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REVIEW ARTICLE

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Petroleum Gases Measurement System With Remote Monitoring using TCP/IP

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ABSTRACT
Computer communication systems and especially the Internet are playing an important role in the daily life. With the help of this knowledge many applications are imaginable. Home automation, utility meters, appliances, security systems, card readers, and building controls, can be easily controlled using special front-end software or a standard internet browser client from anywhere around the world . In this Project we are using TCP/IP protocol implementation for monitoring the data from remote location using internet connection. This project is designed to make Green house or industrial gases monitoring and send alerts to the authority when some parameters exceed above certain value. In This project different sensors are used to measure the parameters like co gas, methane gas & temperature. This will communicate with another authorized personnel and this information will be displayed on the GUI of PC. Which in turn inform the authority about exceeded value of parameter. Also this parameters will be displayed in the green house controlling room. Temperature is sensed by sensors. Sensor output is given to microcontroller.

Keywords: LM35 sensor, MQ7 sensor, MQ4 sensor, TCP/IP Protocol, 89v51 microcontroller.

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INTRODUCTION

Atmospheric concentrations of the key greenhouse gases (GHG) carbon dioxide, methane etc well above pre-industrial levels constitute the main cause for the predicted rise at average surface temperature on Earth and the corresponding change of the global climate system. However, once these gases leaks from their storage places or reservoirs, all the efforts that human beings have made to fight global warming would be wasted. Therefore, what is in needed after the geological GHG storage is long-term monitoring of the greenhouse gas leakage, which is extremely important to help ensure that geologic state of those gases is safe. For this reason, the development of remote online monitoring system is of great significance to geological gas storage and leakage warning. The system can be used in areas involving various gases and temperatures. For eg: Laboratories, Industries, Factories etc. The system can detect changes in these areas which consist various gases and temperatures and inform the authorities.

LITERATURE SURVEY

In paper [1], the author describes the simulation output of the system which can be used in industries to reduce the emission level by the indication given by the system. The greenhouse gases are known to be the major cause of global warming as we know it, since they trap heat inside the earth's atmosphere. Gas leak detection is the process of identifying potentially hazardous gas leaks by means of various sensors. These sensors usually employ an audible alarm to alert people when a dangerous gas has been detected. The sensors used in the system will continuously monitor the emission of gases from the industry. The criterion level which the industry can emit is specified by the controller. If the emission exceeds its criterion level, a LED which is connected with the controller will glow to indicate the industries to reduce its emission level.

In paper [2], the author aims to modify an existing safety and security model for the environment of educational institutions and in home. The goal of this work is to design an embedded system for remotely monitoring the laboratory environment. Nowadays remote monitoring the laboratory and its building is necessary for safety and security purpose, which is also helpful to know the environmental status of the laboratory. The environmental parameters inside the lab, such as presence of gas, alcohol and fire can be detected using respective sensors and the sensed data are then transferred to the microcontroller. The microcontroller takes the control action of activating an alarm whenever the presence of these parameters is found. Then, the Voice alarm and alert message are also sent to the remote area.

In paper [3], the author present that atmospheric concentrations of the key greenhouse gas (GHG) carbon dioxide (CO_2) well above pre industrial levels constitute the main cause for the predicted rise at average surface temperature on Earth and the corresponding change of the global climate system. Therefore, what is in needed after the geological CO_2 storage is long-term terrain monitoring of the greenhouse gas leakage, which is crucial and very important to ensure that geologic sequestration of gas is safe. For this reason, the development of remote online monitoring system is of great significance to geological CO_2 storage and leakage warning. This experiment adopts self-made portable CO_2 monitoring equipment, which obtains localization and time service information through GPS, and it can cache dynamic changes of real-time monitoring data into SD cards. GPRS is employed to wirelessly transmit them to the server, which ensures the continuity of data acquisition and monitoring.

SYSTEM DESIGN

A. Microcontroller

The microcontroller manages the operation of each module. The microcontroller used is 40 pin microcontroller. It has a flash program memory of 16 kbytes. It features high level of integration. It consists of SRAM data memory of 1024 bytes. Its i/o pins are 32 and has three 16-bit timers. Features master slave operation with speed upto 10MHz. The Flash program memory supports both parallel programming and in serial In-System Programming (ISP). Has eight interrupt sources with four priority levels.

