

AGRICULTURE CROP PROTECTION WITH RAIN WATER HARVESTING AND POWER GENERATION

Ajay, Akash , Shivashankar, Patil Sangmesh

Prof. Sunil D.M

School of ECE,REVA University

ABSTRACT

Now a days, in rainy seasons the cultivated crops will get affected due to more rain fall. So in order to avoid this problem this project is designed which helps the protectingof the crops from heavy rainfall and saving that rain water to use it for domestic uses. The rain sensor and soil moisture sensor is used for the working of automatic roof. This system involves protects the crops by the auto roof which covers the whole field. Whenever there is rainfall the rain sensor gets activated. The soil moisture sensors which are deployed in soilchecks the water level. Whenever there is rain, the rain sensor is „ON“ and when the water level in the soil is exceeds the normal level then soil moisture sensor is „ON“ . If both the sensors are „ON“ then this information is send to the controller and the GSM. Then the controller indicates the DC motor to run which opens the roof automatically to close the field using a polythene sheet. If there is any problem in opening of the roof, then this is performed manually by the farmers.This message is sent to their mobile phone using GSM. Then the roof can be opened manually using mechanical roller. In this project, the roof is open automatically when both the sensor is „ON“ .

I. INTRODUCTION

In the Current system there is no protection for crops against natural disasters such as Floods, Rains and as well as from over Sun heat. Which are in turn Reduces the plant growth in turn reduces yield. In this project we are proposing the system which prevents the spoilage of crops due to heavy rains. This is achieved with embedded system design using GSM technology. The actual concept of this project is protecting the crops from heavy rainfall by covering the field automatically and also to save the collected rain water. In order to achieve this, in this system we use GSM, Rain sensor and soil moisture sensor. Here the system will be a sensor based one where the pump will start only when there is the need of water to the land. The auto roof is mainly depends on the rain sensor, soil moisture sensor and temperature sensor. Here, GSM] technology and remote access having major role for automatically closing roof. The GSM and remote access are acting as a control system for our project. The condition of auto roof is usually intimated by GSM. The GSM technology, effectively allows control from a remote area to the desired location in the agricultural field. If there is any problem in

sensors then roof is manually set by using remote access. Based on rainy season and sunny season it will controls the auto roof. The decision making capability carried out by PIC 16F877A. Then the rain water in the roof is collected by the Water tank. When water scarcity in agricultural field, the collected water is pumped out using DC motor 2. In this way the wastage rain water is saved.

The dyanamo are fixed at both the top end of poles, when there is water coming down through water collector unit, it generates the power.

II. EXISITING SYSTEM

In the Current system there is no protection for crops against natural disasters such as Floods, Rains and as well as from over Sun heat. Which are in turn Reduces the plant growth in turn reduces yield. The formers Commit Suicides After their crops got destroyed due to natural weather Calamities. Only Weather Updates or alert are given to formers through Media. But there is no exact time alert or there is no system which can protect former Crops.

III. PROPOSED WORK

3.1 Working

Error! Reference source not found. and **Error! Reference source not found.** of our prototype. When the power supply is switched on, the GSM modem gets initialized. The GSM modem communicates with the ARM LPC2148 board using AT commands. The LCD display is connected to the ADC pins of the ARM processor, in order to display the message. The humidity sensor checks for the soil moisture content whose maximum threshold is kept at 1000°C and minimum of 200°C. When the soil moisture content is less than 200°C the pump motor will pump the water to the field.

The temperature sensor will measure the surrounding temperature of the farm. The rain sensor will sense the heavy rain and closes the panel to protect the crop. All the above information will be informed to the user using GSM technology

When the power supply is turned on the ARM7 LPC2148 microcontroller and the GSM modem/GPRS is initialized. After the initialization, the system asks the user either to select automatic mode or the manual mode.

When automatic mode is selected, Relay is connected to the pump which starts pumping water when the moisture sensor senses the land as dry. Moisture sensor is used for sensing the soil moisture of the crop land to feed them water with the help of 3-Phase power unit, whenever the land gets dried below the threshold level of moisture of land which is suitable for the growth of crops. The temperature sensor senses the surrounding temperature of the farm. When it starts raining, the pump motor will

stop pumping the water to the field and updates the user using GSM/GPRS technique. When there is an unconditional rain the panels provided will be closed automatically to protect the crop. An Alpha numeric LCD is used to display the data.

