Intelligent Agricultural System with Weather Monitoring

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Abstract— The embedded technology is now in its prime and wealth of knowledge available is mind blowing. Embedded project has new opportunities for the peasants and benefits them in various aspects. The system has been proposed to monitor the Weather and Control the Humidity of Agricultural Land. This Project Main objective is to control the Water Pump Motor whenever Soil Moisture Decreases below average level using Microcontroller. This Project also Monitor the Rain Possibilities and environmental Temperature. And a detail of weather condition has send to authorized Mobile number. Index Terms Solar Panel, Sensors, Cell phone, Microcontroller, GSM modem.

Key words: GSM modem, Intelligent Agricultural System, Solar Panel

I. INTRODUCTION

Indian economy is mainly based on agriculture. The most important parameter for the agriculture is timely and sufficient supply of water. The frequent, intermittent, low voltage supply of power to the agriculture sector has caused problems to the farmers who are spending their time monitoring the supply of power without which their work cannot start.

Water is a basic component of all known life on Earth. Water can both sustain life in correct quantities and threaten life when it is not available. Water as a result is a very precious natural resource that must not be wasted. If too much water is applied the problems arise consisting of runoff, erosion, waste of water and deceased plant life. If too little water is applied different problems arise such as turf burnout. The key in irrigation is striking to correct balance for optimal plant life with optimal use of water. An irrigation controller is a device to operate automatic irrigation systems such as lawn sprinklers and drip irrigation systems. Most controllers have a means of setting the frequency of irrigation, the start time, and the duration of watering. Some controllers have additional features such as multiple programs to allow different watering frequencies for different types of plants, rain delay settings, input terminals for sensors such as rain and freeze sensors, soil moisture sensors, weather data, remote operation, etc. Renewable energy, on the other hand can be a clean energy resource. Using renewable to replace conventional fossil fuels can prevent the release of pollutants into the atmosphere and help combat global warming. New renewable (small hydro, modern biomass, wind, solar, geothermal, bio-fuels) accounted for another 2.4% and are growing very rapidly. The share of renewable in electricity generators is around 18%, with 15% of global electricity coming from hydroelectricity and 3.4% from new renewable). This paper thus outlines some applications of solar energy technologies used in agriculture.

II. EXISTING SYSTEM

According to the situation our controller monitors the temperature sensor and humidity sensor. Initially temperature sensor will be in ON condition to monitor the temperature, if the temperature level exceeds the certain level then controller automatically SWITCH ON the motor. Humidity sensor is to measure the moisture content present in land, regarding the moisture level our controller SWITCH OFF the motor using Relay section[1].

III. PROPOSED SYSTEM

The system has been proposed to monitor the weather and control the humidity of agricultural land. The main objective is to supply the water to distinct plants according to their water content level. And also monitor the rain possibilities and environmental temperature. After that, a detail of weather condition has send to authorized mobile number.

IV. PROJECT DESCRIPTION

This project main aim is to control the water level in agricultural land and turn ON and OFF the water pump run motor according to the soil moisture level. Initially at the power ON condition, microcontroller measures the soil moisture using soil humidity sensor which is placed in the soil[1] .If soil moisture below the average level, microcontroller turn ON the water pump motor. If soil moisture becomes above the average level, microcontroller turn OFF the water pump motor the above operation continues again and again at the same time microcontroller measures the air humidity level using air humidity sensor and calculate the possibilities of rain by microcontroller microcontroller also measures the temperature of the environment using temperature sensor in Celsius all the sensors are connected to the microcontroller parallely.Finally possibilities of rain, weather condition and temperature details are sent through GSM modem to authorized mobile number In this project we are using small aquarium water pump for demo purpose.

V. SOLAR BASED AUTOMATED AGRICULTURE PUMP SYSTEMS

Solar power is absolutely perfect for use with irrigation systems for gardens, allotments, greenhouses, and polytonal. When the sun is shining you need more water and so the solar power is there for the pump. By adding a suitable deep-cycle leisure/marine battery, power can be made available 24 hours per day enabling watering in the evening the best time to water plants in the summer so that the water has a chance to soak into the ground.

