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Implementation of Greenhouse Remote Monitoring System for Environmental Studies

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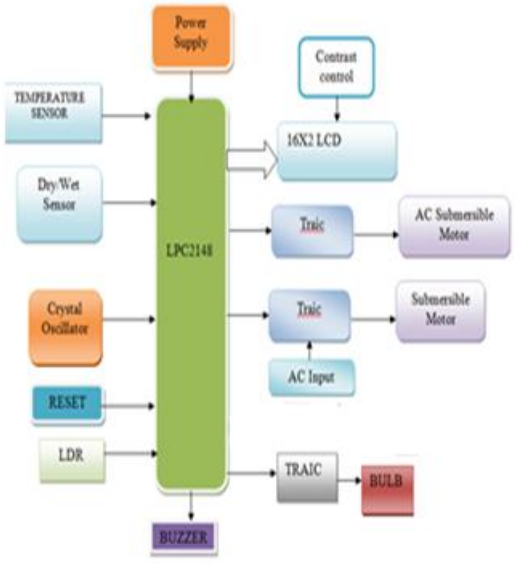
Abstract:
The greenhouse vegetable production needs less labor, less capital, has faster returns than normal vegetable production. And it cannot be easily influenced by the climate. Therefore the greenhouse vegetables are sought after by vegetable growers. It is very difficult to control scattered greenhouse without a remote environment monitoring system. In recent years, there appeared a canopy remote monitoring system based on Ethernet.

Introduction:
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 is 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 GSM Technology.

Existing system:
In this project we are using LPC2148, Moisture sensors, 2 AC submersible pump, 3traic boards in combination with MOC 3021 based opto coupler which acts as a driver, Temperature sensor, LDR. A submersible motor will get switched ON /OFF depending on the soil moisture condition and also when the temperature increases. The status of motor can be displayed on 16X2 LCD. To check the status of day and night mode we are using LDR sensor, Traic with bulb. The status of LDR can be displayed on LCD.



Drawback:
Here PIR sensor and CO2 sensor are not there to identify human and dangerous gas. There is no remote alert using GSM.

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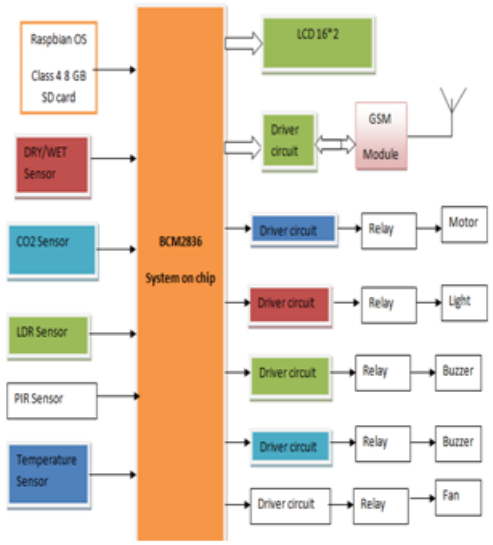
Proposed System:

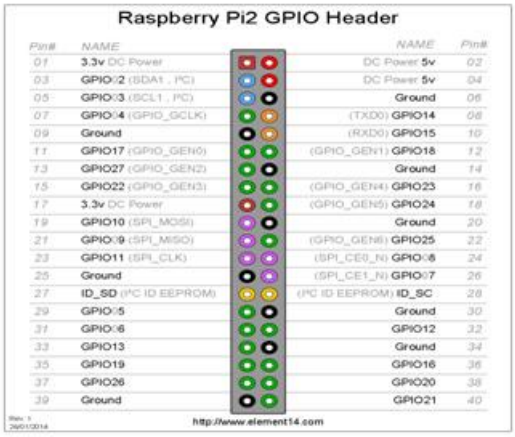
This project uses sensors such as Humidity, Smoke Sensor, Temperature sensor (LM35).Whenever hazardous gas is detected, A relay is connected to produce alert signal. And the sensor values are given to controller. The temperature sensor LM35 senses the temperature and converts it into an electrical (analog) signal, which is applied to the micro controller. Here PIR, LDR sensors are also used and their respective relay are also activated accordingly.

Block Diagram

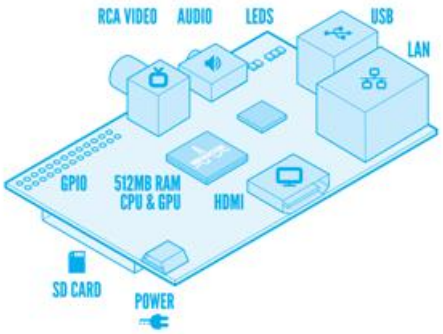


RASPBERRY-PI:

The Raspberry Pi has a Broadcom BCM2836 system on a chip (SoC), which includes an a quad-core Cortex-A7 cluster. The Cortex-A7 MPCore processor is a high-performance, low-power processor that implements the ARMv7-A architecture. The Cortex-A7 MPCore processor has one to four processors in a single multiprocessor device with a L1 cache subsystem, an optional integrated GIC, and an optional L2 cache controller.



