



e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

Volume 10, Issue 3, March 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.122

9940 572 462

6381 907 438

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Implementation of Environment Parameters Monitoring in a Manufacturing Industry Using IOT

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ABSTRACT: The significance of clean, fresh air for human well-being and wellbeing cannot be overstated. However, due to India's industrialization and urbanisation, a rise in air pollution has been observed in recent years, rendering preserving good ambient air quality a challenge. Furthermore, there have been significant shifts in population development and consumption patterns, as well as ongoing economic growth. Cities are becoming more polluted as a result of growth. Hazardous chemicals like carbon monoxide and nitrogen are not only toxic to people's health, but they can have an irreversible effect on the climate. This system uses a wireless sensor network (WSN) to introduce a low-cost and energy-efficient air quality monitoring system that can be easily deployed in highly polluted areas such as India's manufacturing industries to track air quality index including IOT. When the contents of the air threaten the comfort or health of humans and animals, or even harm plants and other items, the air is said to be contaminated. These materials are referred to as air pollutants, and they may be in the form of particles, liquids, or gases. Air Quality Monitoring (AQM) is done to determine the level of pollution, ensure that national legislation is followed, analyse control options, and provide data for air quality analysis. The aim of air quality monitoring (AQM) is to alert humans and protect the atmosphere from toxic air pollution. It also gives industry authorities and environmental departments real-time access to air quality monitoring data. Fast measures can be taken based on the AQI, corrective emission management techniques can be enforced based on the pattern of incidents, the effects of regulatory actions can be measured, and scientific analysis can be conducted.

I. INTRODUCTION

Nowadays web server based monitoring system are widely used in many industries, and they set up a PC-based server which consumes a large power. This project explains data acquisition system that is controlled by a web server.

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function.

An embedded system is a microcontroller-based, software driven, reliable, real-time control system, autonomous, or human or network interactive, operating on diverse physical variables and in diverse environments and sold into a competitive and cost conscious market. An embedded system is not a computer system that is used primarily for processing, not a software system on PC not a traditional business or scientific application. High-end embedded & lower end embedded systems

II. PROJECT AND THE WORLD

Many businesses already use web server-based monitoring systems, and they set up a PC-based server that consumes a lot of power. This project discusses how a web server manages a data acquisition system. An Embedded System is a collection of computer hardware and software, as well as mechanical and other components, that is designed to perform a specific task. A microcontroller-based, software-driven, dependable, real-time control system, autonomous or human or network interactive, running on a variety of physical variables and in a variety of environments, and sold into a competitive and cost-conscious market is known as an embedded system. . An embedded machine is not a processor



unit, nor is it a PC software system, nor is it a conventional business or science application. Embedded devices, both high-end and low-end. The air quality sensor also acts as a MQ-135 sensor, which detects venomous gases in the air in homes and workplaces. Tin dioxide is used in the sensor unit's gas sensor sheet (SnO₂). It has a lower conductivity than clean air, and the conductivity increases as a result of air pollution. Ammonia, nitrogen oxide, smoke, CO₂, and other hazardous gases are measured by the air quality sensor. A small potentiometer on the air quality sensor allows the load resistance of the sensor circuit to be adjusted. For air quality, a 5V supply is used.

