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ENERGY MANAGEMENT OF GREENHOUSES IN SMART GRIDS

Prof.Amol D.Patange[1], Supriya A. Kamble[2]

[1] *Professor,Department of Electronics and telecommunication,Shri Shivaji Institute of Engineering and Management Studies, Parbhani.Maharashtra,India*

[2] *PG Student,Department of Electronics and telecommunication,Shri Shivaji Institute of Engineering and Management Studies, Parbhani.,Maharashtra,India*

Abstract — In an industry during certain peril 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 needed after by vegetable growers. It is very difficult to control scattered greenhouse without a remote environment monitoring system.

Keywords- raspberry pi, ADC, Temp sensor,LDR, etc

I. INTRODUCTION

Smart Grids are envisioned to support large penetrations of distributed demand-side resources coupled with system-wide demand response driven by economic and reliability signals. In this context, utilities are offering demand side management and Demand Response services to better manage their networks [1], [2]. These DR programs incentivize customers with payments or economic penalties to reduce consumption during periods of critical grid conditions or periods of high energy costs. With the integration of information technology and advanced metering infrastructure (AMI) into smart grids, both utilities and customers can have access to two way communication infrastructures, control devices, and visual interfaces that allow them to send, retrieve, visualize, process, and/or control their energy needs[3]. These developments make automated operational decisions feasible in energy systems, presenting a significant potential to improve performance and effectiveness of DSM and DR programs, allowing customer direct involvement in these programs to better manage energy and power consumption. To date, large industrial and commercial customers have been the most active participants in DSM and DR programs because of their potential to achieve large peak-load and energy consumption reductions [1].

II. LITERATURE SURVEY

1.Optimal Energy Management of Greenhouses in Smart Grids

Author: Mohammad Chehreghani Bozchalui

This work presents a novel hierarchical control approach and new mathematical optimization models of greenhouses, which can be readily incorporated into Energy Hub Management Systems (EHMSs) in the context of smart grids, to optimize the operation of their energy systems. In greenhouses, artificial lighting, CO2 production, and climate control systems consume reasonable energy; thus, a mathematical model of greenhouses appropriate for their optimal operation is proposed, so that it can be implemented as a supervisory control in existing greenhouse control systems. The objective is to reduce total energy costs and appeal charges while considering most important parameters of greenhouses; in particular, inside temperature and humidity, CO2 concentration, and lighting levels should be kept within acceptable ranges.

III. 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. Here the data is encode and it 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. The loads are operated using RF wireless technology but this is done manually. By using proposed method automatic operation of loads can be done.

IV. PROPOSED SYSTEM

In an industry during certain peril 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.

Here we are using rasberry pi as a controller.

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 through ADC. The analog signal is converted into digital format by the analog-to-digital converter (ADC).

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. Raspberry pi is the heart of the entire system.

HARDWARE REQUIREMENT

- Raspberry pi model
- Temp sensor
- LDR
- Fan
- Loads

BLOCK DIAGRAM

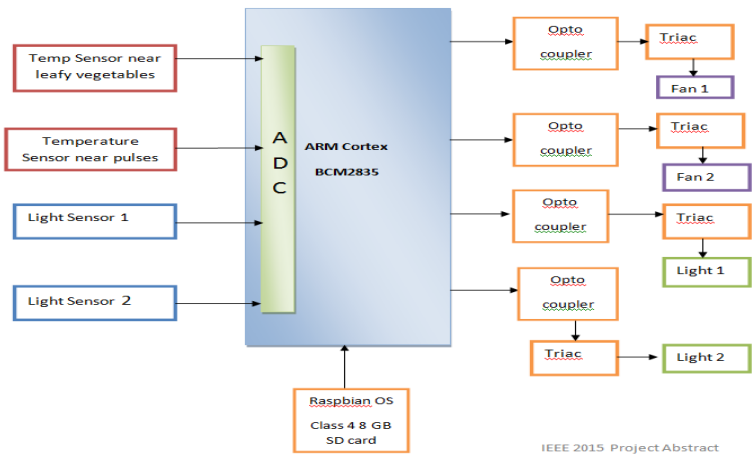


FIGURE 2. BLOCK DIAG. OF ENERGY MANAGEMENT OF GREEN HOUSES IN SMART GRIDS.

Here we are using rasberry pi as a 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. Raspberry pi is the heart of the entire system

ALGORITHM

Step 1`: START

Step2: power up hardware module.

Step 3: we use raspberry pi as a controller.

