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DEVICE CONTROL APPROACH FOR ENVIRONMENT MONITORING USING WIRELESS SENSOR NETWORK

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ABSTRACT: ***In an industry during certain hazards is will be very difficult to monitor the parameter through wires and analog devices such as transducers. To overcome this problem we use wireless device to monitor the parameters so that we can take certain steps even in worst case. Few years back the use of wireless device was very less, but due the rapid development in technology now-a-days we use maximum of our data transfer through wireless like Wi-Fi, Bluetooth, WI-Max, etc. This project is designed as a green house remote monitoring system based on zigbee Technology.***

INTRODUCTION

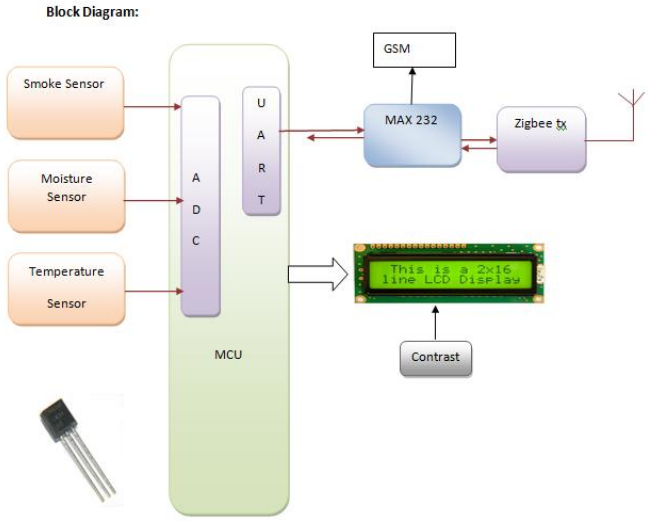
The greenhouse vegetable production needs less labor, less capital, has faster returns than normal vegetable production. And it can not be easily influenced by the climate. Therefore the greenhouse vegetables are sought after by vegetable growers. It is very difficult to control scattered greenhouse without a remote environment monitoring system.

In this project we use different modules such as zigbee, 8051 as controller, smoke Sensor, Temperature sensor, Moisture sensor, and display the presence of gas on 16X2 LCD on the transmitter side. If any gas exceeds the value automatically at the receiver side the particular functionality will be on condition.

For example, the temperature is higher than a particular value the threshold, the fan will be ON condition at the receiver side. And the smoke sensor is activated then the buzzer will be ON, and the moisture is in dry condition then the motor will be ON and vice versa.

This project uses sensors such as smoke Sensor (MQ-6), Temperature sensor (LM35).Whenever hazardous gas is detected, a buzzer is connected to produce audible alert signal. And the sensor values are given to ADC to get processed by controller. The temperature sensor LM35 senses the temperature and converts it into an electrical (analog) signal, which is applied to the micro controller through ADC. The analog signal is converted into digital format by the analog-to-digital converter (ADC).this project uses microcontroller AT89S52.

This project uses two power supplies, one is regulated 5V. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.



Embedded controlled sensor network is the technology used to implement environmental solutions effectively. Many researchers have been making attempts to develop the embedded controlled sensor network. The existing systems are bulky, very costly and difficult to maintain. The proposed system is cost effective and controlled by user friendly embedded systems. In the proposed system ARM based microcontroller and wireless sensors are used to control the

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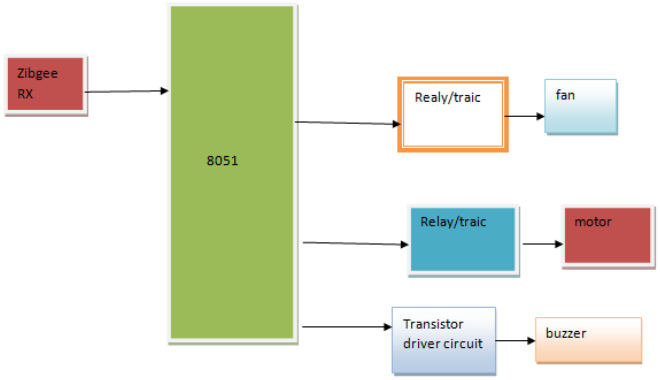
various devices and to monitor the information regarding the environment using Zigbee and GSM technologies.



