

An Integrated Cellular Farming Management using Android Application

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Abstract

India's population is achieved 1.2 billion and the population rate is increasing day by day then following 25-30 years there will be not kidding issue of sustenance, so the improvement of farming is essential. Today, the agriculturists are experiencing the absence of rains and lack of water .In earlier system human participation were used in such condition lack of accuracy and even time consumption was also more so to overcome this system, The fundamental goal of this paper is to give a programmed watering system framework in this way sparing time, cash and force of the former and also implemented the TCP/IP client android application to know the sensor values and automaticall1the system will be on and off . At whatever point there is an adjustment in temperature and dampness of the surroundings these sensors detects the adjustment in temperature and moistness and gives an sign to the microcontroller, with the help of microcontroller the GSM module send a IP address to the mobile number of the owner after that with the help of IP address the android application shows the sensors values. The constant expanding interest of the food requires the fast change in sustenance generation innovation. In a nation like India, where the economy is for the most part taking into account agriculture and the climatic conditions are isotropic, still we are not ready to make full utilization of rural assets. The fundamental reason is the absence of rains and lack of area supply water. Another imperative reason of this is because of spontaneous utilization of water because of which a lot of water goes waste. In the advanced dribble watering system frameworks, the most critical point of interest is that water is supplied close to the root zone of the plants drop by drop because of which an extensive amount of water is spared. The innovation of this watering system will reduce the man power required.

Keywords: android phone, microcontroller (AT89C52), crystal, Lm35, humidity, sensor, ldr, soilsensor, water level, SIM800A GSM module, sprinkler

I. INTRODUCTION

The nonstop expanding interest of the sustenance requires the quick change in nourishment generation innovation. In a nation like India, where the economy is for the most part taking into account agriculture and the climatic conditions are isotropic, still we are not ready to make full utilization of agricultural assets. The fundamental reason is the absence of downpours and shortage of area store water. The consistent extraction of water from earth is decreasing the water level because of which parcel of area is coming gradually in the zones of un-irrigated area. Another critical reason of this is because of impromptu utilization of water because of which a lot of water goes waste [1]. In the advanced drip irrigation system frameworks, the most critical point of interest is that water is supplied close to the root zone of the plants dribble by dribble because of which a vast amount of water is saved. At the present period, the formers have been utilizing watering system strategy as a part of India through the manual control in which the agriculturists flood the area at the customary intervals. This procedure at times devours more water or in some cases the water achieves late because of which the products get dried. Water inadequacy can be unfavorable to plants before unmistakable shrinking happens. Implemented development rate, lighter weight organic product takes after slight water insufficiency. This issue can be rectified in the event that we utilize programmed microcontroller based drip watering system framework in which the watering system will occur just when there will be extreme prerequisite of water [2].

Watering system framework utilizes valves to turn watering system ON and OFF. These valves might be effectively computerized by utilizing controllers and solenoids. Automatic homestead or nursery watering system permits former's to apply the appropriate measure of water at the ideal time, paying little mind to the accessibility of work to turn valves on and off. Also, former's utilizing automatic hardware can decrease overflow from over watering saturated soils, abstain from flooding at the wrong time of day, which will enhance crop execution by guaranteeing sufficient water and supplements when required. Programmed Drip Irrigation is a profitable instrument for exact soil moisture control in exceptionally particular nursery vegetable generation and it is a basic, exact strategy for watering system. It additionally helps in efficient, evacuation of human error in conforming accessible soil moisture levels and to expand their net benefits [3].

II. PROBLEM FORMULATION

- 1) Simple and easy to introduce and design.
- 2) Saving energy and assets, with the goal that it can be used in appropriate way and amount.
- 3) Farmers would have the capacity to spread the perfect measure of water at the opportune time via automatic form or nursery watering system.
- 4) Avoiding watering system at the wrong time of day, reduce overflow from overwatering immersed soils which will enhance crop execution.
- 5) Automated watering system framework utilizes valves to turn motor ON and OFF. Motor can be automated effortlessly by utilizing controllers and no need of work to turn motor ON and OFF.
- 6) It is exact strategy for watering system and a profitable apparatus for precise soil moisture control in very particular nursery vegetable production.
- 7) It is efficient, the human mistake disposal in conforming accessible soil moisture levels