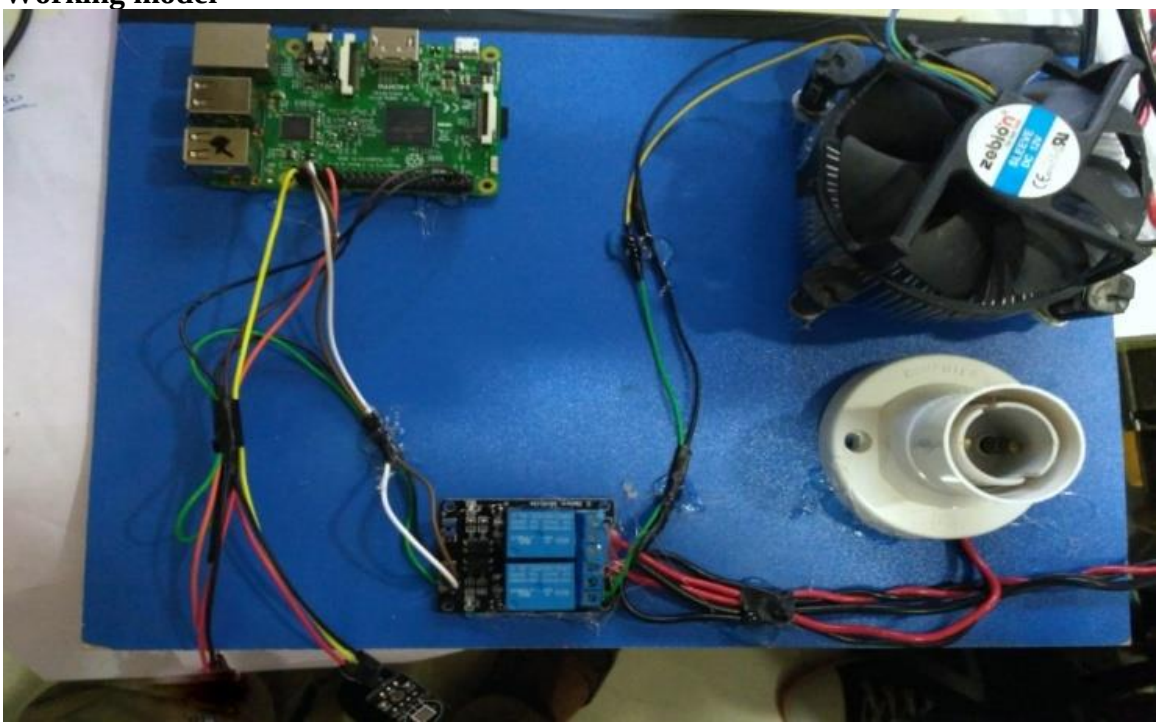
Step 6: Temperature sensor is used to sesnse the temp. if temp is high then fan is on.

Step 7: LDR is used to identify day or night.

Step 8: In the same way LDR senses night. then the load will be on automatically

Step9: STOP

Working model



V.COMPONENTS AND SYSTEM DESIGN

1. **Raspberry Pi Model**

512 Mb with a pleasant black plastic case: The Raspberry Pi could be a low value, credit-card sized laptop that plugs into a laptop monitor or TV, and uses a customary keyboard and mouse. it's the flexibility to act with the skin world, and has been employed in real time applications. This board is that the central module of the entire embedded image capturing and process system as given in figure. Its main elements include: main process chip, memory, power provide HDMI Out, LAN port, USB ports and abundant world interfaces.

2. Temp Sensor

The LM35 is a integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 therefore has a plus over linear temperature sensors label in ° Kelvin, because the user isn't needed to work out an outsized constant voltage from its output to get convenient Centigrade scaling. The high-accuracy version of the LM35 doesn't need any external calibration or trimming to supply typical accuracies of ±1⁄4°C at temperature and ±3⁄4°C over a full −55 to +150°C temperature vary.

3. LDR

Light Dependent Resistor is made of a high-resistance semiconductor. It can also be referred to as a photoconductor. If light falling on the device is of the high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron conducts electricity, thereby lowering resistance. Hence, Light Dependent Resistors is very useful in light sensor circuits. LDR is very high-resistance, sometimes as high as 10MΩ, when they are illuminated with light resistance drops dramatically.

4. ADC(Analog to Digital Converter)

The ADC0808, ADC0809 data acquisition component is a monolithic CMOS device with an 8-bit analog-to-digital converter, 8-channel multiplexer and microprocessor compatible control logic.. The 8-bit A/D device uses consecutive approximation because the conversion technique. The device options a high electrical resistance chopper stabilised comparator, a 256R potential divider with analog switch tree and a consecutive approximation register. The 8-channel multiplexer.

5. TRIAC

The TRIAC is a three terminal semiconductor device for controlling current. It gains its name from the term TRIode for Alternating Current. It is effectively a development of the SCR or thyristor, but unlike the thyristor which is only able to conduct in one direction, the TRIAC is a bidirectional device. This universal triac controller circuit with optocoupler solves the issues that triac have when functioning at low temperatures (triac needs higher gate current) include an transistor at the result of the optocoupler circuit.

The transistor amplifiers the trigger pulse coming from the optocoupler and the gate current is high enough to trigger the triac in all temperature cases.

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

VI. CONCLUSION AND FUTURE SCOPE

This project presents a high sensitive sensors based automotive device control. 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.

This project can be enhanced by using GSM or any wireless sensor network to transmit the data for the status monitoring. The moisture sensor can also be included to know the status of it and can be controlled though the Motor

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