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Fig. 1: Solar Panel

An automated agriculture pump system can be put together using a suitable 12V programmable timer which will turn on the pump at the same time every evening. Alternatively a bespoke electronic relay control board* can be put together to supply power to the pump (or many different pumps) with your choice of turn on/off times each day. To protect the pump from being damaged if it runs out of water to pump, and to prevent any secondary tanks from overflowing, float switches can be used to detect water levels and their readings fed into the electronic controller.

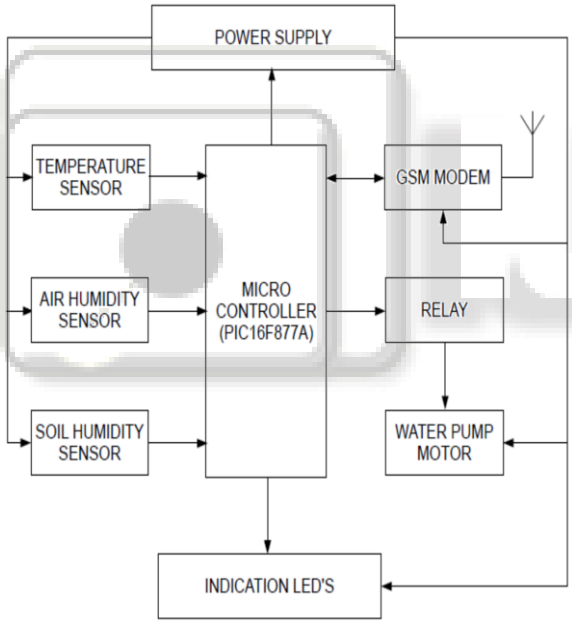

Fig. 2: Block Diagram

A. Microcontroller (pic16f877a)

This powerful (200 nanosecond instruction execution) yet easy-to-program (only 35 single word instructions) CMOS FLASH-based 8-bit microcontroller packs Microchip's powerful PIC® architecture into an 40- or 44-pin package and is upwards compatible with the PIC16C5X, PIC12CXXX and PIC16C7X devices. The PIC16F877A features 256 bytes of EEPROM data memory, self programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire Serial Peripheral Interface (SPI™) or the 2-wire Inter-Integrated Circuit (I²C™) bus and a Universal Asynchronous Receiver Transmitter (USART). All of these features make it ideal for more advanced level A/D applications in automotive, industrial, appliances and consumer applications.

PIC16F873A/876A devices are available only in 28-pin packages, while PIC16F874A/877A devices are available in 40-pin and 44-pin packages. All devices in the PIC16F87XA family share common architecture withthe following differences:

- The PIC16F873A and PIC16F874A have one-half of the total on-chip memory of the PIC16F876A and PIC16F877A
- The 28-pin devices have three I/O ports, while the 40/44-pin devices have five
- The 28-pin devices have fourteen interrupts, while the 40/44-pin devices have fifteen
- The 28-pin devices have five A/D input channels, while the 40/44-pin devices have eight
- The Parallel Slave Port is implemented only on the 40/44-pin devices

B. Temperature sensor

The MCP9700/9700A and MCP9701/9701A family of Linear Active Thermistor™ Integrated Circuit (IC) is an analog temperature sensor[2] that converts temperature to analog voltage. It's a low-cost, low-power sensor with an accuracy of ±2°C from 0°C to +70°C (MCP9700A/9701A) ±4°C from 0°C to +70°C (MCP9700/9701) while consuming 6 µA (typ.) of operating current.

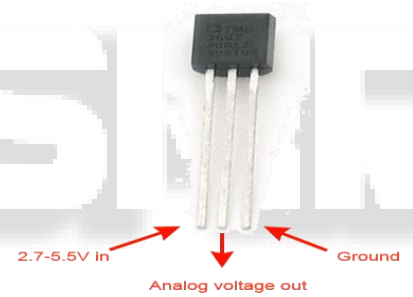

Fig. 3: Temperature Sensor

C. Humidity sensor

This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component, and connects to a high-performance 8-bit microcontroller, offering excellent quality, fast response, anti-interference ability and cost-effectiveness.