When the manual mode is selected, the information about the farm field will be updated to the user only when he calls to an authenticated number given.

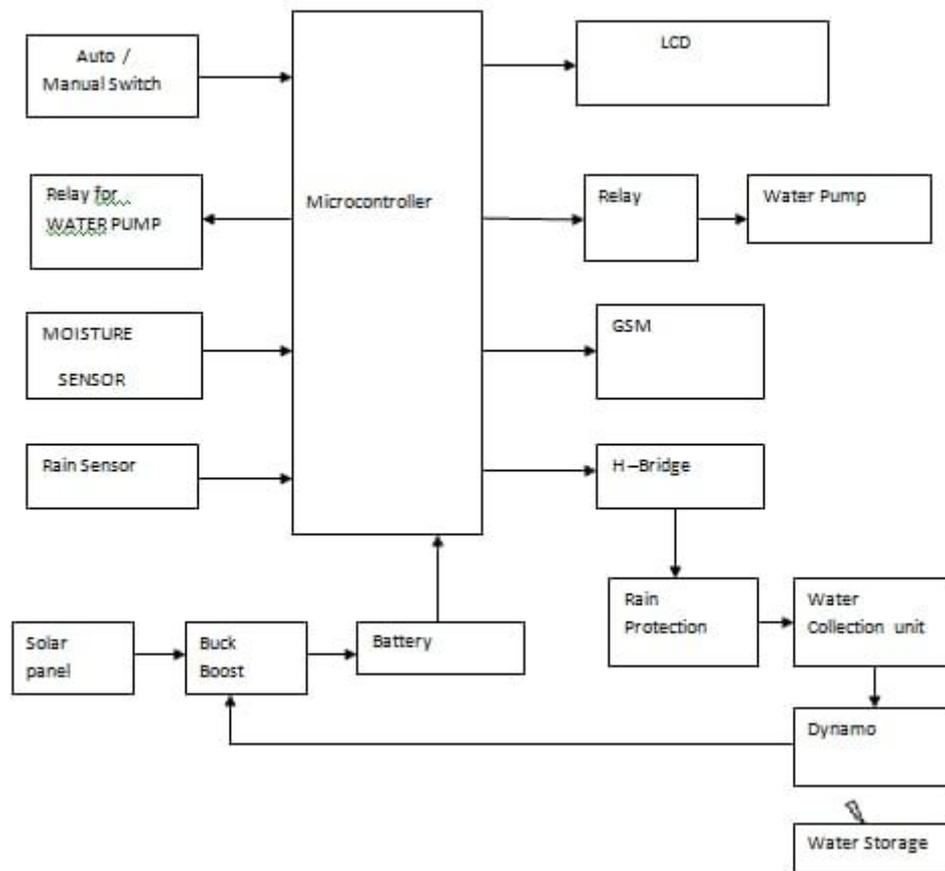
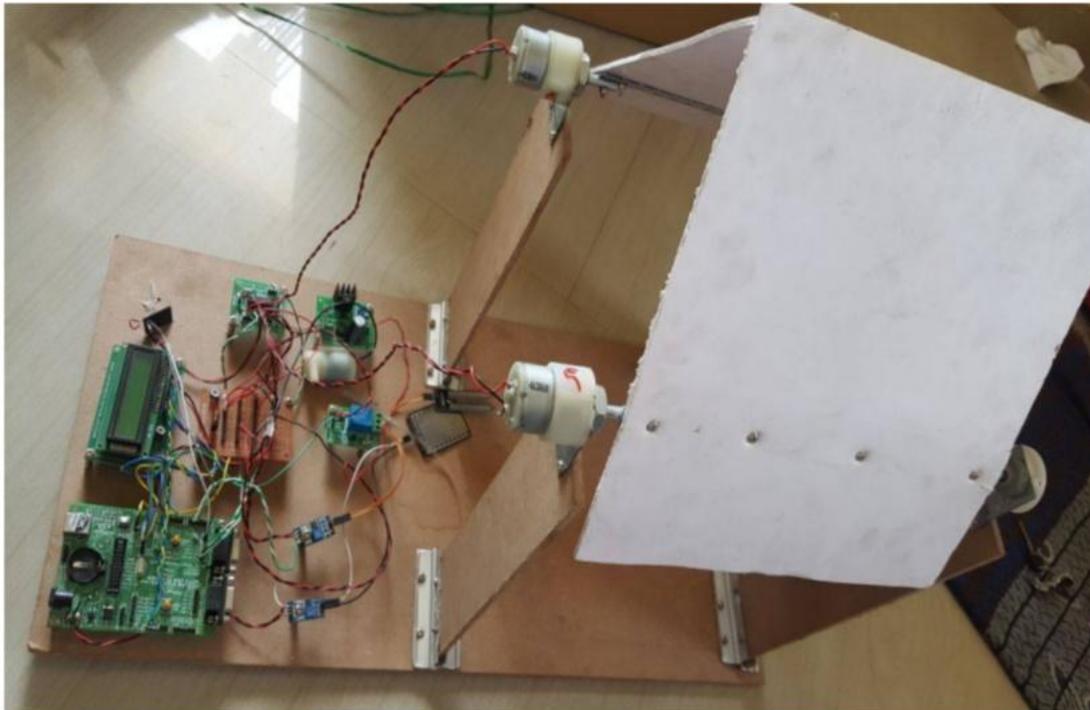