Here we are using 3 sensors to monitor the temperature, smoke and moisture around. Let us have a detailed look about all those.

LM35 Precision Centigrade Temperature Sensor

FEATURES DESCRIPTION

• Calibrated Directly in ° Celsius (Centigrade)

• Linear + 10 mV/°C Scale Factor • 0.5°C Ensured Accuracy (at +25°C) • Rated for Full −55°C to +150°C Range

• Suitable for Remote Applications

• Low Cost Due to Wafer-Level Trimming

• Operates from 4 to 30 V

• Less than 60-µA Current Drain

• Low Self-Heating, 0.08°C in Still Air

• Nonlinearity Only ±¼°C Typical

• Low Impedance Output, 0.1 Ω for 1 mA Load

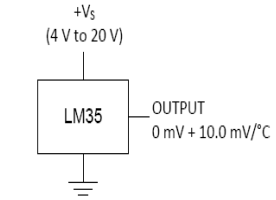


Figure 1. Basic Centigrade Temperature Sensor (+2°C to +150°C)

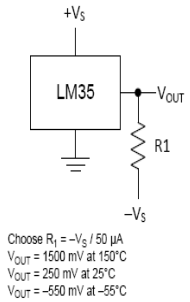


Figure 2. Full-Range Centigrade Temperature Sensor

MQ-2 Semiconductor Sensor for Combustible Gas

Sensitive material of MQ-2 gas sensor is SnO2, which with lower conductivity in clean air. When the target combustible gas exist, The sensor's conductivity is more higher along with the gas concentration rising. Please use simple electrocircuit, Convert change of conductivity to correspond output signal of gas concentration.

MQ-2 gas sensor has high sensitity to LPG, Propane and Hydrogen, also could be used to Methane and other combustible steam, it is with low cost and suitable for different application.

Character Configuration

*Good sensitivity to Combustible gas in wide range
* High sensitivity to LPG, Propane and Hydrogen
* Long life and low cost
* Simple drive circuit

Application

* Domestic gas leakage detector
* Industrial Combustible gas detector
* Portable gas detector

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Soil moisture sensor

These measure the water content in soil. A soil moisture probe is made up of multiple soil moisture sensors. Since analytical measurement of free soil moisture requires removing a sample and drying it to extract moisture, soil moisture sensors measure some other property, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for moisture content. The relation between the measured property and soil moisture must be calibrated and may vary depending on soil type. Reflected microwave radiation is affected by the soil moisture and is used for remote sensing in hydrology and agriculture. Portable probe instruments are used by farmers or gardeners.

Technologies commonly used in soil moisture sensors include:

• frequency domain sensor such as a capacitance sensor.
• neutron moisture gauges, utilize the moderator properties of water for neutrons.
• electrical resistance of the soil
• Time domain transmission (TDT) and time domain reflectometry (TDR); water has a high dielectric constant; a higher water concentration causes a higher average dielectric constant for the soil. The average dielectric constant can be sensed by measuring the speed of propagation along a buried transmission line.[1][2]
• heat dissipation sensors rely on the effective thermal conductivity of soil. Soil with additional water conducts heat more readily than dry soil.[3] Heat dissipation sensors that include a porous intermediate water holding element are subject to errors of up to 30% during the wet and dry cycles.

Advantages:

• Reliability
• Ease of Operation
• Useful to detect harmful gases
• Can be used as electrolytic applications

Applications:

• Can be used in Mines to detect presence of dreadful gases.
• In public places like shopping malls, etc, this project can be applied where public safety is a major task.
• In hospitals and sensitive areas also this project can be implemented.
• In Marine Applications

Conclusion

By these module there is no need to monitor continuously what ever is happening around. One can get relaxed by leaving the work to the controller this will be sensing different things around using different sensors and the action will be taken accordingly.

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