Optimal Energy Management of Greenhouses in Smart Grids

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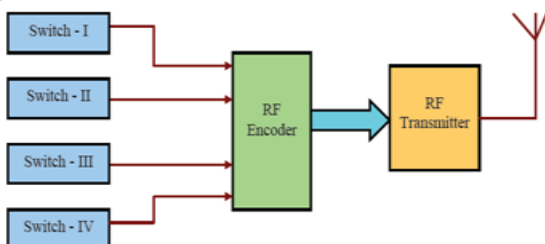**M.Tech Student**
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ABSTRACT:

In an industry during certain hazards is will be very difficult to monitor the parameter through wires and analog devices such as transducers. 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

Existing system

Controlling industrial / home appliances is a very interesting and useful project. This project is designed to control up to four electrical appliances. This project used popular RF encoder and decoder IC's. Four Switches are connected to the RF Encoder. This encoded data is transmitted through a RF transmitter module. In the receiver side, the RF receiver module receives the encoded data and decodes using an RF Decoder. This decoded output data is given to triac driver. Loads are driven through triacs. Up to 7A load can be connected to these loads.

## TRANSMITTER:

Receiver
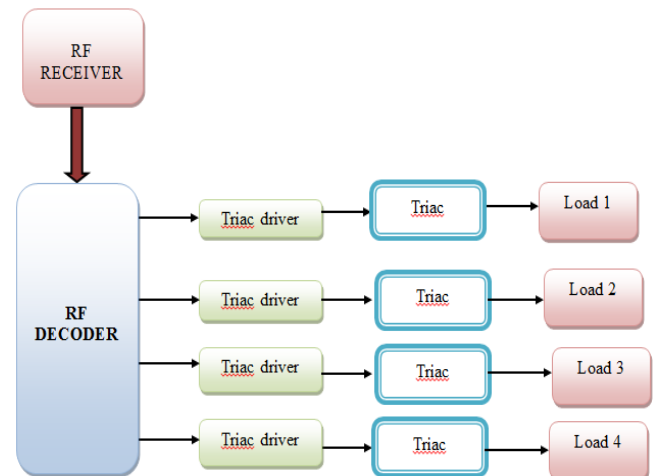
Drawback:

In the above given method, the loads are operated using RF wireless technology but this is done manually. By using proposed method automatic operation of loads can be done.

Proposed system

In an industry during certain hazards is will be very difficult to monitor the parameter through wires and analog devices such as transducers .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.

This project uses sensors such Temperature sensor (LM35), LDR. The temperature sensor LM35 senses the temperature and converts it into an electrical (analog) signal, which is applied to the micro controller. As the particular temperature sensor is activated high, the load(Fan) is ON. In the same way the LDR senses night, the load (bulb) will be ON. Here two temperature sensors and two LDR sensors are used.
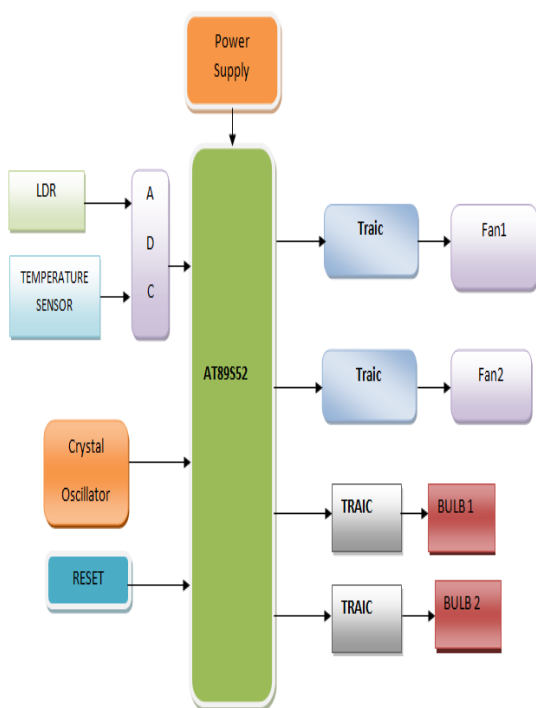
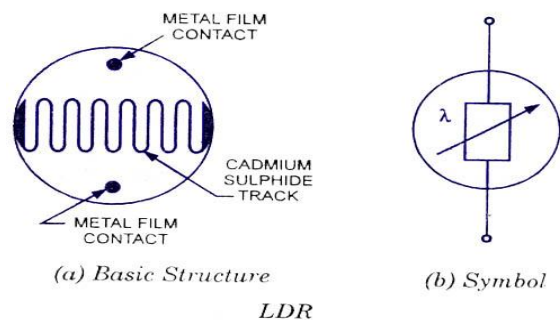