Fig.1: Block diagram

3.2 Experimental Model



By implementing this paper we can avoid crop damage against rains and floods and as well a good yield can be achieved in farming lands. By using solar roof tops instead of normal panels we can generate energy from it and same can be used for Agriculture activities.

3.3 Hardware Setup

As shown in the fig 2 the ARM7 is used to achieve this, we are interfacing bidirectional dc motor and GSM module with ARM7 LPC2148. The circuit comprises of microcontroller, LCD, voltage regulator and relay is built on a wooden board. All the connections are made and soldered so as to maintain proper stable circuit connections. The model is built for protection of crops from heavy and uneven rainfall. The required supply is provided to all the components used in the circuit. Different sensors are used to control the different parameters in the Protection of crops and to create a suitable environment for the proper usage of rain water.

ARM

ARM is an advanced reduced instruction set computer (RISC) , and it is a 32-bit processor architecture

expanded by ARM holdings. The LPC2148 is a 16 bit or 32 bit ARM7 family based microcontroller and available in a small LQFP64 package. It has 12MHz crystal for system clock and 32KHz crystal for RTC. 8kB to 40kB of on-chip static RAM and 32kB to 512 kB of on-chip flash memory.

H-BRIDGE

An H bridge is an electronic circuit that enables a voltage to be applied across a load in opposite direction. These circuits are often used in robotics and other applications to allow DC motors to run forward or backward direction.

Rain Sensor

A rain sensor or rain switch is a switching device which is used to sense the water activated by rainfall. There are two main applications for rain sensors. The rain sensor is connected to arm7 and dc motor driver when there is both the sensors condition is on then that causes the system to shut down in the event of rainfall.

Soil Moisture Sensor

The Soil Moisture Sensor is used to measure the amount water content in soil. Soil-moisture devices measure the energy level at which water is being held by soil. The Soil Moisture Sensor to Measure the loss of moisture over time due to evaporation and plant uptake. When there is both sensors condition is ON then that causes the system to shut down in the event of rainfall.

GSM

GSM Can control Appliances even from long range of distances. A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. The baud rate can be configurable from 9600-115200 bps through AT (Attention) commands.

