Soil Sensor Based Auto Gardening Using Solar Model

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Abstract-Agriculture field plays a vital role in everywhere the main and the most important asset for the gardening purpose is the water, But the scarcity of the water is the Big problem that we are facing nowadays i.e due to lack of rain and scarcity of land reservoir water. Therefore we should use the proper method for gardening, in-order to avoid the deficiency of water. Another very important reason of the water scarcity is the unplanned use of water, due to which a lots ofwater getting wasted.For this purpose we are using auto gardening using solar model bythe use of soil sensor, which tells about the condition of the soil, i.e. wet or dry. This system derives power from the solar model through photovoltaic, without using the commercial power.In this project we are using solar energy which is useful for gardening purpose by using a pump. Our circuit is comprises of sensor, op-amp IC, where sensor part builds using the IC.Op-amps are configured as a comparator and two copper wires are inserted inside the soil, tells about the dry or wet condition of the soil. If the soil is dry, the information is passed by the microcontroller ,then after switch on the pump for the gardening purpose, by taking the water from the reservoir .This is the best method for the gardening the plants using solar energy without waiting for the rain. Depending on climatic conditions, Battery is used for the gardening purpose without sun-shine. This is why the project is more reliable and much more economical in all aspects.

Index Terms- Solar cell, Moisture sensor, Battery, Mother Board.

1. INTRODUCTION:

As we know the solar energy is socially and politically defined energy source. We can use this source for many purposes in our day to life. Out of all we can also use this source for gardening purpose by saving wastage of water.by using a moisture sensor we can enable the gardening the gardening process by using solar cell .We refer various journals before doing this project. this is a very low cost process that will helpful for the farmers, who wants to farm the field with very low cost range, thus this is the best way for irrigation purpose .We learn what is irrigation process at first? Irrigation is a wayof arranging and use rate of irrigation liquid in a good way[1].The irrigation is a way of using the water on field, growing of the Sid or crops, now we know about the irrigation system and now we learn about what is actually solar cell and its uses and how it helpful in our irrigation system? Solar system is something, which plays a vital role in agriculture field.Solar cell is the combination of solar and cell. We learn much information regarding solar cell refereeing from many journals[2, 3,4].we also use moisture sensor which tell about the soil wet or dry.We understand about the sensor and its uses by taking the help of many journals. This is a project where we use embedded in C so we can say this is a project of both hardware and software, we uses the programming for different purpose.Our project helps for irrigation purpose in an efficient manner so this process is very suitable and we can not only

use in small area but alsowe can use in a large area with high effect of solar cell.

2. CIRCUIT DESCRIPTION AND FEATURES:

2.1 SOLAR CELL: Solar-cell is aninstrument that helps the light from the sun, to produceelectricity or we can say a photovoltaic cell used for power source.It is a combination of solar and cell. Solar is something related to sun, produced by or using the suns light or heat which we can use in various purposes in our day to life and this project is one of them. A photovoltaic **cell** is a device which converts the light of energy directly into electricity by the effect of photovoltaic. It is always is in the form of photoelectric cell which, whenever fall upon to a light, can produce an electric current without taking the help of voltage energy sources. Thus it is all about the solar cell, which we use in our day to day life.

2.2 MOISTURE SENSOR:

Soil moisture sensormeasures the water content in soil. The combination of no of moisture sensors is known as moisture probe. Soil moisture sensors measure various properties, like dielectric constant, electrical resistance, and acts as a proxy for the moisture content.

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2.3 MOTHER BOARD:

In this project, the motherboard that we are using is designed with micro controller of 51-MSC core compatible. The motherboard is designed on a PCB, that helpful for the MC. This board is madeof, many microcontrollers, registers for input and output purpose, auto reset circuit and an oscillation division.

2.4 VOLTAGE COMPARATOR:

An op-amp is a well-balance very high gain circuit. This parallels the characteristics of comparators and can be substituted in applications with low-performance requirements. It defines as operational amplifier, normally useful for different operations in a system.
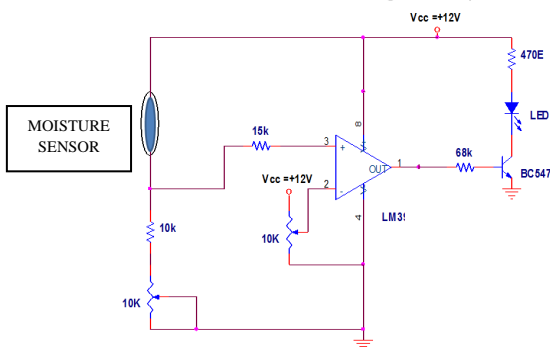

Fig.1. Moisture sensor with voltage comparator

3. DESIGNING PRICIPLE:

The project uses a transistor to on/off the motor, which is designed to receive the input signal of telling about the moisture condition of the soil like behaving here as sensor. This is achieved by using an op-amp as comparator which acts as wall between the way of determining the condition of the soil and the controller. Once the controller receives this signal, it generates an output that drives a transistor for operating the water pump. The sensing arrangement is made by using a moisture sensor inserted into the field at a distance. According the temp of the soil the sensor gives a voltage. This voltage is compared with a voltage comparator. The project is designed to operate a pump of irrigation for automatic purpose. So whenever dry condition are arises the moisture is in the soil reduces, which turns ON the water pump. Motor switches become off when the moistures are increases.

4. EMBEDDED SYSTEM:

An embedded system is a system with a vital function within a larger system, often with very effective constraints. It is embedded as part of a complete device often including hardware, electrical parts. Embedded systems play like a controller for many devices thathelps in our day to day use. Almost of all microprocessors are manufactured as components of embedded systems.

5. PROGRAMMING AND CONTROLLER REQUIRED:

8051 microcontroller requiresprogramming and coding, the 8051 may only address 64k of RAM. To expand RAM beyond this limit we requiredlanguage of programming and hardware system. Some time we have to do it by our own hand, since for many compilers and assemblers supports maximum up to 64k, so it will not support more than 64k of RAM. Normally the programs can usually fit with in 64k but often RAM is lacking. Thus if you need more than 64k of RAM, Then at first we have to check weather compiler supports or not. If not then be prepared to do it by your ownhand.Then we have to do the program according to the requirement.
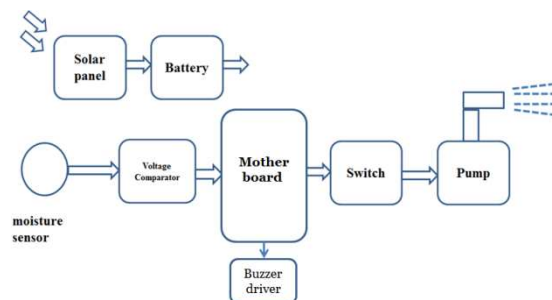

Fig.2. Automatic Irrigation system with solar energy.

Fig.3 Final project hardware view.

6. CONCLUSION:

Hence we did our project which is very much help full in case of irrigation purpose by using these devices. This project is developed and tested in the laboratory and found to operating satisfactory in the test conditions. The accuracy observed is quite high.With investing a very few cost we can able to start the irrigation process and we can also usein case of large field by a high volt solar cell. This is very effective and suitable project from which we learn a lot about irrigation and embedded system.

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