Smart Irrigation System

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ABSTRACT
This paper deals with innovative technology in various ways to irrigate agricultural land using solar power. By using this system we can find suitability/humidity in the soil. And also we find the surrounding Temperature & humidity in air by using sensor. The main purpose of this paper provides irrigation by knowing the soil moisture. This system saves the energy and power and it is very important in future. We will use this project in countries where there is of water seems be in short for agriculture.
**Keywords:** Soil, Moisture sensor, Humidity sensor, Temperature, Arduino, Solar Panel.

I. INTRODUCTION

The contribution of agriculture sector to the Indian economy is huge. The Use of manpower should not be excessive and these techniques need to be used to maximize profits over time. Nowadays the demand for energy is increasing and there is a constant flow of fuel into existing sources. And Sources and pollution is on the rise and forcing mankind to take up new, unconventional energy resources like solar energy, wind energy. Development of these new technologies is achieving our goal of sustainable development.

1] Photovoltaic pumping can be installed anywhere. And they can take care of five to ten years. Because they need less maintenance so it also reduces costs. 2] In the past irrigation method is major reason for this old method to imitate the crop in a traditional way without knowing the right Crop ratio, thus destroying some crops.3] We use this project to solve the problem. Due to the growth of the world's population, the growth of agriculture needs to be increased and on the other hand, due to the increasing demand for food due to the population, Farmers are facing many problems. 4] It can control the pump using Arduino based on an Arduino UNO based Automatic irrigation system in this project we have added soil moisture sensor, humidity sensor & Temperature sensor. To the input voltage signal of the input sense the moisture in the soil as well as sense the air& temperature of surrounding area. 5]You can also use the GSM model in this project. Using of this model we can do your motors off at home. 6] This project provides information by Arduino using sensors, when the soil is dry then motor is on when soil is wet then motor is automatically off it is displayed on LCD. 7] Solar Panels are generally known photovoltaic or PV panels. In solar conversion of sunlight in electricity & this electricity stored by battery. It is used to operate electrical equipment and power equipment.
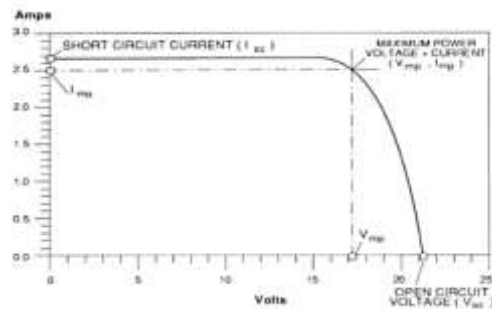
II.   BLOCK DIAGRAM AND WORKING
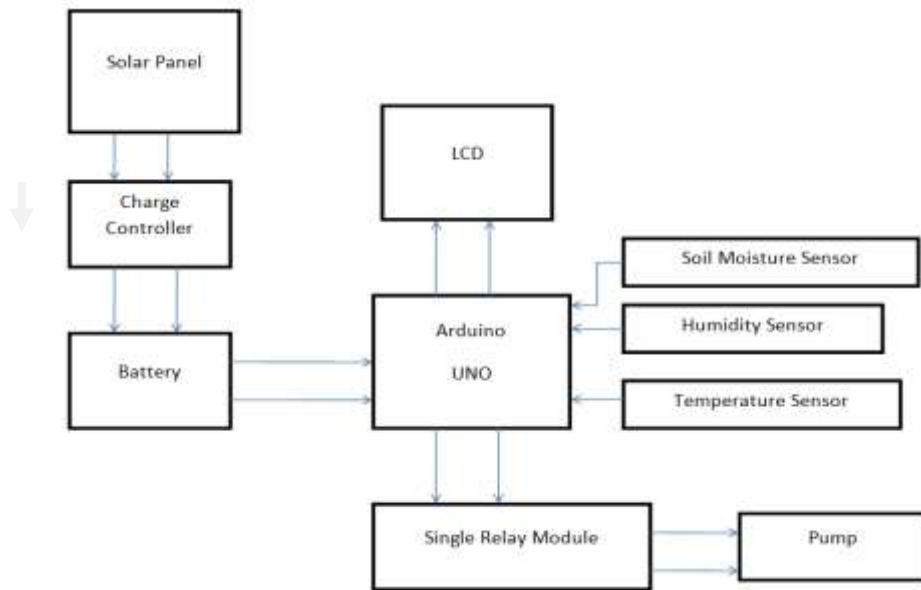
Above Fig show Arduino based irrigation system. Arduino is a brain of our project. In this project we connect solar panel, charge controller, battery, LCD, Single Relay Module. In this system we used three types of sensors soil moisture sensor, humidity sensor& temperature sensor. This sensor connected to the Arduino. We use nonconventional energy source. Solar converts sunlight into electricity, this electricity stored in battery through charge controller. In our project we used a one code and this code properly set in Arduino. On this code three sensors are worked automatically. Soil moisture sensor is work when the soil is dry then pumps get automatically on and soil is wet then pump is not working automatically. Humidity sensor senses the surrounding air and Temperature sensor measure the temperature. We connect relay to input of the Arduino these relay control the operation of the water pump.
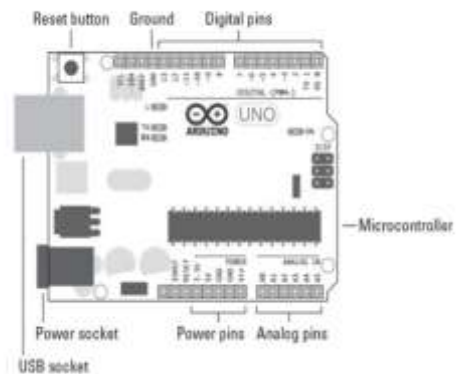
III.   COMPONENTS

1. Solar Panel
Fig 3.1 Solar Panel

Solar energy is the most abundant source of energy in t device used to into we electricity world. It is Convert sunlight in this project used 20 solar polycrystalline solar panel that consist of several crystals of silicon in a single pv cell. This solar panels made up of multiple photovoltaic cell each cell contains silicon crystals which makes it function as a semiconductor device.

