



International Journal of Intellectual Advancements and Research in Engineering Computations

Analysis and monitoring of secure smart environmental system and safety alert using IOT

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ABSTRACT

A smart city enables the effective utilization of resources and better quality of services to the citizens. To provide services such as air quality management, weather monitoring and automation of homes and buildings in a smart city, the basic parameters are temperature, humidity and CO₂. This paper presents a customized design of an Internet of Things (IoT) enabled environment monitoring system to monitor temperature, humidity and CO₂. In developed system, data is sent from the transmitter node to the receiver node. The data received at the receiver node is monitored and recorded in personal computer (PC) through a Graphical User Interface (GUI), made in visual basic. The results and the performance of the proposed system is discussed.

Keywords: Microcontroller, IOT, Pollution Monitoring, Smart city, Internet of Things, Cloud

INTRODUCTION

The IoT has a large role to play in future smart cities. The IoT can be used in practically all scenarios for public services by governments. Sensor-enabled devices can help monitor the environmental impact of cities, collect details about sewers, air quality, and garbage. Such devices can also help monitor woods, rivers, lakes, and oceans. Many environmental trends are so complex, that they are difficult to conceptualize. The Internet of Things (IoT) is a recent communication paradigm that envisions a near future, in which the objects of everyday life will be equipped with microcontroller transceivers for digital communication, and suitable protocol stacks that will make them able to communicate with one another and with the users, becoming an integral part of the Internet. An urban IoT can provide means to monitor the quality of the air in crowded areas, parks, or fitness trails. The realization of such a service requires that air quality

and pollution sensors be deployed across the city and that the sensor data be made publicly available to citizens.

EXISTING SYSTEM

A wireless device network (WSN) is an infrastructure comprised of sensing, computing and communication elements that permits the administrator to monitor Pollution management of the specified parameters in the network. Typical application of WSN includes knowledge assortment, monitoring, surveillance and Pollution. All Sensor are deployed over the specified area and the pollution related information is captured from all available sensor.

PROPOSED SYSTEM

The goal of building a smart city is to improve quality of life by using technology to improve the

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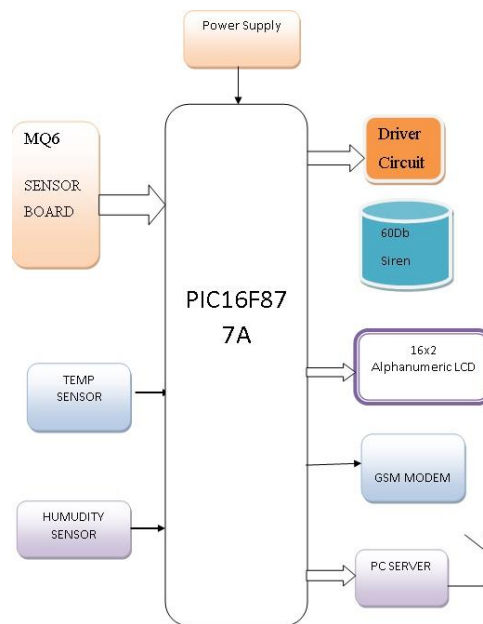
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efficiency of services and meet residents' needs. Information and Communication Technology allows city officials to interact directly with the public to tell what is happening in the city, how the city is evolving, and how to enable a better quality of life. A Smart City is one with at least one initiative addressing one or more of the following six characteristics: Smart Governance, Smart People, Smart Living, Smart Mobility, Smart

Economy and Smart Environment. We are going to develop an app that is going to bear a hand in this campaign.

Consider an area that is being surveyed for estimating how much the area is affected by pollution. The constituents of air along with its proportion are calculated and if it is higher than normal then the officials are intimated about it. Then the people are evacuated to a safe place.

Block diagram



LM35 Temperature Sensor

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade)

temperature. It operates at 4V to 30V. It has low impedance 0.1W for 1mA Load. It has Linear + 10.0 mV/°C scale factor.

