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Solar Based Automatic Irrigation System

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***Abstract*: India is an agriculture-based country. Most of us are completely dependent on Agricultural crops. Agriculture is the source of employment for most Indians and has a significant impact on the country's economy. proper irrigation system usage is very important because there is a shortage of land-reserved water due to a lack of rain and spontaneous use of water, and as a result, large amounts of water go to waste. For this reason, we use this automatic plant watering and soil moisture monitoring system, which is extremely helpful in all climatic conditions. Automation of farm irrigation and soil moisture control using a microcontroller, a soil moisture sensor, and a pump motor through a relay module This automatic irrigation system senses the moisture level present in the soil and automatically switches the pump when the power is on. When the soil goes dry, the pump will start watering. The aim of the execution is to decrease water use, and automatic irrigation can be used to save time with a low-power monitoring device.**

***Keywords*—soil moisture sensor, *Relay*, automatic irrigation, Microcontroller**

INTRODUCTION

In this digital world, we need every possible thing around us to be automatic, which decreases human effort. There are growing electronic circuits that make today's life easier and simpler. The current energy and water crises are major issues that affect everyone. So, there is a need to preserve energy and water. The plan for this is to make a solar-powered prototype to irrigate the field automatically. Imagine how useful it will be when you are busy doing other work and your field is being irrigated automatically at less cost. No need to worry about under and over irrigation no need to worry about the wastage of water and costly electricity; no need to panic about your important programmes. This is what automatic irrigation is about, and there is no end to its practical application.

II SOLAR BASED AUTOMATIC IRRIGATION SYSTEM

As the name implies, it irrigates the field when the humidity value of the soil is less than the reference value and turns off automatically when the humidity value of the soil exceeds the reference value. We have arrived at the dawn of the technological era after various periods of development. Humanity began with a gravestone and a stick and has now progressed to nuclear weapons. Humans have always wanted to do their work in a more simplified and easier way since the beginning of time. Speaking the truth, they've always wanted some backing to do their work for them. And they've got technology that has given them effects beyond their imagination. A person finds it nearly impossible to spend a day without technology. There are robots assisting people in their workshop. Machines have helped them do insolvable effects that mortals alone can't do. So they're sufficiently dependent on technology. There is technology in every field because robotization has replaced humans in so many sectors of tedious jobs. People are wasting energy for no reason, like 1 when they forget their workshop because of their busy schedule. Therefore, we're going to design a system that lets them do their work without destroying water or electricity.

EXISTING SYSTEM

The majority of these systems are homemade. The homemade system needs labour to cover productivity and the health of the crop. Consider the labour payment; this system (the automatic irrigation system) is less expensive. It became extremely difficult for the former in his day-to-day life to maintain sufficient water for the crop he was cultivating. Typically, fields would be located far from the farmers' homes, where he could not see whether the water was flowing or not. sufficient for the needed crop or not. It was veritably delicate to go to the fields only to switch on and off the pump. It primarily leads to the destruction of time for the former. And also, it leads to "over irrigation" and "under irrigation.". We also require more manpower if the land is larger. To reduce these pitfalls for the former, we have introduced market irrigation, which regulates the inflow of water into the field depending upon the humidity demand of the land. In this system, we use a soil humidity detector that detects the quantum of humidity present in the soil and Depending upon the demand for the position of humidity content needed for the crop, the water inflow is regulated, therefore conserving water by avoiding over flooding of the crop.

PROPOSED SYSTEM

In this proposed system, we use the solar energy from solar panels to automatically pump water from a drag well directly into a ground-position storage tank, depending on the intensity of the sun. While conventional styles include pumping water from a drag well into a well and from this well onto the field using another pump, our system uses only a single stage of energy consumption wherein the water is pumped into a ground-position tank from which a simple stopcock controls the inflow of water into the field. This saves a substantial amount of energy and makes effective use of renewable energy. A stopcock is controlled using an intelligent algorithm in which it regulates the inflow of water into the field depending upon the humidity demand of the land. In this system, we use a soil humidity detector that detects the quantum of humidity present in the soil, and depending upon the position of the humidity content needed for the crop, the water inflow is regulated, therefore conserving water by avoiding over-flooding of the crop.

SOIL MOISTURE

Soil moisture is a important parameter of the environment. This helps very much in advancement in the agriculture sector. some crops needs particular amount of (more or less) water for well growing. This level of moisture can measured using soil sensors, this helps in knowing the level of moisture at every instance.

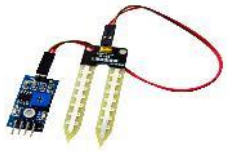

Fig1.soil sensor

BLOCK DIAGRAM

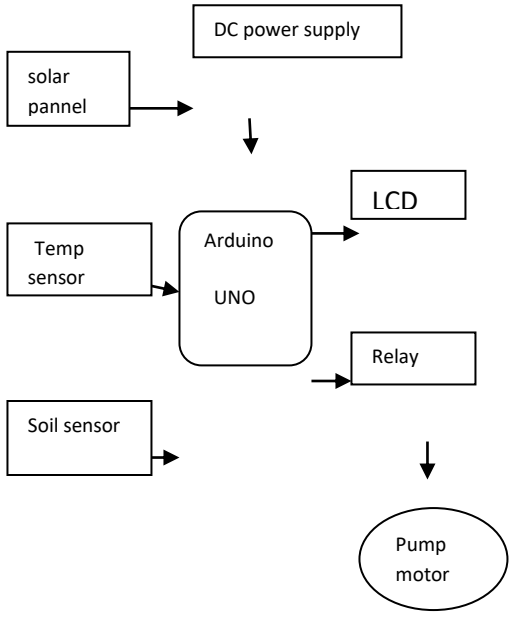

Fig2

SOLAR POWER

A solar panel, or solar module, is one component of photovoltaic system. Solarpannel sometimes called as photovoltaic, they collect solar energy from sun (sun light) and convert it into electrical energy. The main component of solar pannel is a solar cells.

Hardware requirement

1. Arduino UNO
2. Soil sensor
3. Temperature sensor(LM35)
4. Solar panel
5. Relay
6. LCD display
7. Pump Motor

Software requirement

1. C Language

WORKING

The proposed system introduces a new method of automatically supplying water to plants as needed. On the input side, there are two sensors .The soil moisture sensor monitors the soil moisture according to the cultivated crop . When the soil moisture falls above or below the set value, it controls with the microcontroller whether to pump water or not. The temperature sensor monitors the temperature of the surrounding air. If the temperature exceeds or falls below the set value required for crops growth the microcontroller directs the iron lever to flood the entire field, thus maintaining the temperature required for healthy crop growth.

The LCD screen is used to display the functions of the microcontroller. A solar panel converts solar energy into electricity and stores it in a battery. The components are connected directly to the battery so that each component can work. The relay acts as a switching element, capturing data from the ground sensor. The motor starts and stops automatically because of the relay.

CONCLUSION

With this project, we achieved successful results by testing a device called a solar-based automatic irrigation system. The purpose of large or small scale automatic irrigation system and make it smarter and more efficient. Different sensors (soil moisture, temperature) with different devices were used to make this project| (water pump, battery, LCD,). Using Arduino has proven to be profitable because it can serve many different sensors simultaneously and there are different types and sizes of sensors available in the market. Arduino boards are another device. Several design criteria were used in this system. The sensors used were perfect to detect and send signals to the Arduino, control the water pump, and were tested indoors as it is on a farm. The purpose of the display is to show whether the engine is on or off. When it rains, the system does not work to save water

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