INDUSTRIAL ENVIRONMENT MONITORING SYSTEM USING AVR328

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ABSTRACT

Air pollution is increased day by day due to various factors. The level of pollution has increased due to industrialization and urbanization which results in harmful effects on human health. So as to observer quality of air, a Wi-Fi based module is designed & implemented using Internet of Things simply called as IoT. This system is design on a device to IoT for monitoring air pollution, once the sensor has read the particular pressure in industry.

In order to monitor, system has implemented in a WSN (Wireless Sensor Network) based on new framework which is based on the data acquisition and transmission. Different type of sensors are used such as CO, CO_2. A system is used through which the level of sound and the existence of the harmful gases in the surroundings area can be detected. A text message is sent to the base station through Wi-Fi module which shows the content of CO, CO_2 gases as well as temperature present in surrounding.

This system designed on device to cloud architecture in IoT for monitoring air pollution precisely. Once the sensor node reads individual pollutants composition and location coordinates, Air quality index (AQI) will be calculated using linear segmented principle with greater Vancouver AQI table and Max operator aggregation method. Based on AQI value, corresponding LED will be actuated for indication and health impact with precaution steps messages will be displayed on the screen. All those data will be pushed to cloud storage an open source application programming interface for loT based devices. These pushed data along with date and time can be retrieved as a separate excel sheet for future analysis.

Keyword: *ATMEGA 16, WSN, Gases, Sensor, Air pollution, IoT (Internet of Things), LCD display, Wi-Fi Module,etc.*

1. INTRODUCTION

A Power Station is additionally referred because the generating station, power station, power house, or generating plant is Associate in Nursing industrial facility for the generation of electrical power. Each power station contains one or additional generators, if the machine is rotating that convert mechanical power into electrical power. There are two types of energy resources specifically renewable and non-renewable energy resources. The most distinction between is renewable energy resource is well generated at interval a brief amount of your time whereas non-renewable energy cannot. For example, renewable energy resources specifically solar energy, wind energy, geo thermal energy, hydro electrical energy. For example of non-renewable energy resources includes coal, petroleum, and fossil fuel.

The development of air contaminated is termed pollution explicit attention is given to factors which can affect have on effect on human health and therefore the health of the natural system itself. Industrial monitoring is the collection of information at totally different locations of industries and at regular intervals of your time in order to provide the data which can be accustomed outline current conditions. We advise to use Wireless Sensor Network (WSN) for this purpose. Due to the quality of parameters, large variations are found between totally different industries. The device nodes are set with gas sensors and that they communicate wirelessly and big variety of outputs collected from individual sensors is compared for a additional correct analysis. Thus, Wireless Sensor Networks provide powerful new ways in which to watch air quality.

2. BLOCK DIAGRAM

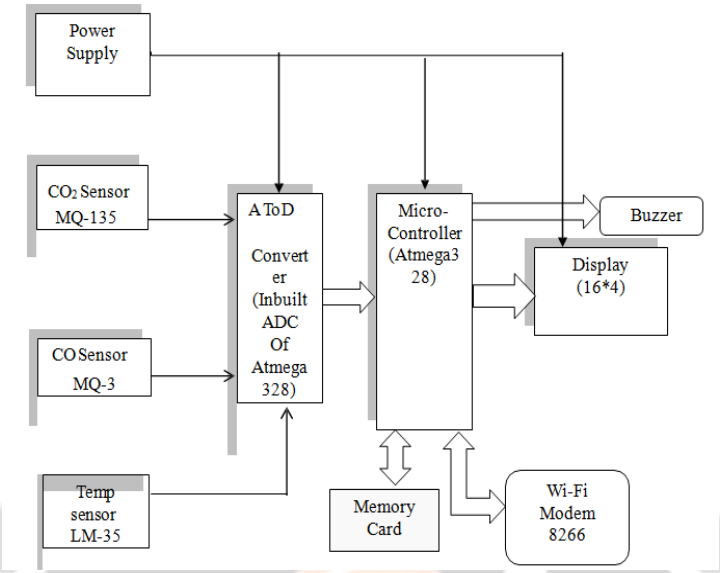


Fig. a

3. RELATED WORK

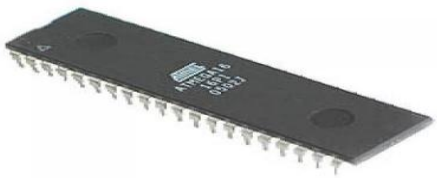
The projected air quality observation is predicated on the block diagram as shown in Fig(a). The information in air is acquired by CO_2 sensor, SO_2 sensor, temperature and humidity sensor, power supply are used. All the information are transfer to the A to D converter (Inbuilt ADC Of Atmega328). After the information acquisition stage, the pre-processing stage comes within which the Arduino processes the information received from the sensors and changes it into additional variable kind to be accessed at the base station and by the user.

After this data are stored in the Micro-Controller (ATMEGA328) & Eencrypted memory card, then 24x7 data are displayed in LCD display. In case all the sensor temperature are overflow then buzzer are indicate, & man power are control be temperature.Wi-Fi acts as a gateway for the communication between Arduino and the base station. The text message though Wi-Fi module marks an extra precaution for the level of CO in air. Temperature and humidity values are also transmitted via a short range communication with the Wi-Fi module.