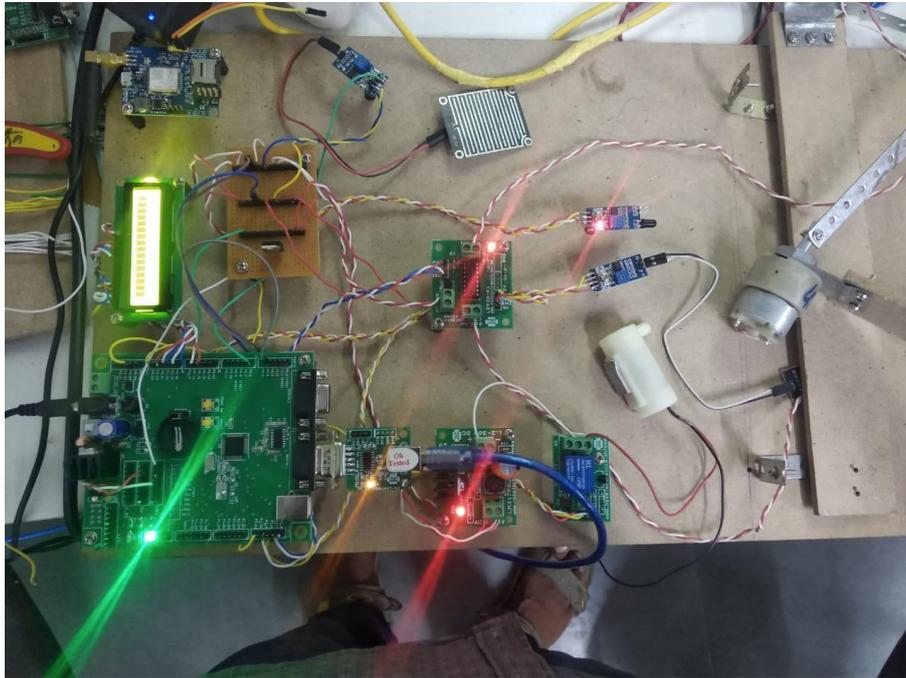


Fig 4: Hardware setup

IV. HARDWARE AND SOFTWARE REQUIREMENT

Table:2

HARDWARE REQUIREMENT	SOFTWARE REQUIREMENT
<ol style="list-style-type: none">1. ARM7 LPC2148 Microcontroller2. Solar PV Panel3. Liquid Crystal Display4. Voltage Regulator LM78055. GSM Module6. H-Bridge7. Relay8. DC Gear Motors9. LDR Sensor10. Rain Sensor11. Humidity Sensor12. Infrared Sensor13. Water Pump	<ol style="list-style-type: none">1. Embedded C2. Keil Compiler3. Flash magic

VI. CONCLUSION AND FUTURE SCOPE

In our project we have designed a model to help the farmers in rural zones.

- Our Remote Controller could be installed on existing pump sets for a nominal cost.
- Operating our Remote Controller does not require any special skills. It is as simple as sending a SMS or a missed call.
- The user can send a SMS message from anywhere in the world to operate this equipment. The security feature in the software will make sure that it works only with pre-assigned phone numbers.
- Implementation of Wireless Sensor Networks

Future Scope

By using solar roof tops instead of normal panels we can generate energy from it and same can be used for Agriculture activities.

REFERENCES

- [1] S. H. J. S. A. J. P. M. G. Akshay S.Hegade, "GSM Based Automation in Agriculture," *International Reasearch Journal Of Engineering And Technology*, vol. 3, no. 5, pp. 3115-3119, 2016.
- [2] M. S. R. Mr.Takkasila Akbar Saleem, "Automatic Crop Monitoring Using Embedded System," *International Reasearch Journal Of Engineering And Technology*, vol. 4, no. 7, pp. 651-657, 2017.
- [3] K. K. P. Vedashree.S, "Protection Of Crops and Proper Usage of Rain Water with Embedded System Using GSM technology," *IJESC*, vol. 7, no. 6, pp. 12682-12684, 2017.
- [4] A. A. & S. Reddy, "Monitoring for Precision Agriculture using Wireless Sensor Network-A Review," *Global Journals of Computer Science And Technology Network, Web & Security*, vol. 13, no. 7, pp. 975-981, 2013.
- [5] A. B. J. L. Sagar Lachure, "Review on Precision Agriculture Using Wireless Sensor Network," *International,Conference on Innovations in Information Embedded and Communation Systems*, vol. 10, no. 7, pp. 16560-16565, 2017.