III. SYSTEM ARCHITECTURE

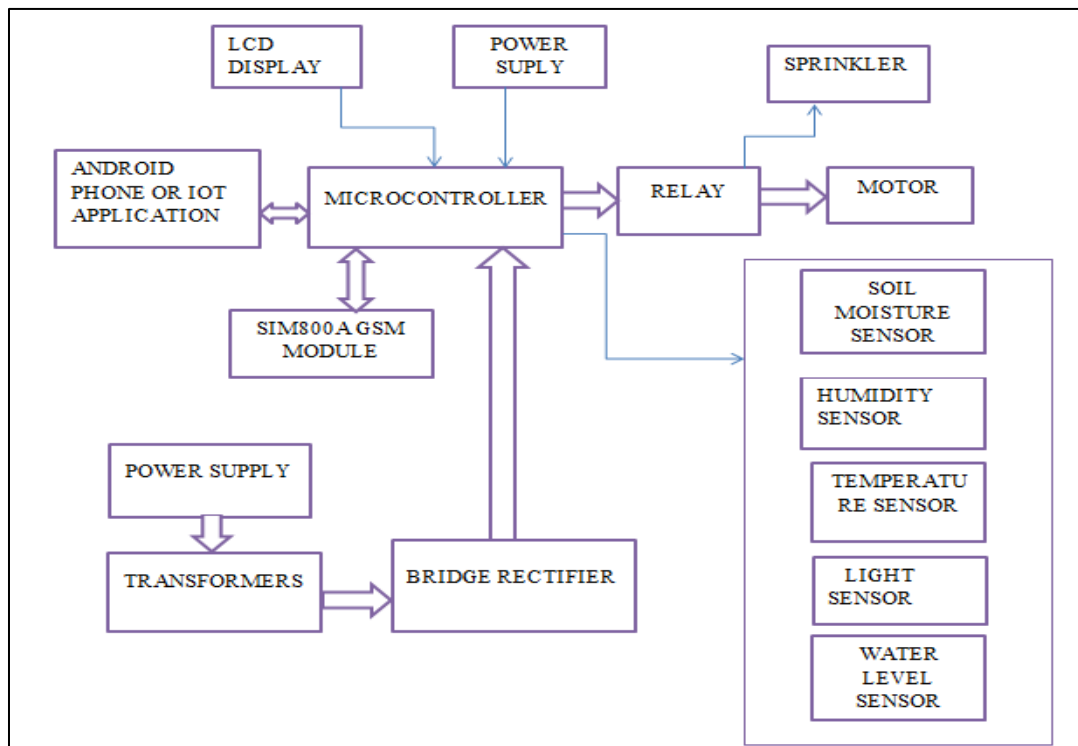


Fig. 1: Block diagram of receiver



Fig. 2: Transmitter

It speaks with the different sensor modules continuously keeping in mind the end goal to control the light, air circulation and waste process effectively inside a nursery by impelling a cooler, pump, sprayer and lights individually as indicated by the important state of the harvests. An incorporated Liquid crystal display (LCD) is additionally utilized for ongoing showcase of information obtained from the different sensors and the status of the different gadgets. Likewise, the utilization of effectively accessible parts lessens the manufacturing and support costs. The configuration is entirely adaptable as the product can be changed at whatever time. It can subsequently be perfectly customized to the particular necessities of the client.

This makes the proposed framework to be a sparing, convenient and a low support Solution for nursery applications, particularly in country zones and for small scale Agriculturists. No all the more going through extend periods of time watering with a hose. You won't need to stress over recollecting moving the hose like 20 minute either. Your new frameworks will do all the recalling for you. Spares water. A programmed irrigation system framework can spare you truly a large number of gallons of water a year just by recalling turning itself off at the correct time. Ensures your budgetary venture. Your home's appearance is a vital element in deciding it's fairly estimated worth. An alluringly finished outside, with lavish development and solid plants, helps your home venture that new, very much looked after look.

IV. HARDWARE COMPONENTS

A. SIM800A:

SIM800A is a two recurrence GSM/GPRS module, SMT bundling. Its steady execution, reduced appearance, high cost execution, to address the issues of clients.

SIM800A working recurrence is 900/1800MHz GSM/GPRS, it can understand the transmission of voice, SMS and information data with low power utilization. SIM800A size is 24*24*3mm, can be connected to an assortment of conservative item outline necessities.

