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Solar Powered Smart Irrigation System Using Humidity Sensor and Float Sensor

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***Abstract**: Solar powered smart irrigation system using Arduino, soil moisture sensor,float sensor , solar panel, and relay module.*
This project is about a moisture-sensing automatic plant watering system using Arduino UNO powered by solar panel. The system reads the moisture sensor and switches on the motor when the moisture is below the set limit. When the moisture level rise above the set point, the system switches off the led indicator. The status of the tank motor and the moisture level will be displayed on a 16×2 LCD display. Monitoring of the moisture content of the soil will be done using a soil moisture sensor and the water level of the tank will be detected using a float switch which automatically switches off the motor when the reservoir is filled.
The motor is switched ON when the soil moisture falls below a certain set value and if there is less water in the tank. The status of the soil moisture and the tank water level will be displayed using a 16×2 LCD.

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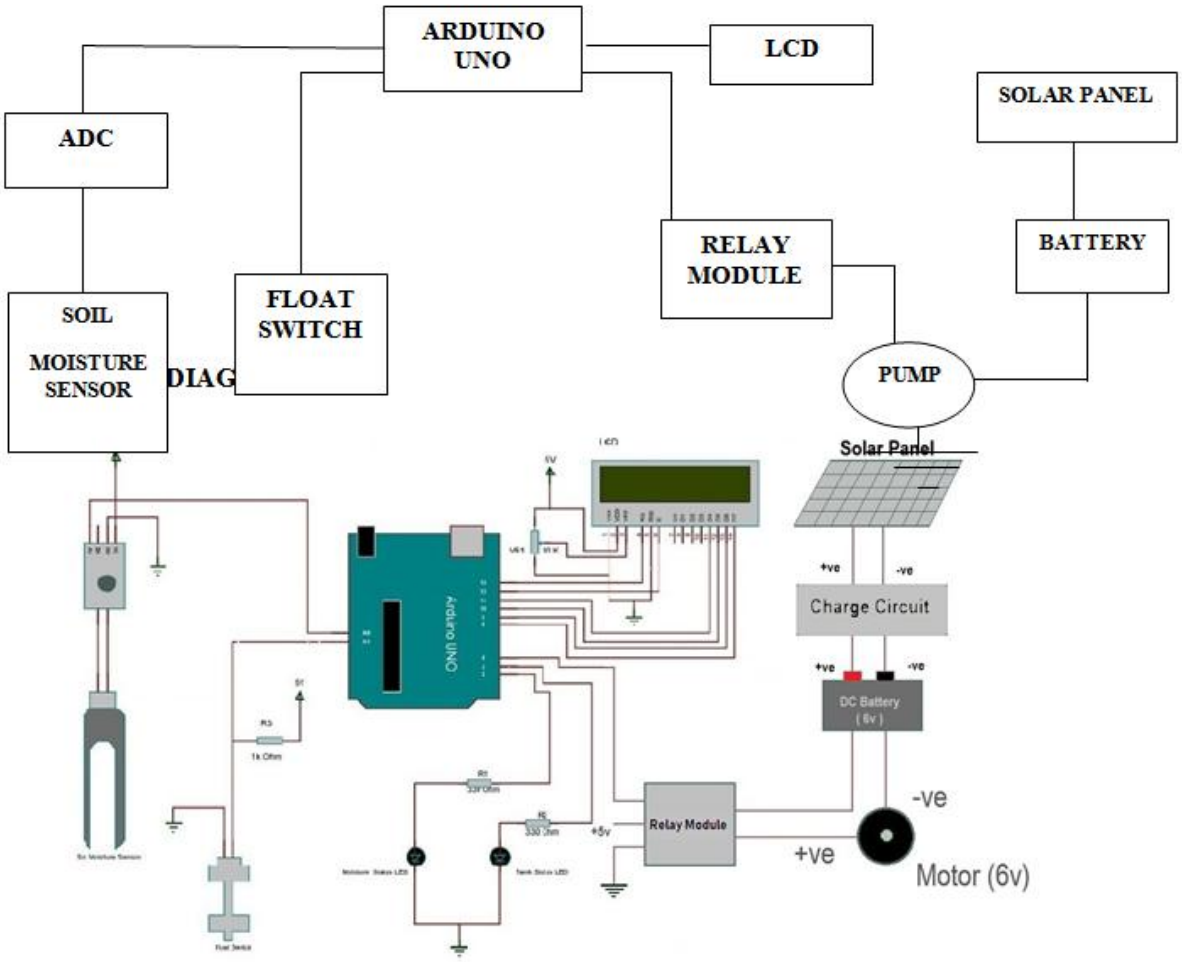
I. INTRODUCTION