Hardware modules
Temperature Sensor

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. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4°C at room temperature and ±3⁄4°C over a full −55 to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The
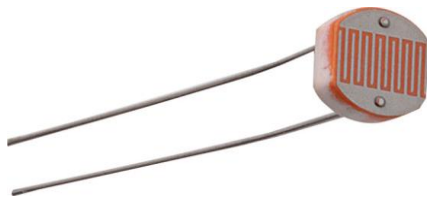
LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 μA from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35 is rated to operate over a −55° to +150°C temperature range, while the LM35C is rated for a −40° to +110°C range (−10° with improved accuracy). The LM35 series is available packaged in hermetic TO-46 transistor packages, while the LM35C, LM35CA, and LM35D are also available in the plastic TO-92 transistor package. The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-220 package.
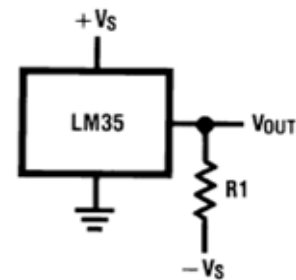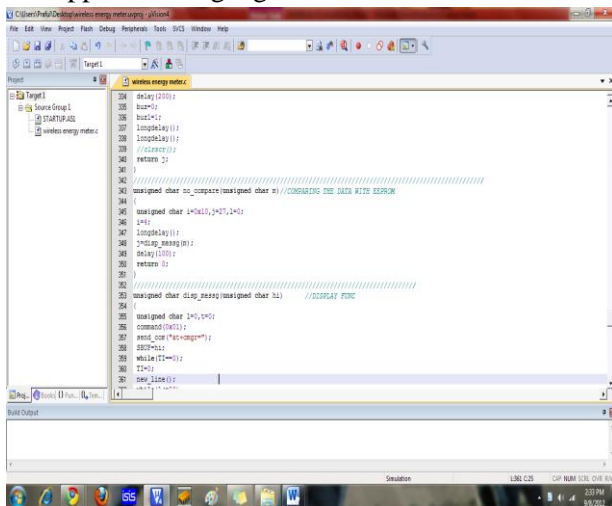

LIGHT DEPENDENT RESISTOR:

An LDR is an input transducer (sensor) which converts brightness (light) to resistance. It is made from cadmium sulphide (CdS) and the resistance decreases as the brightness of light falling on the LDR increases. LDR's 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.

(a) Basic Structure   (b) Symbol
LDR

Advantages:

- Highly sensitive
- Fit and Forget system
- Night – Day mode sensing
- Low cost and reliable circuit
- Complete elimination of manpower

Applications:

- Street lights
- Garden Lights
- Hotels, hostels and house hold applications
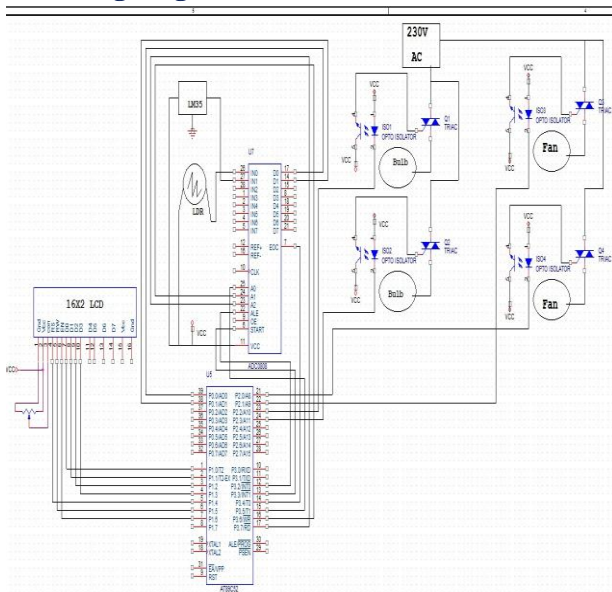- Offices
- Industries

Software tools

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.

Conclusion

This project presents a high sensitive sensors based automotive device control. The tracking controller based on the closed loop algorithm is designed and implemented with MCU in embedded system domain. The light sensitivity resistors are used to determine the night – day vision. The proposed system can control devices automatically. Thus, the power can be saved.

Experimental work has been carried out carefully. The proposed method is verified to be highly beneficial for all the electrical appliances.

Interfacing diagram

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