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Rope Traversing Robot for Air Pollution Monitoring

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ABSTRACT: Robots all have some kind of mechanical construction, a frame, form or shape designed to achieve a particular task. For example, a robot designed to travel across heavy dirt or mud, might use caterpillar tracks. The mechanical aspect is mostly the creator's solution to completing the assigned task and dealing with the physics of the environment around it. The robot with caterpillar tracks would need some kind of power to move the tracker treads. Here this project implements Hanging robot for monitoring the industries like (Gas and petroleum), Thus constructing a rope path for hanging robot way to travel and placed sensor and control hanging robot from Base station., Collecting information related to harmful gases and updating it in the server using IoT.

KEYWORDS: Rope Traversing, Node MCU, IoT.

I. INTRODUCTION

This paper proposes a wireless control and monitoring system for an induction motor based on IoT communication protocol for safe and economic data communication in industrial fields where the wired communication is more expensive or impossible due to physical conditions. A module of transducers and sensors monitors the parameters such as pollution level, temperature, humidity and smoke level which are responsible for the quality of air and transmit the data through IoT. Also, IoT based system is used for collecting and storing data and accordingly generating control signal to stop or start the induction machine wireless through computer interface developed with Node MCU.

Existing System

Single Phase and Three Phase Industrial machines are very popular in industries because of their vast applications. Hence it becomes necessary to protect them against faults so as to ensure uninterrupted operation and functioning. Various parameter controlling and monitoring systems are there for other types of machine, but in case of industrial machine the controlling and monitoring systems are not extensively used due to high cost of installation and physical constraints. So as to overcome the limitations in monitoring and controlling, Zigbee Based System is used which makes it cost-effective and simple.

Proposed System

In this project we propose a hanging robot Model system. This Robot mainly used for industrial purpose using a battery. This robot moves from one place to another place with the help of motor rotation with respect to forward, reverse and the data can be received controller through IoT.

If the gas and temperature sensor value increases it automatically sends the alert signal to the buzzer and also we measure light dependent level using LDR sensor in case of fire. The sensor value will be monitored continuously by using microcontroller and send the information quickly and alert the authority persons .

Advantages:

- Cost efficient
- Easy to implement
- Easy to maintain



II. RELATED WORK

Gibbon-Like Crawling Robot for High Voltage Transmission Line Inspection

The robot can swing cantilever on the high-voltage line to achieve obstacle crossing. After kinematics analysis of the bionic model of the inspection robot, the 3d model of the robot is established in SolidWorks. Simulation analysis of the robot is carried out through the built-in motion plug-in to ensure that the robot can achieve the desired motion effect, which verifies the stability and rationality of the mechanism design.

At present, the existing research on gibbon-like crawling robots is all about the control of cantilever swing motion by grasping rigid bar. High voltage transmission line is a flexible environment. In order to control the cantilever swing motion of the gibbon-like crawling robot grasping the transmission line, it is necessary to study the rigid-flexible coupling model between the robot and the high voltage transmission line. At present, there is no similar research on gibbon-like crawling robots, which can provide a new direction for future research.

Sensing Harmful Gases in Industries using IOT and WSN

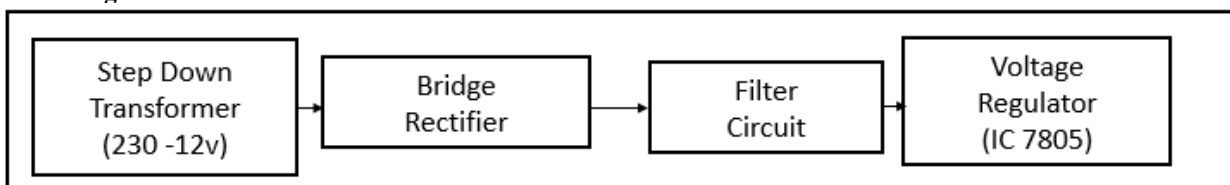
Industrial automation has become very much popular these days because of upcoming demand in the competitive scenario. This project proposed a secured and energy efficient wireless industrial automation system via IOT and WSN technology. In this system small scale industrial sensing applications like temperature control, proximity sensing, humidity monitoring etc. can monitor wirelessly through wireless devices. The small, rugged, inexpensive and low powered WSN node consisting sensors and ARM-7 will bring the IoT to even the smallest objects installed in any kind of environment, at reasonable costs. Raspberry-Pi module is used as IOT gateway. IoT is used for transmission and reception of data. Using web server along with raspberry pi it is possible to monitor and control industrial devices remotely by using local internet browser and the data can be displayed on dashboard for further controlling actions. Use of these both IOT and WSN technology reduces comp