Agriculture is the backbone of all developed countries. It uses 85% of available fresh water recourses worldwide and this percentage continues to be dominant in water consumption because of population growth and increased food demand. Due to this, efficient water management is the major concern in cropping system in arid and semi-arid areas. An automated irrigation system is needed to optimize the water use for agricultural crops. The need of automated irrigation system is to overcome over irrigation and under irrigation. Over irrigation occurs because of poor distribution or management or waste of water, chemical which leads to increased soil salinity with consequent buildup of toxic salts on the soil surface in areas with high evaporation. To overcome these problems and to reduce the human effort in continuous monitoring, solar powered smart irrigation system has been used. This project is the application of knowledge of microcontroller, sensors, use of logic in programming. The final product is thus easy to use, portable, requires less human effort, has the option of switching to solar power where there is scarcity of electricity.

LIST OF REQUIRED COMPONENTS

NAME	QUANTITY	RATING
Arduino UNO	1	14 digital input/output pin, 6 analog pin, 16Mhz crystal oscillator
Soil moisture sensor	1	8 bit, operating range -40^{0}c
Pump	1	6 volt, DC
LED	2	1 volt, 20 mA
LCD	1	16×2 LCD, 16 pin 5 volt
Float Switch	1	2.7 in diameter, 4.85 long, 1 amp, 30 v DC/ 125 v AC
Solar Panel	1	16 v, 3.5 A
Battery	1	6 V DC
ADC	1	10 bit(0-1023),clock speed 50KHz-200KHz
Resistance	4	1KΩ(2),10Ω,160Ω
Transistor	1	BC548B
Diode	3	1N40007(2), 1N4736A(1)
Relay Module	1	20mA, 5V, 20VAC 30VDC

II. BLOCK DIAGRAM



III. WORKING PRINCIPLE

At first soil moisture sensor senses the moisture of the soil and gives some pulse to converter module. Converter module takes the output (analog pulse) of the sensor and gives the analog output which is fed to arduino input. Float switch is connected to the arduino through other analog input port which is used to measure water tank level. Arduino is connected to several output devices like display (LCD) , water pump, LED indicator. LCD display shows the status of the circuit which is in running condition. The other output of the Arduino is connected to the two indicators LED1 & LED2. LED1 indicates the moisture status & LED2 indicates the water tank level . Other output is connected to the relay module. The one output of the relay module is connected to the battery positive terminal through the motor. Battery negative terminal is directly connected to the pump. The battery is connected to the solar pannel through the solar charger circuit.

The motor will be off in two conditions :

- Soil moisture is greater than set value of moisture.
- Water level of tank is low.

IV. IMPORTANCE OF PROJECT IN PRESENT TECHNICAL SCENARIO

The result kit would give a portable and easy to serve**_Agricultural** sector.the problem faced in efficient water management is the major concern in cropping system in arid and semi-arid areas. An automated irrigation system is needed to optimize the water use for agricultural crops. The need of automated irrigation system is to overcome over irrigation and under irrigation.

V. CONCLUSION

The knowledge of the project cost estimation and manufacture of solar powered irrigation system using smart technology is helpful for the **Agricultural** sector as well as industry purpose. It provides low cost solution to produce organic crops and reduce dependable of electricity.

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