4.1 HARDWARE REQUIRED

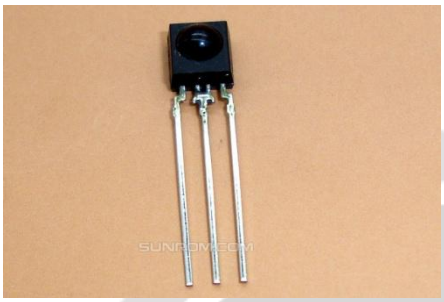
A] ATMEGA 16

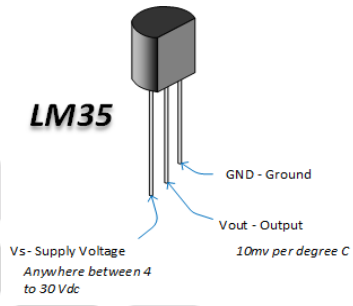
A microcontroller is a single chip, self-contained computer which incorporates all the basic components of a computer on a much smaller scale. Microcontrollers are often referred to as single chip devices or single chip computers. In functional terms, a microcontroller is a programmable single chip which controls a process or system. Microcontrollers are typically used as embedded controllers where they control part of a larger system such as appliance, automobile, scientific instrument or a computer peripheral. Microcontrollers are designed to be low cost solutions therefore using them can drastically reduce part and design costs for a project.



B] TEMPERATURE SENSOR

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ˚ Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4˚C at room temperature and ±3⁄4˚C over a full −55 to +150˚C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. The LM35 is rated to operate over a −55˚ to +150˚C temperature range, while the LM35C is rated for a −40˚ to +110˚C range (−10˚ with improved accuracy).





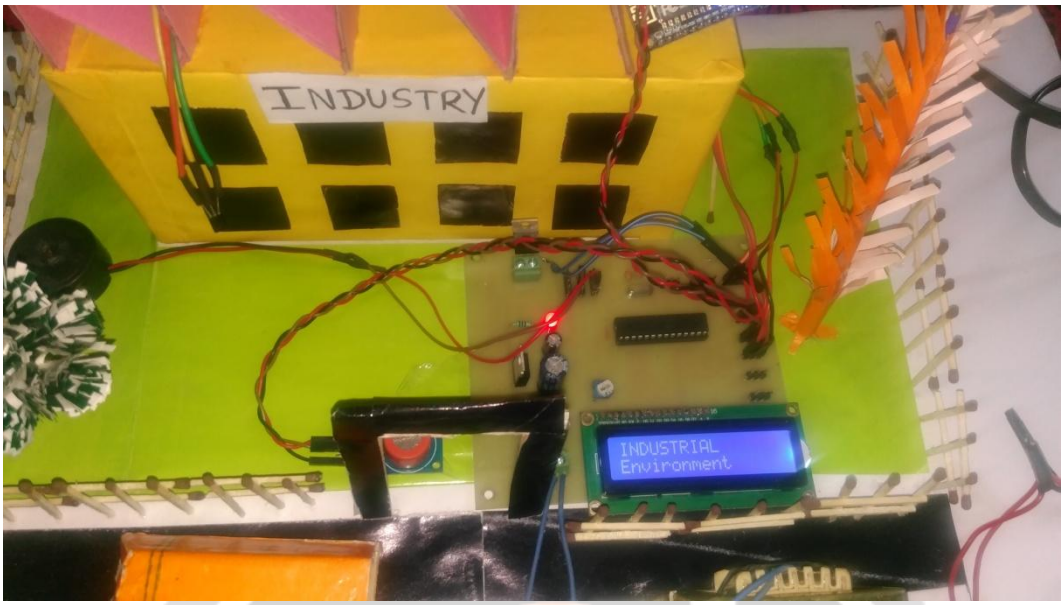
C] CARBON DIOXIDE SENSOR

The MQ-135 gas sensor senses the gases like ammonia nitrogen, oxygen, alcohols, aromatic compounds, sulfide and smoke. The boost converter of the chip MQ-3 gas sensor is PT1301. The operating voltage of this gas sensor is from 2.5V to 5.0V. The MQ-3 gas sensor has a lower conductivity to clean the air as a gas sensing material. In the atmosphere we can find polluting gases, but the conductivity of gas sensor increases as the concentration of polluting gas increases. MQ-135 gas sensor can be implementation to detect the smoke, benzene, steam and other harmful gases. It has potential to detect different harmful gases. The MQ-135 gas sensor is low cost to purchase.

D] CARBON SENSOR

The Grove - Gas Sensor (MQ3) module is useful for gas leakage detection (in home and industry). It is suitable for detecting Alcohol, Benzine, CH4, Hexane, LPG, CO. Due to its high sensitivity and fast response time, measurements can be taken as soon as possible. The sensitivity of the sensor can be adjusted by using the potentiometer. This module is made using Alcohol Gas Sensor MQ3. It is a low cost semiconductor sensor which can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. The sensitive material used for this sensor is SnO2, whose conductivity is lower in clean air. It's conductivity increases as the concentration of alcohol gases increases. It has high sensitivity to alcohol and has a good resistance to disturbances due to smoke, vapor and gasoline.

5. PROJECT MODEL



6. APPLICATIONS

1. **Roadside pollution Monitoring.**
2. **Industrial Perimeter Monitoring.**
3. **Site selection for reference monitoring stations.**
4. **Indoor Air Quality Monitoring.**
5. **To make this data available to the common man.**

7. CONCLUSION

This system is employed to watch numerous parameters of atmosphere using ATMEGA 328 microcontroller. The WSN Technology is planned to enhance quality of air, with the utilization of technologies like WSN which boost the method of watching aspects of atmosphere like air quality watching issue planned during this paper. The detection and watching of dangerous gases is taken into consideration and connected precautions are thought of here within the kind of a buzzer so the mandatory action may be taken. It's calculated that this method can have an excellent acceptance within the market because it may be centralized system for a complete watching operate. This watching system is increased by adding wireless network like a memory card for storage of values from gas sensors can be used like Carbon dioxide (CO2), Carbon monoxide (CO), Temperature. Another aspect of measurement particulate matter can be introduced to create it additional advanced.

9. REFERENCES

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