Inference on IoT

Monitoring In this paper a cost effective air pollution monitoring system is proposed. This system can be used for monitoring pollutants in air of particular area and to find the air quality analysis. The proposed system will focus on the monitoring of air pollutants concentration with the help of combination of Internet of things with wireless sensor networks. The analysis of air quality can be done by calculating air quality index (AQI). This information will be displayed on the webpage via internet in real time. By the combination of internet of things and wireless sensor networks for purpose of air pollution monitoring it becomes easy to keep the air quality data updated in real time. Also the system is cost effective which make its installation possible in various areas. The developing system will have a complete monitoring system which is IOT based. Also the information will be directly sent to the internet from system; no need of computer for transmission purpose which reduces the cost. Real time air pollution wireless monitoring system uses Xbee whereas Zigbee and GPS based air pollution monitoring system and WSN based air pollution monitoring system uses Zigbee for sending collected pollutant information to the computer. In Wireless sensor network based pollution monitoring system a Bluetooth network is used as well as analysis is done using ID3 algorithm. Arduair Air quality monitoring system uses USB cable for data transfer also real time graph plotting has done. All the above system has short range to send data to the computer. Real time wireless air pollution monitoring system has used multi hop network but it is costlier due to Libelium WAPS. Real time indoor CO2 monitoring system uses radio modules for data transmission and does analysis graphically. The systems discussed above send data on webpage via computer which is time consuming. The air analysis is done graphically or using some algorithms. It is necessary to develop such a system which can be simply collect pollutant data as well as send it directly to the webpage and analyze it.

III. METHODOLOGY

Block Diagram



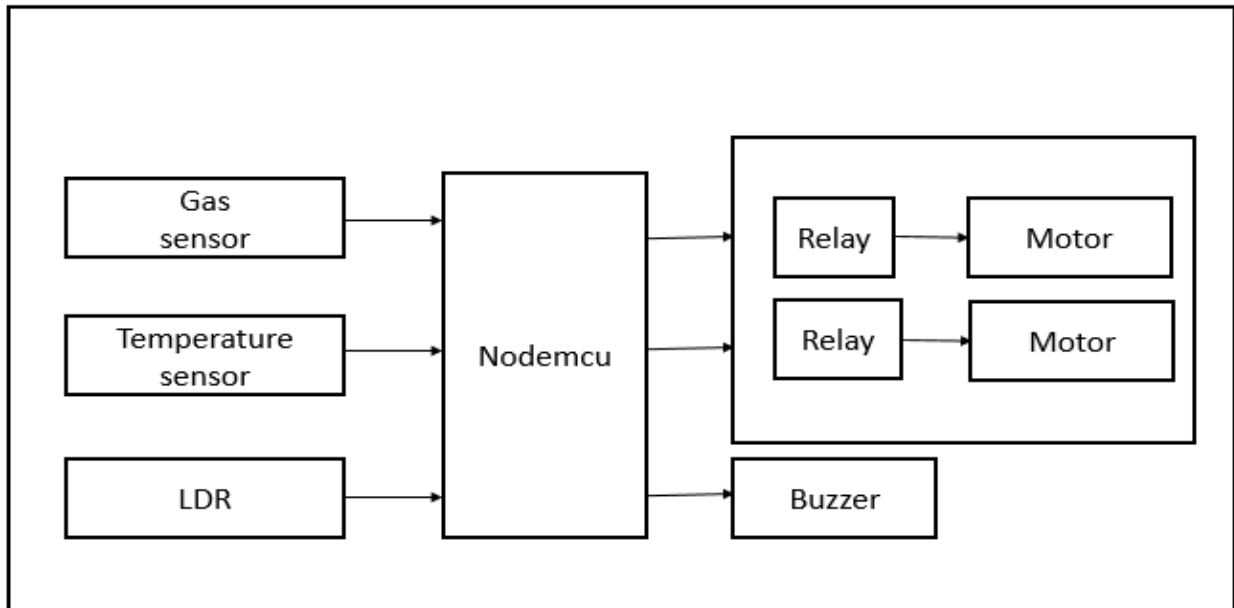


Figure No 1 Block Diagram Of Rope Traversing

This WI-FI module (Node MCU – ESP 8266) is connected to our device for the control of movement of the robot and also to store the data of the air quality , temperature, humidity etc at the database. Gas Sensor along with smoke sensor is used to detect the air pollution level. If the values of the data crosses the threshold limit which indicates the severity of the pollution then with the help of Node MCU through IoT it automatically informs the concerned authority. With the help of IoT Concept the kit is connected to Mobile through an app via Node MCU. By this the robot will be controlled remotely