B. ATmega48 Microcontroller:

The microcontroller is at the center of each implanted module. Consequently, extraordinary consideration must be practiced in picking the privilege microcontroller without compromising on functionality. Keeping in perspective numerous components that represented the right usage of our undertaking the ATmega48 microcontroller from Atmel Corporation's AVR microcontroller family was picked. Couple of significant reasons might be referred to legitimize our decision of this microcontroller. The first being, that all AVR microcontrollers are intended to convey more execution at lesser force utilization. It is good with prevalent conventions like I2C and SPI. It likewise has propelled highlights like an on chip simple to computerized converter, 6 pulse width modulation channels, and information maintenance is bolstered up to a hundred years at 25° C. Likewise compilers for the ATmega88 are accessible free of expense from the producer. An additional point of interest is that the AVR arrangement can be customized utilizing the AVRGCC (GNU C compiler) , along these lines settling on it an undisputed decision for even GNU/Linux based software engineers. The Atmega48 microcontroller has execution rates of up to one MIPS for each MHz of clock recurrence. Explaining the determinations of the CPU of the AVR, it is a 8 bit microcontroller with cutting edge RISC engineering. The CPU is intended for the stellar blend of parallelism and execution. In this way the CPU utilizes the Harvard engineering (separate recollections and transports for system and information). The CPU likewise obliges a 32 universally useful 8-bit registers. Atmel gives the information handbook and application notes for the microcontroller in compact record group on their official site 'www.atmel.com'. As an initial step, we will continue now to consider the microcontroller to sum things up subtle element, beginning with the pin design.

C. Sensors:

1) LDR Sensor:

LDRs or Light Dependent Resistors are extremely valuable particularly in light/dim sensor circuits. Typically the resistance of a LDR is high, in some cases as high as 1,000,000 ohms, yet when they are lit up with light resistance drops significantly. LDR change their resistance when light falls on them. At the point when there is no light, it will have high resistance. As the light force expands, its resistance decreases.

The circuit below shows the demonstrates a LDR sensor which comprise of a mono stable multivibrator utilizing IC 555. At the point when the light falls on the LDR its resistance gets diminished and the present courses through that way. The capacitor gets released to Vcc/3. When the fall of light stops on the LDR, its resistance increments, subsequently capacitor gets charged to Light Dependant Resistors or photograph resistors or photocells are gadgets that Vcc. This in turn makes an interfere with the microcontroller at pin P1.2.

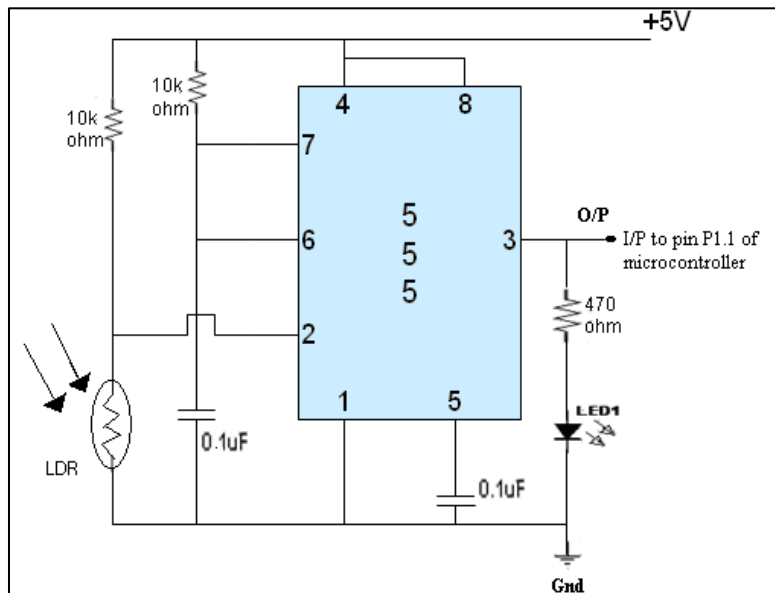


Fig. 3: LDR sensor circuit using 555 timers

2) Temperature sensor (LM35):

National Semiconductor's LM35 IC has been used for sensing the temperature. It is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in oC). The sensor circuitry is sealed and not subject to oxidation, etc.

$$\text{Formula Used: Temperature (oC)} = (\text{Vout} * 100) / 5 \text{ oC}$$

D. Relay:

Relay is an electrically worked switch. Relay permit one circuit to switch a second circuit which can be totally separate from the first. Relay can switch AC and DC, transistors can just switch DC. Relay can switch higher voltages than standard transistors. Relay are regularly a superior decision for exchanging expansive streams (> 5A). Transfers can switch numerous contacts without a moment's delay



Fig. 4: Relay symbol

1) Software Components

It is interfaced between the equipment and PC. The elements are inbuilt in a product application is called as a software components.

The software components used in our project is listed below.