Basic Hardware of Raspberry-PI:



Global System for Mobile Communication Definition:

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.

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LCD:

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

Command	RS	RW	D7	D6	D5	D4	D3	D2	D1	D0	Execution Time
Clear display	0	0	0	0	0	0	0	0	0	1	1.64mS
Cursor home	0	0	0	0	0	0	0	0	1	x	1.64mS
Entry mode set	0	0	0	0	0	0	0	1	I/D	S	40uS
Display on/off control	0	0	0	0	0	0	1	D	U	B	40uS
Cursor/Display Shift	0	0	0	0	0	1	D/C	R/L	x	x	40uS
Function set	0	0	0	0	1	DL	N	F	x	x	40uS
Set CGRAM address	0	0	0	1	CGRAM address						40uS
Set DDRAM address	0	0	1	DDRAM address							40uS
Read "BUSY" flag (BF)	0	1	BF	DDRAM address							-
Write to CGRAM or DDRAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	40uS
Read from CGRAM or DDRAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	40uS

These components are "specialized" for being used with the microcontrollers, which means that they cannot be activated by standard IC circuits. They are used for writing different messages on a miniature LCD.

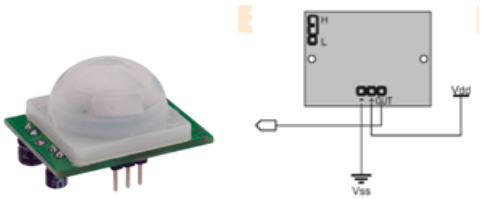
TEMPERATURE SENSOR:

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.

PIR SENSOR:

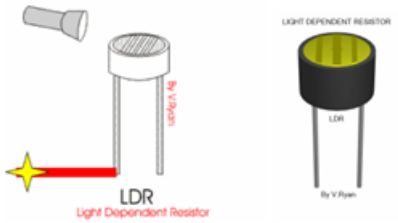
A PIR sensor, or Passive Infrared sensor, is a type of detector that is capable of detecting infrared light emitting from objects within its field of view.

PIR sensors differ from other infrared sensors because they are only able to receive infrared waves rather than being able to emit and receive them. Because all objects emit infrared (electromagnetic waves that travel with heat), PIR sensors are able to detect objects that are in front of them. In fact, PIR sensors can see many things that humans cannot. PIR sensors are used for a number of applications, such as night vision, motion detection, and laser range finding.



LIGHT DEPENDENT RESISTOR:

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically. The animation opposite shows that when the torch is turned on, the resistance of the LDR falls, allowing current to pass through it.



LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1,000,000 ohms, but when they are illuminated with light, the resistance drops dramatically.

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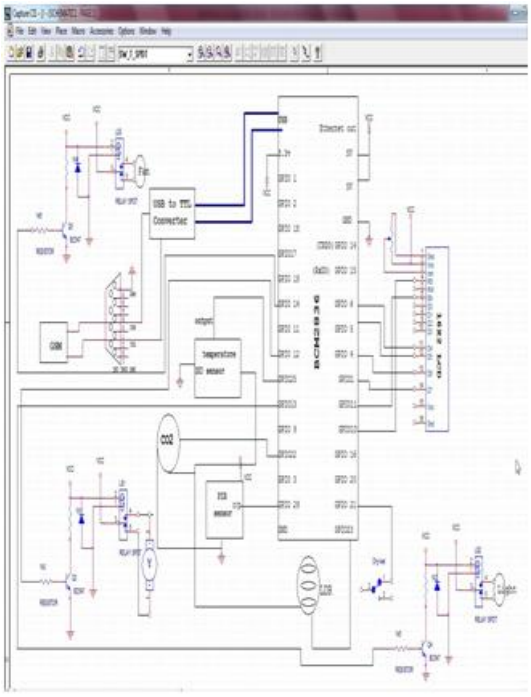
Interfacing Diagram:



Advantages:

- Reliability
- Ease of Operation
- Useful to detect harmful gases

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 Marine Applications

Hardware Kit:

Result:

Conclusion:

The greenhouse vegetable production needs less labor, less capital, has faster returns than normal vegetable production. We have arranged few sensors to maintain environment automatically. The status of every sensor will given through the SMS. Here PIR, LDR sensors are also used and their respective relay are also activated accordingly.

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Is a proficient Ph.D person in the research area of Image Processing from Vel-Tech University, Chennai along with initial degrees of Bachelor of Technology in Electronics and Communication Engineering (ECE) from Dr. S G I E T, Markapur and Master of Technology in Embedded Systems from SRM University, Chennai. He has 13 years of teaching experience and has published 12 Papers in International Journals, 2 Papers in National Journals

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and has been noted under 4 International Conferences. He has a fellowship of The Institution of Electronics and Telecommunication Engineers (IETE) along with a Life time membership of Indian Society for Technical Education (ISTE). He is currently bounded as an Associate Professor and is being chaired as Head of the Department for Electronics and Communication Engineering discipline at Siddhartha Institute of Engineering and Technology, Ibrahimpatnam, Hyderabad. Technology and Design, communication systems and Digital electronics.