of a dangerous LPG leak in your auto or in a service station, storehouse tank terrain. This unit can be fluently incorporated into an alarm unit, to sound an alarm or give a visual suggestion of the LPG attention. The detector has excellent perceptivity combined with a quick response time.

The detector can also smell iso-butane, propane, LNG and cigarette.

Fig.2 Gas Sensor

5.3 HEART BEAT SENSOR

The Heart Beat Detector provides a simple way to study the heart's function. This detector monitors the inflow of blood through ear lobe. The heart forces blood through the blood vessels in the observance, the quantum of blood in the observance changes with time. The sensor shines a light through the ear and measures the light that is transmitted.

The clip can also be used on a fingertip or on the web of skin between the thumb and index finger.

Fig.3 Heartbeat sensor (037&bt)

6. Arduino IDE

Arduino IDE The Arduino IDE (Integrated Development Environment) is Software to develop the coding in the terrain. The Coding is developed and also execute the process The all the modules running in embedded C software coding.

Fig.4 Arduino code Part-1

Fig.5 Arduino code Part-2

7. CIRCUIT & BLOCK DIAGRAM

Fig.6 Circuit diagram

Fig.7 Circuit diagram

8. ANALYSIS OF RESULT & DISCUSSION

Fig.7 Sensors output to user

Fig.8 Output data stored in Cloud

* DHT11 Temperature & Moisture Detector has temperature & moisture detector complex with a calibrated digital signal affair to the stoner.

* The MQ2 gas detector is one of the most extensively espoused in the MQ detector series. It can descry LPG, SMOKE, ALCOHOL, PROPANE, HYDROGEN, METHANE, AND CARBON MONOXIDE amounts.

* The KY-039 detector senses the heart of the mortal being & it's a simple device with provides accurate affair.

* Knot MCU is an IoT Module grounded on ESP8266 Wi-Fi Module. Knot MCU uses Lua Scripting language and is an open-source Internet of Effects (IoT) platform.

9. CONCLUSION

By operation of this design in the diligence we can increase the safety features of the workers. This design help in covering the workers health and terrain. The novelty of the design, the data are transferred to pall using IOT. The IOT conception is enforced in this design. The person health also covered and IOT generalities added. This design is cost effective and modernized. The IOT conception we used to help to pierce the data anywhere and work fleetly to increase the product by reducing the man power failure. Parameters are detected continuously on worker's health and if they cross the predefined limit, also the stoner gets information about all three detectors and it displays in control room and it'll automatically modernize the values.

REFERENCE(S)

(1) X. Ma,Y. Miao,Z. Zhao,H. Zhang,J. Zhang, " A new Approach to Coal and Gas Outburst Prediction Grounded onMulti-sensor Information Fusion", Proc. IEEE International conference on robotization and logistics, pp 1613-18, China 2008.

(2) H.K. Chan, " Agent- Grounded Plant Position Wireless Local Positioning System with ZigBee Technology", IEEE Systems Journal,vol. 4 (2),pp. 179-85, 2010.

(3) Yuan wei-q, i Lin Jun-nan, Research and Perpetration of Bedded Interface of Ethernet, Instrument Fashion and-61.

(4) E.K. Stanek, " Mine Electro technology Exploration The Past 17 Times", IEEE deals on assiduity operations,vol. 24

(5), pp 818-19, 1988. (5)S. Wei,L. Li-li, "Multi-parameter Monitoring System for Coal Mine grounded on Wireless Sensor Network Technology", Proc. International IEEE Conference on Industrial Mechatronics and Robotization, pp 225-27, 2009.

(6) Hema D1,Dr. PadmajaK.V2," Smart Helmet for Industrial Workforce" IEEE deals on assiduity operations,vol. 28 (3), pp 815-02, 2019.

(7) Mangala Nandhini. V, Padma PriyaG.V, Nandhini. S,Mr.K. Dinesh," IoT grounded Smart Helmet for Ensuring Safety in Diligence." IEEE deals on assiduity operations, 2018.

(8) K. HARSHITHA,K. SREEJA,N. MANUSHA,E. HARIKA,P.V. KRISHNA RAO, " Zigbee Based Intelligent Helmet for Coal Miners Safety Purpose", IEEE Systems Journal,vol. 2 (2),pp. 122-65, 2020.