- 1) CVAVR cross compiler
- 2) AVR studio programmer
- 3) Embedded C

V. EXPERIMENTAL RESULTS

Values taken from the sensors which executed in fields, model pack appeared in figure 5. The equipment setup of the proposed framework is appeared in figure 6. here we have composed a module utilizing microcontroller and GSM. once the three phase power comes module will send a SMS to validated clients. On the off chance that the previous needs to switch on the motor he simply need to offer ring to the specific modem number which is executed close to the motor. When the soil moisture is dry then the sensors sense the moisture and send the message to microcontroller after that microcontroller sends the IP address by message to former or authorized person after that he will give IP address to TCP/IP clients app in android mobile it will shows the soil moisture value after that he will send message to microcontroller it will switch on the motor automatically. When the temperature is high then the sensors sense the temperature and send the message to microcontroller after that the microcontroller

sends the IP address by message to former or authorized person after that he will give IP address to TCP/IP clients app in android mobile it will shows the temperature value after that he will send message to microcontroller it will switch on the motor automatically. When the humidity is high then the humidity sensors sense the humidity and send the message to microcontroller then the microcontroller sends the IP address by message to former or authorized person then he will give IP address to TCP/IP clients app in android mobile it will shows the humidity value after that he will send message to microcontroller it will switch on the motor automatically. When the preset value of light goes high then the light sensors sense the resolution of light and send the message to microcontroller then the microcontroller sends the IP address by message to former or authorized person then he will give IP address to TCP/IP clients app in android mobile it will shows the LDR value after that he will send message to microcontroller it will switch on the motor automatically.

When the water level is low then the water level sensors sense the level of water and send the message to microcontroller then the microcontroller sends the IP address by message to former or authorized person then he will give IP address to TCP/IP clients app in android mobile it will shows the water level value after that he will send message to microcontroller it will switch on the motor automatically. When all the sensor achieves preset worth at once, sensors from specific function will sends message to microcontroller and subsequent to accepting messages from microcontroller individual activity will done by specific components.

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223.228.93.102:1234
Connected
AT+CIPSENDTemperature=64
light intensity=15
Humidity value=13no moisture in soil sprinkler on
water=Empty
motor is onAT+CIPSENDTemperature=59
light intensity=15
Humidity value=13no moisture in soil sprinkler on
water=Empty
motor is onAT+CIPSENDTemperature=53
light intensity=17
Humidity value=13no moisture in soil sprinkler on
water=Empty
motor is onAT+CIPSENDTemperature=24
light intensity=18
Humidity value=13no moisture in soil sprinkler on
water=Empty
motor is onAT+CIPSENDTemperature=49
light intensity=18
Humidity value=13no moisture in soil sprinkler on
water=Empty
motor is on
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Fig. 5: Results taken from android phone

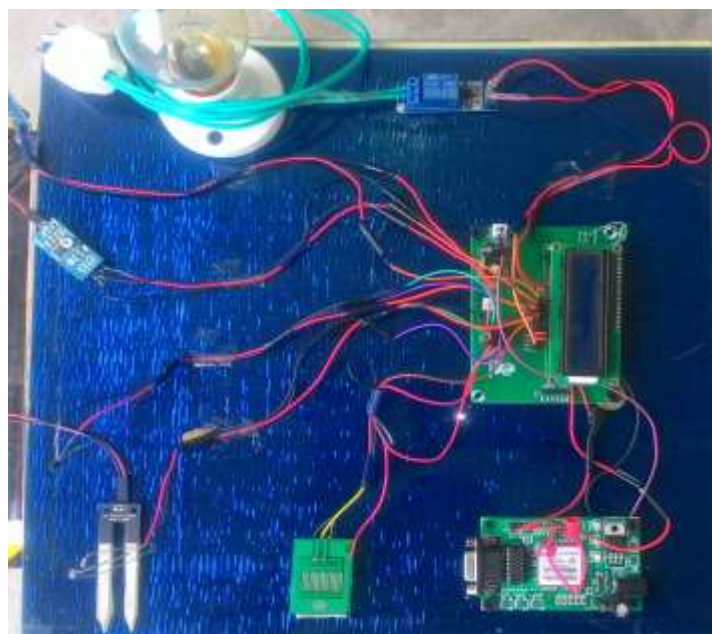


Fig. 6: Hardware setup

VI. CONCLUSION

This audit is proposed to aggressive water administration for the agricultural area. Microcontroller in the framework guarantees about expansion in frameworks life by decreasing the force utilization bringing about lower power utilization. It is thought to be utilized at Cricket stadiums or Golf stadiums furthermore out in the open greenhouse zone for appropriate watering system. Robotized watering system framework has an enormous interest and future extension as well. It is efficient, prompted evacuation of human blunder in modifying accessible soil dampness levels and to amplify their net benefits in agreement to elements like deals, quality and development of their product.

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