III. WORKING OF SYSTEM

The Arduino Uno R3 boards and ESP8266 WI-FI Modules operate at 3.3 V, while the LCD, DHT11, MQ-135, MQ-7, DUST SENSOR, and PH SENSOR operate at 5V DC. Connecting the Arduino to a USB port or a 12V adaptor will provide electricity. The rest of the components are operated by the Arduino board's 5V output since the voltage supply and ground pins of the other modules are attached to the common VCC and ground, respectively. The system's LCD is attached to the Arduino Uno's 2, 3, 4, 5, 6, and 7th pins, and it runs in 4-bit mode. The monitoring environmental parameters of the industry are displayed on an LCD display. The analogue outputs of the MQ-135 Dust and MQ-7 Sensors are wired to the Arduino A0, A1, and A2 Analog inputs, respectively. The dust sensor output is an analogue voltage proportional to the measured dust density, with a sensitivity of 0.5V/0.1mg/m³. CO₂ and CO are monitored via MQ-135 and MQ-7 with PPM (parts per million) units, from which an AQI (Air Quality Index) can be calculated; the dust sensor output is an analogue voltage proportional to the measured dust density, with a sensitivity of 0.5V/0.1mg/m³. The DHT11 is a temperature and humidity sensor that is widely used. The sensor contains a dedicated NTC for temperature measurement and an 8-bit microcontroller for serial data production of temperature and humidity values. With an accuracy of 1°C and 1 percent, the sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90%. In the manufacturing industry, a pH Meter is a serial output system connected to the Arduino's 11th Pin as a software serial input for potentiometrically calculating the pH, which is either the concentration or behaviour of hydrogen ions, of an aqueous solution. While special probes are often used to measure the pH of semi-solid substances, pH metres are typically used to measure the pH of liquids.