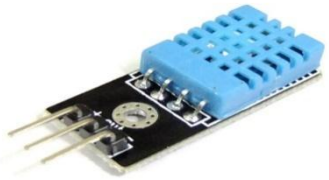

Fig. 4: Humidity Sensor

1) Features:

- Full range temperature compensated
- Relative humidity and temperature measurement
- Calibrated digital signal
- Low power consumption
- Long transmission distance
- Outstanding long-term stability

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- Extra components not needed
- 3 pins packaged

D. Soil moisture temperature

The Soil Moisture Sensor is used to measure the volumetric water content of soil. This is used capacitance to measure the water content of soil (by measuring the dielectric permittivity of the soil, which is a function of the water content). Simply insert this rugged sensor into the soil to be tested, and the volumetric water content of the soil is reported in percent.

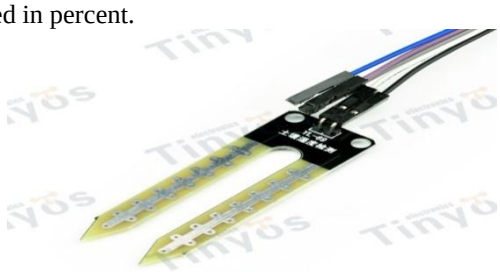

Fig.5: Soil Moisture Sensor

1) Features

- Rugged design for long term use.
- Consumes less than 600uA for very low power operation.
- Measures volumetric water content (VWC) or gravimetric water content (GWC).
- Patent pending technology.
- Wide supply voltage range.
- Can be buried and is water proof.

VI. ALERT MESSAGE FROM SENSOR

A. GSM Modem

Short Message Service is GSM techniques to transfer data from distant places such as from one area to the area of the same city or from another city .In our project we are using SMS technique to instant or quick transfer of data or notice to the required destination. It is a convenient facility of the GSM network. A message consisting of a maximum of 160 alphanumeric characters can be send to or from a mobile station. If the subscriber's mobile unit is powered of f or has left the coverage area, the message is stored and offered back to the subscriber when the mobile is powered on or has re-entered the coverage area of the network. This function ensures that the message will be received.

In our project we are using SIM300[3] for transfer of data from weather station. Interfacing with PIC is done with RS-232 through D-TYPE 9 pin connector. SIS is the leading manufacturers of GSM modems for lower price in India.

VII. CONCLUSION

Designing and installing a simple solar powered well water pumping system suitable for one household. Much of this information could be applicable to a residential water system that uses a storage tank. The present proposal is a model to modernize the agriculture industries at a mass scale with optimum expenditure. Using this system, one can save manpower, water to improve production and ultimately profit. In today's life human being is becoming so busy that he can't pay his attention to work like water supply. But plants and trees are the sources of oxygen for human being and their existence is also important to lead the human life. So it is necessary that excess supply of water usage should be avoided to save the water. By providing precise timing for water supply this will help to save water. Water saving is the main aim of our system and with the help of scheduling principle we have tried to achieve that, it will definitely helps the human being to save water and in such a way it will be helpful for earth.

REFERENCES

[1] Intelligent Agricultural System With Weather Monitoring-Divya R, Vidhatha Technologies, Bangalore.
[2] Innovative Water Saving Agriculture By Using Resources
Naresh kumar reddy, LBR College of Engineering, Mylavaram, India
[3] Wireless Sensor Network for Disaster Monitoring Dr. Maneesha Vinodini Ramesh, Amrita University, India
[4] A web-based remote indoor climate control system based on wireless sensor network Jingcheng Zhang, Department of Science and Technology, Linkoping University, Sweden
[5] An Automated Tsunami Alert System Assistant Professor, Department of CSE, Annamalai University, Chidambaram, Tamilnadu.
[6] Flood Warnings, Flood Disaster Assessments, and Flood Hazard Reduction The Roles of Orbital Remote Sensing G. R. Brakenridge, Department of Geography, Dartmouth College, Hanover.

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