$I=I_0[\exp(qV/nkT)-1]-I_l$
Power=20watt
Voltage=12v
Short circuit current=1.66amp

2. Arduino Uno

Fig3.3 Arduino Uno

This project we use UNO Arduino board. It is Open Source electronic platform with

microcontroller ATmeaga328P. It has 14 digital input /output Pins. It is developed by Arduino.cc. It is used for variety of electronic project. Arduino is a 16MHZ ceramic resonator. Arduino operation at 5V and maximum current 40mA.The Arduino Uno is programmed using the Arduino Software (IDE), our Integrated Development Environment common to all our boards and running both online and offline.
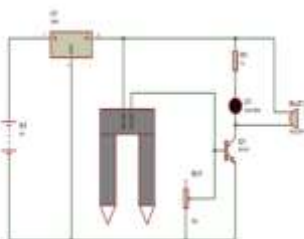
3. Soil Moisture Sensor

Fig3.3 Soil Moisture sensor

Soil moisture sensor usually refers to sensor that estimates volumetric water content. Soil moisture measure the water content in the soil. This device used to convert Physical Parameter into electrical signal. Soil moisture removing, drying and weighing of a sample. Soil moisture depending on environment. Operating voltage in this sensor 3.3to 5v.
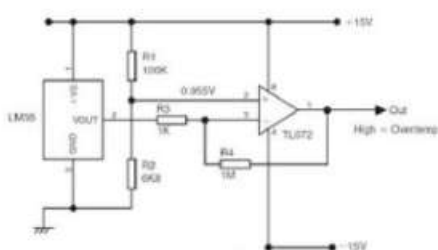
4. Temperature sensor

Fig3.4 Temperature Sensor

Temperature sensor basically measure the heat generated by an object to which is connected. In this project we use LM35 Temperature sensor. It is semiconductor based sensor LM means linear monolithic. LM35 is that outputs are analogue signal. In LM35 have three pins.
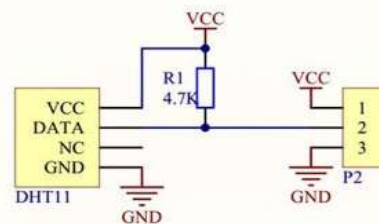
5. Humidity Sensor

Fig3.5 Humidity Sensor

This sensor measure surrounding air. Humidity range of this sensor is 20 to 80% with 5% accuracy. The rate of this sensor is 1Hz. It is measured water vapour present in air. DHT11 is a digital temperature & humidity sensor. It is operating at 3 to 5volt. Maximum current is 2.5mA.
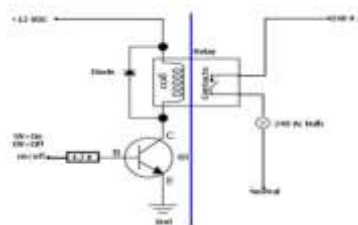
6. Relay

Fig3.6 Relay

This is single opt coupler isolated relay .It is a 5v relay. It is used for control the operation of water pump. This is a programmable electrical switch can be controlled by Arduino. It is use by control on/off the device.

4. Specification of the system

Sr No	Components	Specification
1	Solar panel	20W
2	Water pump	12V DC
3	Arduino	5V
4	Soil moisture sensor	3.3V To 5V
5	Relay	5V
6	LCD	4.7V To5.3V

5. Future scope:
1] Rain gun sensor can be added so that when it rains there won't be floods & this shield the field. & evades floods.
2] Irrigation is process of providing the desire amounts of water to the agricultural land. This

process is beneficial in minimizing runoffs or drought situations for the croup cultivation

IV. RESULT & ANALYSIS

Irrigation can be completed in farmer, garden, & greenhouse etc. This system can be automatically. It can be concluded that Photovoltaic systems are designed to supply water and irrigation in areas where there is scarcity of electricity. Also since sun is used as the energy source output coincides with the amount of solar radiation. The selected irrigation system should be such that it minimizes the water losses without putting additional pressure on the water head. The system was able to achieve the temperature before and after operation of the system. This system able to communicate with the moisture to make sure it fulfils the required meant of irrigation The farmers, agriculturist, nursery will be highly benefited with system because it is easy to operate and user friendly.

Soil Testing

Types of soil	Temperature	Humidity	Dryness in soil	Wetness in soil
Red Soil	25	80	667	387
Black Soil	25	80	672	395

V. CONCLUSION.

The aim of this project saves power, energy & time. The Automatic irrigation system based on soil moisture using Arduino has been tested successful. Display the humidity data provide by the Sensor in LCD Screen. Moisture sensor measure moisture level in the soil. When Soil dry then motor goes on. When soil is sufficiently waited then pump goes on. The energy needed to the water Pump & controlling system is given by solar panel. By using solar energy save the electricity & reduce pollution.

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