IV. EXPERIMENTAL RESULTS

Hardware Output

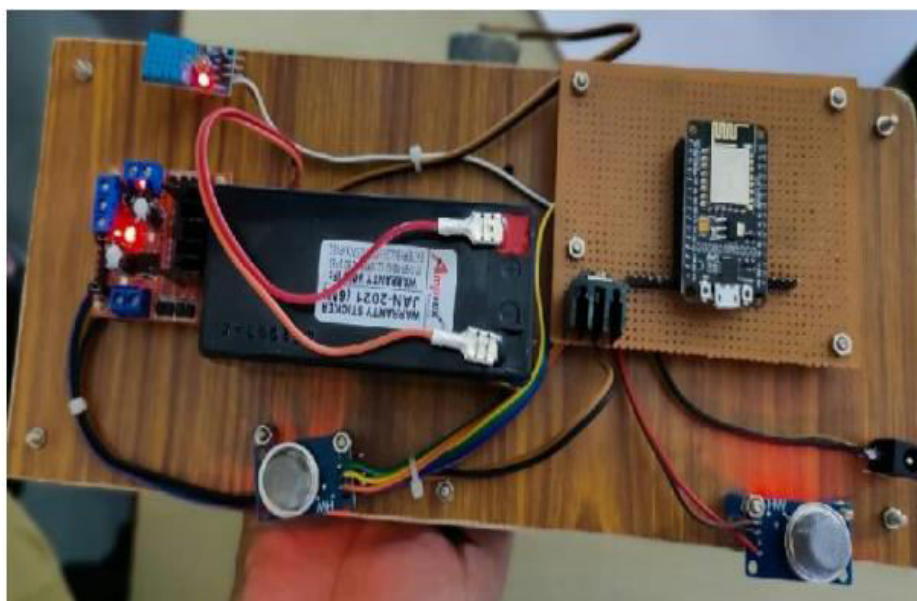


Figure No 2 Hardware Output Of Rope Traversing

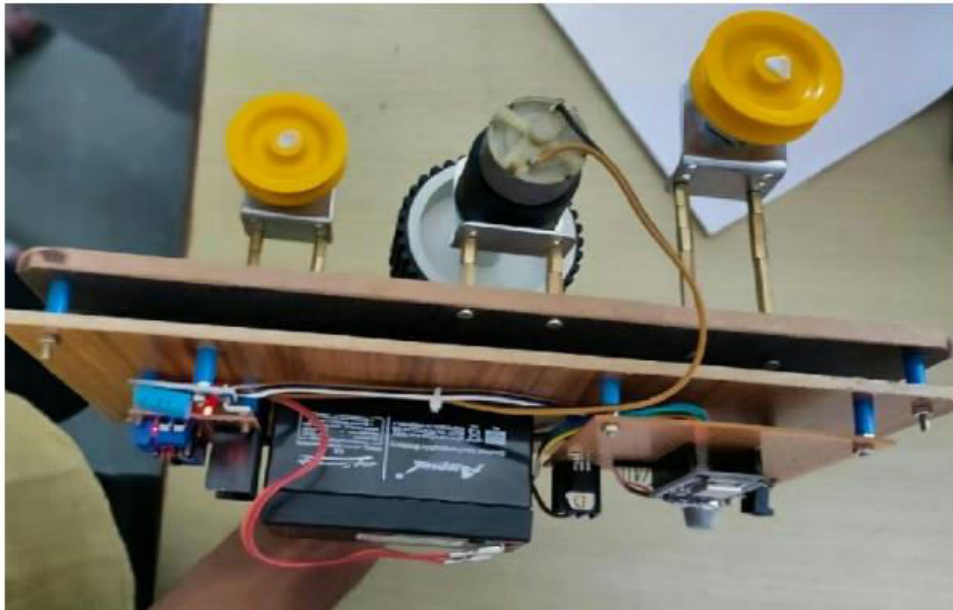


Figure No 3 Hardware Component Of Rope Traversing

Screen Shots

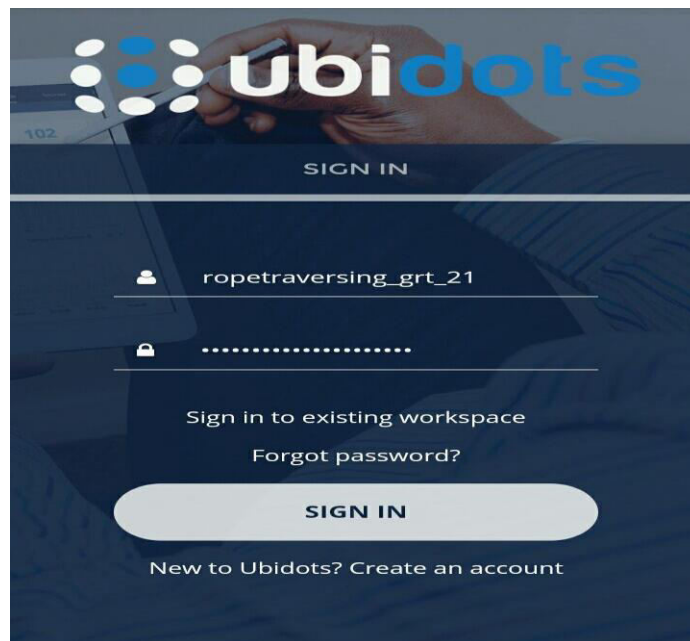


Figure No 4 Login Console Of Rope Traversing In Mobile

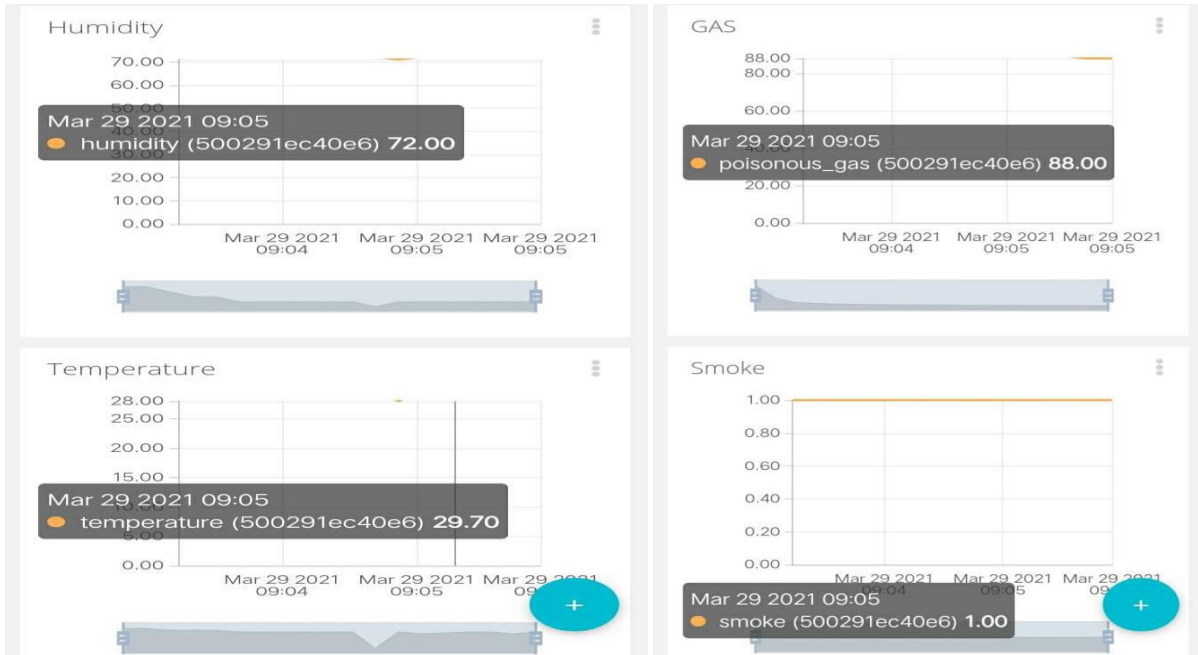


Figure No 5 Showing Of Temperature Data In Console

Figure No 6 Showing Of Gas And Smoke Data

smoke alert! Inbox ☆



Figure No 7 Screenshot Of Getting Email About Smoke Alert In The Particular Place

V. CONCLUSION

With the help of this study, a parameter monitoring system for pollution levels in industries and traffic areas based on IoT is achieved and tested successfully. The system developed is capable to perform such operations as running the motor through Node MCU with the help of IoT, stopping it, measuring, monitoring and controlling the most parameters of like Harmful gases, Smoke level, Humidity and temperature. All of these values can be transferred to the host computer, displayed on the interface, represented graphically. Monitoring and controlling the basic parameters were examined and achieved in various ways. IoT transmission using Node MCU technology is a wireless protocol is used for the communication. This protocol is widely used various areas for its better reliability, low power consuming profile, excellent Capability, high flexibility and low cost. So it's significant to embed the IoT protocol into the WSN system that widely applied now in every area. The system achieved can be used for industrial applications. The whole system may be very useful to colleges and research institutes that have vocational, technical, and industrial education.



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