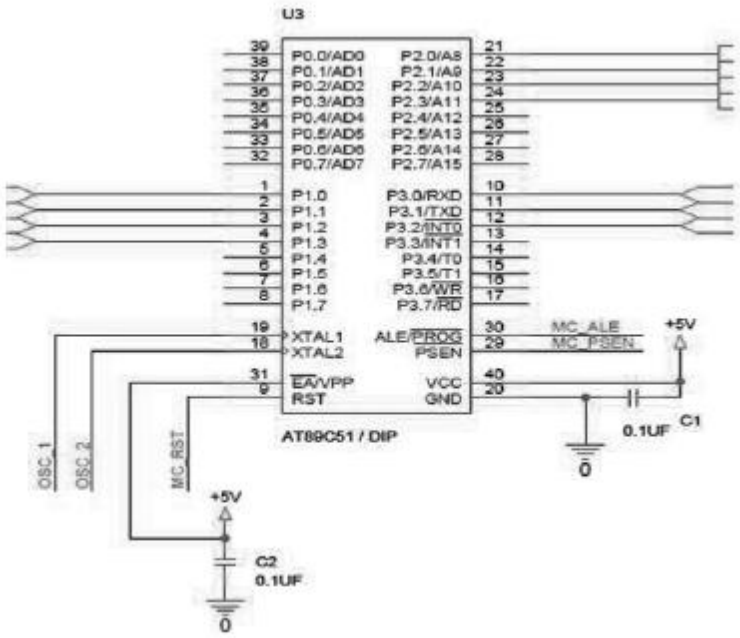

Fig 1: 89V51 Microcontroller

B. Sensor Specifications

Air environmental information acquisition sensors array includes: CO sensor, temperature sensor and methane sensor. These sensors, respectively, provide real-time collection of air data to the central processing unit. Each sensor is described in the following.

Temperature sensor (LM35): It will sense the temperature change in the specified area and according produce the output voltage The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly rational to the Celsius (Centigrade) temperature

CO Sensor (MQ7): This is a Carbon Monoxide (CO) sensor, suitable for sensing CO concentrations in the air. The MQ-7 detects CO concentrations from 20 to 2000ppm. This sensor has a high sensitivity and fast response time. The sensor's output varies the resistance as per the change in CO levels. The output is then connected to an ADC.

Methane sensor (MQ4): It measures methane present in the atmosphere from 0 to 100% volume with resolution of 0.01 % for 0-10% methane and 0.1% for 10-100% volume.

C. Signal-Conditioning-Circuit

This circuit will filter and amplify the signals from all the sensors, so that it can be further used for ADC. The task of filtering and amplifications will be performed by filter circuit and Op-Amps.

D. ADC

The function of ADC is to convert the analog signals in to digital format, the output signals from the sensors will be connected to the input channels of ADC. The ADC will convert them into digital format so as to make it readable for microcontroller.

PROCESS FLOW

Process flow includes two main parts, Data Aquisition and Data Transmission. Data Acquition includes acquiring status of concentration of the gases in the environment with the help of various sensors. Data Trasmission takes place as follows.

A. Server System

The data from the ADC is then given to microcontroller. The controller will process this data and send it to the server PC via serial communication using RS-232 protocol. The server PC will then take help of TCP /IP protocol in order to make this data available for the entire client PCs over the internet. For this a software programming is used in order to translate data to TCP/IP protocol server will reply to client PCs requests. It will send the data using TCP/ IP protocol to clients.

B. Client PC

Client PCs will access data from server by sending the requests. The client will receive the data from server. Client PCs will have a specially designed GUI (Graphical User Interface) in order to represent data in graphical format. The GUI is created by using software programming. In this way user can access the data over the internet.

THEORETICAL MODEL OF PROJECT:

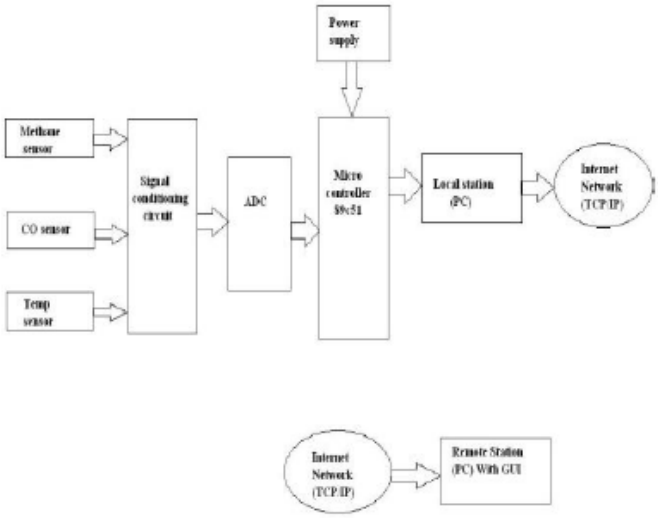

Fig 2: System Architecture

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