IV. PROTEUS SIMULATION

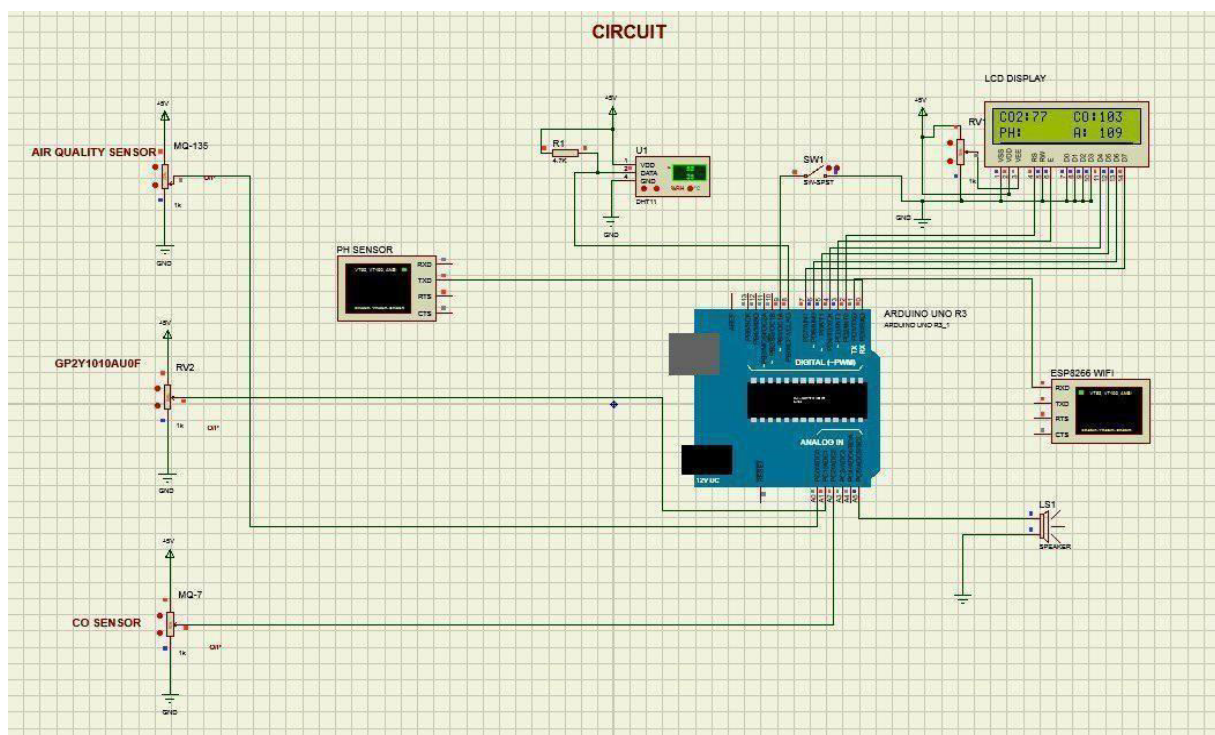


Fig.1 Normal mode of operation

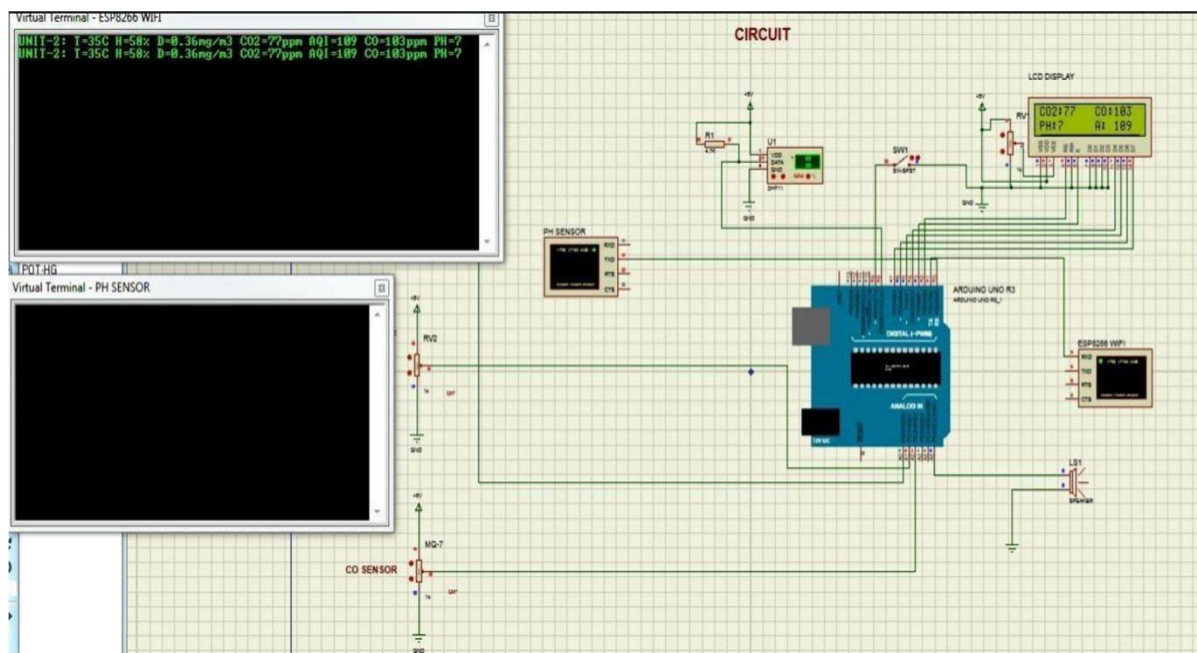


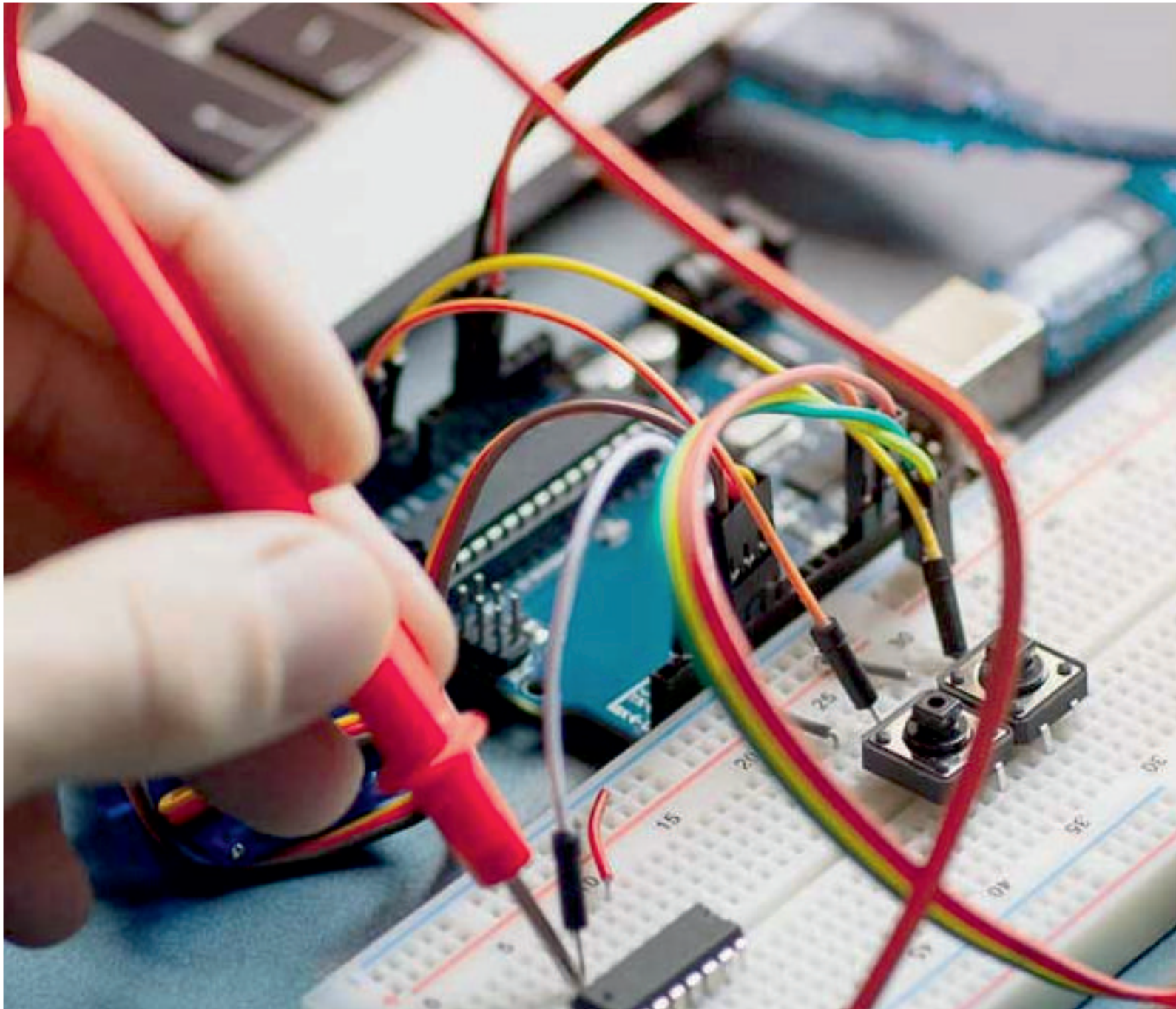
Fig.2 - Environment Parameter Monitoring indication

V. CONCLUSION

This article outlines a reconfigurable smart WSN device based on the Internet of Things for tracking industrial safety parameters. Sensor data can be intelligently collected by the machine. It was developed using wireless communication as a basis for design. It's ideal for the actual and cost-effective needs of a high-speed data acquisition system in an IoT environment. The use of the ARDUINO UNO simplifies peripheral circuit design and makes the whole device more versatile and scalable. As long as the sensors are attached to the device, they can be used in a number of ways. This paper describes the main design approach for a reconfigurable smart sensor interface system. Eventually, we checked that the device achieved good results in practise by using industrial safety parameters monitoring in an IoT setting as an example. Nonetheless, there are several interesting avenues for future research in the field of WSN in the IoT climate. As a result, an IoT-based industrial environmental monitoring parameter system has been developed and deployed. The output of the environmental parameter was successfully transmitted via the LCD Monitor. The people will be protected from pollutant gases as a result of this initiative. In industries, process management and monitoring are needed to meet the increased demand for data accuracy. It is more advantageous to businesses to monitor air emissions in the local area and to ensure the safety of their workers.

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