HAZARDOUS AREA MONITORING FOR INDUSTRIAL PLANT POWERED BY IOT

Abstract

Internet of Things (IoT) represents a general concept for the ability of network devices to sense and collect data from the world around us, and then share that data across the Internet where it can be processed and utilized for various practical purposes in different aspects of life. The reach of IoT based systems in industrial areas is still limited, but it has huge potential. In this project, we create an IoT based hazard monitoring system specifically suited to requirements of mining, refining and manufacturing industries. The system actively records, processes and analyzes the temperature of sur- roundings, which is a prime safety parameter in areas where molten metal is processed, manufacturing is done or welds are made. Also, it keeps track of high levels of dangerous gases present in the environment (LPG/Natural Gas). If a parameter is violated, the system sends an immediate notification to a set of preset list of users on their smartphones, and continues logging and moni- toring data for further analysis to suggest improvements in the safety regulations of the industry. The sensors used in this prototype model can be modified with industry requirements (for example more robust temperature sensor may be required in very harsh conditions) whenever the need arises.

Keywords:

- Raspberry Pi 3
- Temperature Sensor- DS18B20
- Gas Sensor- MQ 5/9
- Breadboard
- Raspbian OS (Running on Rpi-3)
- Simplepush API

INTRODUCTION:

Technology advancement is a never-ending process; thus, we must be well-equipped and informed about new developments. Day-to-Day human life has gotten more convenient as a result of these technological improvements. Automation has evolved into a must need. The internet today provides access to all data and systems, and web technology is continually expanding. A network interface enables remote management and control of embedded devices using a web-based embedded system. Controlling Internet of Things (IoT) devices is done through web controllers, often known as E-controllers. A web controller, often known as an Econtroller, is a set of embedded systems and software stacks that is the most extensively used method of web development in the world. Instead of employing large server systems for monitoring, administering, and handling data, remote login and monitoring using a distributed web control system produced using web pages generated in web applications are increasingly used instead of big server systems for monitoring, administering, and processing data. Web control systems that leverage IoT has three characteristics: energy savings, comfort, and efficiency. Our main objective is to adapt the Internet control system to the Internet of Things, allowing users to access the application over the Internet from anywhere in the globe. IoT monitoring allows you to analyze dynamic systems and analyze billions of events and alerts. IoT monitoring also enables you to bridge the gap between devices and businesses by collecting and analyzing a wide range of IoT data at a web scale across connected devices, consumers, and apps. The industrial monitoring system connects itself with the open-source app Blynk. Blynk connects itself with esp8266 for virtual control of the devices along with getting updates. The Arduino Mega is the brain of the project connected to the component and operates them with the code embedded in it. Sensors like smoke sensors, humidity, and temperature sensors are used to monitor the surroundings of the machine.

Incredibly simple architecture

The system requires just 3 core hardware components to run, and runs with minimal space and resource requirements.

System crash protection

It is configured in such a way that it recovers and reconnects itself after a crash/power cut, and can resume working immediately.

High capacity system

It can serve alerts to more than a million unique users, and more new users can be added by just adding their API Key to the system.

Completely Secure

The system uses encrypted notifications for sensitive notifications and communication with cloud service is also based on unique API keys.

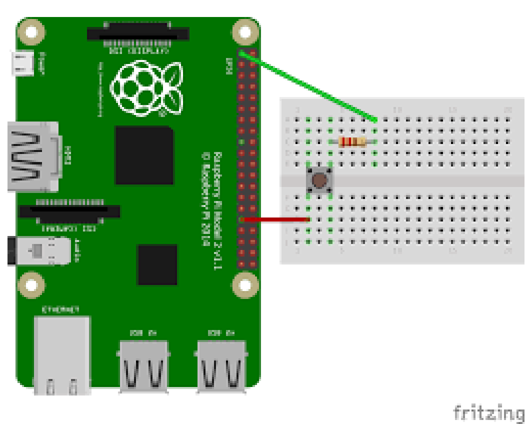
Versatile

Notification parameters and user access control can be adjusted to suit your requirements.

Cost Effective

Cheaper to implement than other options and it cover a large area and user-base with low maintenance costs.

RASPBERRY PI3 AND PULL RESISTOR



CONCLUSION

IoT is present and gaining more traction in a lot of fields, and one of the most important field is industrial applications. There are a huge number of ways in which industries can make use of IoT to improve working conditions, efficiency, cutting costs and improving the overall growth of the sector. However, hazard monitoring and mitigation is often overlooked in industrial areas. Therefore, this project specifically aims to make use of IoT to actively mon- itor and analyse various factors in a typical heavy industrial zone like tempera- ture and levels of gases in the environment. If the above parameters exceed the recommended safe values, the system can track the same and issue alerts. Also, the data generated in real time can provide important information about how smoothly the work is going on in different zones. This system can be deployed in many industrial areas like mining, under- ground factories, metal refineries, automatic welding factories and even heavy parts production lines. It will help to provide a safe and efficient working en- vironment in such areas, while also opening new paths to improve the safety parameters of these places.

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