

Surveillance System for Petroleum Industry

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Abstract - The providing monitoring of the various toxic gas leakages in large-scale industries is critical since it seriously affects the safely producing activities and first line workers' lives. Gas Leakages in open or closed areas can prove to be dangerous and lethal. Even though the conventional Gas Leakage Detector Systems have great precision, but they fail to acknowledge a few factors in the field of alerting the people about the leakage. In this, we present a newly developed mobile car with WIFI communication to smartly monitor and track the concentration of various toxic gases and having Smart Alerting techniques which involves sending message to the concerned authority and an ability to predict hazardous situation so that people could be made aware in advance.

In these we have focused on continuous obstacle detection along the path with the toxic gas detection and delivery of the barrel. Whenever the gas leakage is detected or the temperature overshoots the threshold value, the power supply will automatically cut off and an alarm will be raised. The particular readings will be uploaded to cloud storage and also informed to the concern authority through mail.

1. INTRODUCTION

Due to the advancement and drastic development in communications and computing technologies, different types of surveillance systems are readily available to the end-users. Surveillance systems are utilized in many places for public and private security, such as banks, supermarkets and environments which are hazardous or inaccessible for human beings (for example, in environments which with poisonous gases, or very low or high temperatures). Since computers and network are widespread, many new network-based applications are emerging in everyone's daily lives.

Today many business and industrial owners have a surveillance monitoring system. Furthermore, the number of residential owners employing surveillance systems is also in an increasing trend. Traditionally, these systems have been built in an ad hoc fashion with direct wired connections from the cameras to a control center to monitor these cameras. Generally, this type of wired system is very costly and it limits the number of cameras within the system. This is changing due to the use of local area network technology, Wi-Fi, Bluetooth and ZigBee for the interconnections and the fact that the control system can be connected to the Internet. The connection of the surveillance system to the Internet enables owners to access information collected by the security and monitoring system from any place through Internet.

2. METHODS AND MATERIALS

2.1 EXISTING SYSTEM

(A) WIFI-based Smart Car for Toxic Gas Monitoring in Large-scale Petrochemical Plants. (Paper- 978-1-4799-8745-0/15/\$31.00©2015 IEEE)

Overview: A newly developed car to smartly monitor and track the concentration of various toxic gases. Based on the innovated monitoring patterns and our existing on-line gas monitoring in oil and gas industry. We developed smart monitoring car with mobility and intelligence. This smart car is easy-implement, easy-operate, low-cost and flexible to move on the ground. The mobile monitoring car owns the ability of transmitting large types of sensing data, e.g., audio data. At the front of mobile monitoring car, there is a camera. This type of car is equipped with various gas sensors, e.g., CO₂, CO, SO₂, and H₂S.

(B) Gas Leakage Detection and Smart Alerting and Prediction Using IoT (Paper: - 978-1-5090-6221-8/17/\$31.00 c 2017 IEEE)

Overview: we have used the IoT technology to make a Gas Leakage Detector having Smart Alerting techniques involving sending text message to the concerned authority and an ability to predict hazardous situation so that people could be made aware in advance by performing data analytics on sensor readings.

(C) Toxic Gas Boundary Area Detection in Large-Scale Petrochemical Plants with Industrial Wireless Sensor Networks. (Paper: - 0163-6804/16/\$25.00 © 2016 IEEE)

Overview: It presents a newly developed self-driven car to smartly monitor and track the concentration of various gas leakages. The sensor used is MQ2. In addition, various sensors will be attached to the car for the continuous humidity and temperature detection. This article overviews continuous object detection techniques that have emerged in recent years. Most of the research focuses on the estimation of the toxic gas boundary.

Existing system disadvantages:

1. In the existing system readings are taken on the timely manner or after the regular interval of time.
2. Data will not be recorded in digital form, if that would be in digital form it can be analyzed directly with for various purposes.
3. In manual data collection process there are chances of errors.