SY-HS220 Humidity Sensor



This sensor module converts relative humidity (30-90%RH) to voltage and can be used in weather

monitoring application. Operates at DC 5V. Output humidity-1.98V (at 25 degree and 65RH).

MQ-7 Gas Sensor



This is a simple-to-use Carbon Monoxide (CO) sensor, suitable for sensing CO concentrations in the air. The MQ-7 can detect CO-gas concentrations anywhere from 20 to 2000ppm. This sensor has a high sensitivity having heating time 60 seconds. The sensor's output is an analog resistance. The drive circuit is very simple operating at 5V. Operates at temperature- -20°C-50°C.

PIC Microcontroller

PIC16F877A is used in lot of pic microcontroller projects. PIC16F877A also has many application in digital electronics circuits. It has a total number of 40 pins and there are 33 pins for input and output. The PIC microcontroller PIC16f877a the most renowned microcontrollers in the industry. This controller is very convenient to use, the coding or programming of this controller is also easier. The advantages is that it can be write-

erase as many times as possible because it use FLASH memory technology.

GSM Module SIM900

The SIM900 is a complete quad band GSM/GPRS solution in a SMT module which can be embedded in the customer applications. It can communicate with controllers via AT commands. This module support software power on & reset. It is designed with a very powerful single chip processor & it has low power consumption.

LCD DISPLAY

LCD (Liquid Crystal Display) screen is an electronic display module. A 16x2 LCD is very basic module. It can display 16 characters per line and there are 2 such lines. In a LCD display each character is displayed in 5x7 pixel matrix. The LCD is shown in Figure.

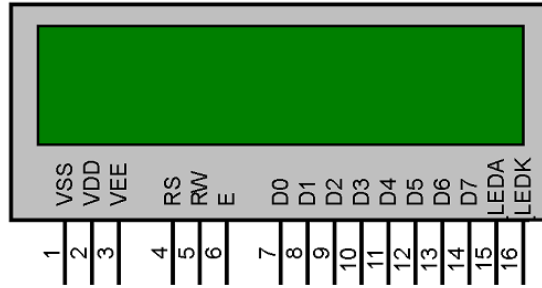
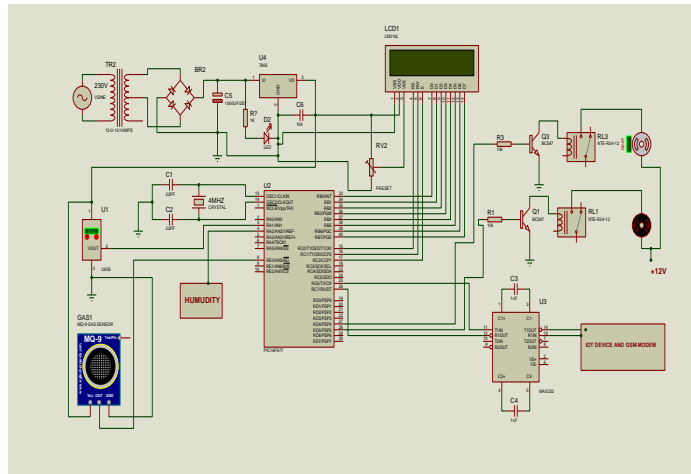


Figure : LCD display

This is interfaced to PORT B (pin 33-40) of the microcontroller. LCD in 8 bit mode is connected to microcontroller. D0-D7 pins are connected to

RBO-RB7 pins of microcontroller. RW pin is connected to the GND.

Circuit diagram



CONCLUSION

In this paper, the notation of environmental monitoring using IoT was proposed to monitor the city from the damages cost which may affect the living of the citizens. As a proof of concept we implemented a IoT of a proposed system. We showed that our system can access the data without any embedded system.

FUTURE WORK

The information's that are collected by the sensors could be used by the authorities to take necessary action such as emergency warning messages and evacuation of people to safe places. Further implementing pollution monitoring systems will help to assess how bad air pollution is from day to day and save the environment from further pollution.

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