2.2 PROPOSED SYSTEM

- We are going to monitor two parameters of the industry temperature humidity and we there will be gas leakage detection along with the fire detection.
- We will be using ATMEGA328 microcontroller, and it will be interfaced with the sensors.
- Temperature and Humidity sensor: DHT11
- Gas sensor: MQ2
- Microcontroller will continuously monitor the values of sensor and compare it with predefined thresholds and if any value is crossing threshold then it will buzz alarm
- Same time those values will be sent to the sever over the Internet using the WIFImodule.
- As values are sent to server they can be monitored from any location and processed anywhere.
- This values can be seen in android application.

ADVANTAGES OF PROPOSED SYSTEM

- No Human resources needed to go to monitor the values.
- Values can be monitored remotely.
- No need to keep watch on values as there is alarm system.

2.3 MATERIAL

HARDWARE REQUIREMENTS

- Arduino Mega
- Bluetooth
- Temperature Sensor
- Humidity Sensor
- MQ2 Gas Sensor
- IR Diode Sensor
- Motor Driver Module
- Battery
- WiFi Module
- Buzzer

SOFTWARE REQUIREMENTS

- Arduino software
- Arduino Bluetooth control

METHODOLOGY

WORKING

ATMEGA 328 will continuously Monitor the values of all the sensors First we will read the Gas sensor. After that we are going to take readings from the DHT 11 sensor. We are going to append all the readings into one string so that we can transfer all the data to the server in one request only. That string of data will be given to Node MCU based on the transmit pin of the ATMEGA 328. Node MCU is continuously checking for any new data as soon as we send data it capture all the data and send it to the server. We have a PHP file which is going to accept data continuously from the Node MCU. ATMEGA 328 and Node MCU will keep on

communicating and sending data to the PHP file on the server.

The mobile application named arduino Bluetooth Control which monitors car via Bluetooth connectivity the system contains sensor for detection of gas, temperature and humidity. Gas sensor detects gas range if there is a leakage in gas the sensor will on the car will detect it and it will make a noise (like buzzer) which will make the people aware and can take safety precaution.



Fig 1 -: Block Diagram

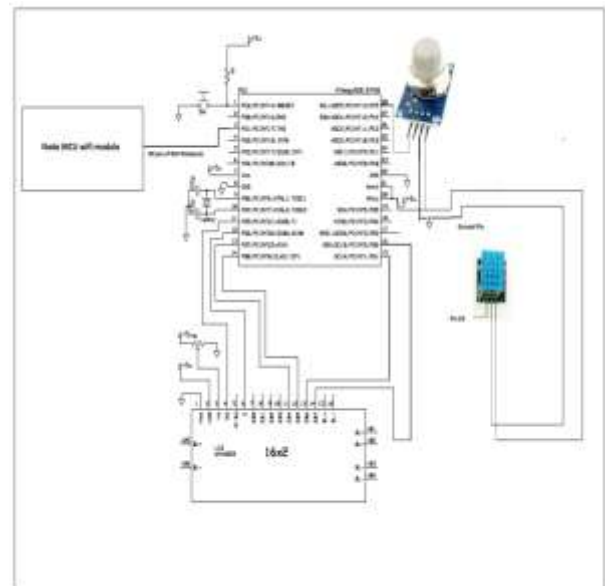


Fig 2-: Pin Diagram

3. CONCLUSIONS

We have implemented a Project in two parts:

We implemented manually controlled Robot, so that we can move the Robot as per the surveillance Area based on the suspected area, a robot will be controlled over the remote position using the android App and communication media will be Bluetooth.

Sensor monitoring part will be taken care by the different circuit which will be mounted on the Robot. It will sense the sensor values and then sent them to server, based on the

sensor readings we are going to decide if this is danger conditioner not and we will send SMS alert.

The importance of gas sensing is set to grow with increasing requirements for safety and environmental protection across many industries. The current range of gas sensing technologies has served us well but the future holds many new possibilities.

The main objective of the work is designing microcontroller based gas detecting and alerting system. If the gas is detected then user can get alert message. The advantage of this automated detection and alerting system over the manual method is that it offers quick response time and accurate detection of an emergency and in turn leading faster diffusion of the critical situation.

The sensors are used to monitor the leakage of the gas as sensor plays as important role in our day-to-day life. The system handle the detection. If there is a leakage of gas then it can perform the necessary safety measures accordingly within a second. And an alert will send to authorized person. If the user don't have any internet connection then user can't get alert message. This process can be done faster than the existing process.

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