

Hybrid Based Smart Irrigation Control System

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Abstract :

The primary reason to acquaint this paper is with increment mindfulness about shrewd water system and to give preventive measure on wastage of water, aggravation of power in conventional method for water system. In the present time, there is parcel of advances and framework, which are utilized for shrewd water system, yet a few frameworks are not conservative for little scale arrive holder. Along these lines, we can present our sun oriented based shrewd water system framework, which will be conservative for little scale and in addition substantial scale arrive holder. In our framework, the fundamental piece of this framework is microcontroller, which is consistently present in contact with all checking gadgets, for example, soil sensor, solenoid valve, and weight check. Soil sensor display in the dirt and profundity of this sensor is as per plant. It constantly sense water level in the dirt. At the point when lacking water level is available, at that point it sends flag to microcontroller. Microcontroller gives order to solenoid valve. As per summon solenoid valve play out the task open and close the valve itself. The issue happened because of expanding or diminishing of weight additionally lessens with weight check. To decrease human exertion. Entire framework is takes a shot at sun powered vitality; thus the framework is absolutely inexhaustible.

Key words - Solar panel, Microcontroller, Water pump, Soil sensor, Solenoid valve, Pressure gauge, Moisture sensor.

I. INTRODUCTION:

Making this framework is originated from genuine living cases of agriculturists from rustic territory. In everyday life the mindfulness identified with electrical and hardware gear increments, yet in the event of provincial region still there is less mindfulness. The water system is a fake strategy for giving water to plant which helps developing of agribusiness crops. Be that as it may, some of the time the wellspring of water is constantly given to crops even after they inundate in adequate way. Along these lines the wastage of water is happened, and some of the time water isn't accessible for outstanding plant. Likewise in provincial zone, the power accommodated water system is just for 8 hours, and henceforth issue identified with stack shedding are presented. Because of these plant efficiency and reliability of the irrigation is decreases.

Along these lines to make the water system temperate, solid and productive, we presented one framework. So that, the client can effortlessly acquainted with the framework. In our task named sunlight based based shrewd water system framework by utilizing PIC microcontroller, we utilized sun oriented board, battery, inverter, water level marker, water pump, smaller scale controller, soil sensor, solenoid valve, sprinkler, non return valve, Pressure measure what's more, demonstrate. All hardware's are effectively accessible in the showcase. In the event that we are utilizing motor for water pumping at that point there is no need of inverter. Water level pointer is utilized to identify the level of water from water repository microcontroller is utilized to give charge to all checking hardware. Here and there blockage and spillage of pipe happened, which will bring about expanding or diminishing weight and caused to diminish exactness. This issue can be overwhelmed by utilizing non return valve and weight measure in our framework. GSM show utilized as a correspondence medium amongst administrator and entire framework, with the goal that client continuously mindful about every last task.

The consistent expanding interest of nourishment requires the quick change in sustenance generation innovation. In a nation like India, where the economy is for the most part in light of farming and the climatic conditions are isotropic, still we are not ready to make full utilization of agrarian assets. The primary reason is the absence of downpours and shortage of land supply water. The ceaseless extraction of water from earth is decreasing the water level because of which part of land is coming gradually in the zones of un-flooded land. Another vital reason of this is because of spontaneous utilization of water because of which a lot of water goes to squander. This issue can be redressed in the event that we utilize microcontroller based computerized water system framework in which the water system will occur just when there will be intense necessity of water.

DEFINATION OF IRRIGATION:

Water system is the simulated utilization of water to the dirt more often than not for helping with developing yields. In edit creation it is for the most part utilized as a part of dry territories and in times of precipitation deficiencies, yet in addition to ensure plants against ice. Dribble water system otherwise called stream water system is a water system technique which limits the utilization of water and compost by enabling water to the underlying foundations of plants, either onto the dirt surface or straightforwardly onto the root zone, through a system of funnels, tubing, and producers.

II. METHODOLOGY:

The customary water system techniques like overhead sprinklers, surge write nourishing frameworks normally wet the bring down leaves and stem of the plants. The whole soil surface is soaked and frequently remains wet long after water system is finished. Such condition advances diseases by leaf shape growths. The surge write strategies expend substantial sum of water and the territory between trim columns stays dry and gets dampness just from coincidental precipitation. On the opposite the dribble or stream water system is a sort of present day water system procedure that gradually applies little measures of water to some portion of plant root zone. Trickle water system strategy is developed by Israelis in 1970s.

Water is provided as often as possible, frequently day by day to keep up positive soil dampness condition and avoid dampness worry in the plant with appropriate utilization of water assets. Its shape relies upon soil attributes. Trickle water system spares water in light of the fact that exclusive the plant's root zone gets dampness. Little water is lost to profound permeation if the best possible sum is connected. Trickle water system is mainstream since it can build yields and reduction both water prerequisites and work. Lower working weights and stream rates result in decreased vitality costs. A higher level of water control is achievable. Plants can be provided with more exact measures of water. Sickness and creepy crawly harm is diminished since plant foliage remains dry. Working expense is normally decreased. Leagues may keep amid the water system process since columns between plants stay dry.

III.BLOCK DIAGRAM AND DESCRIPTION:

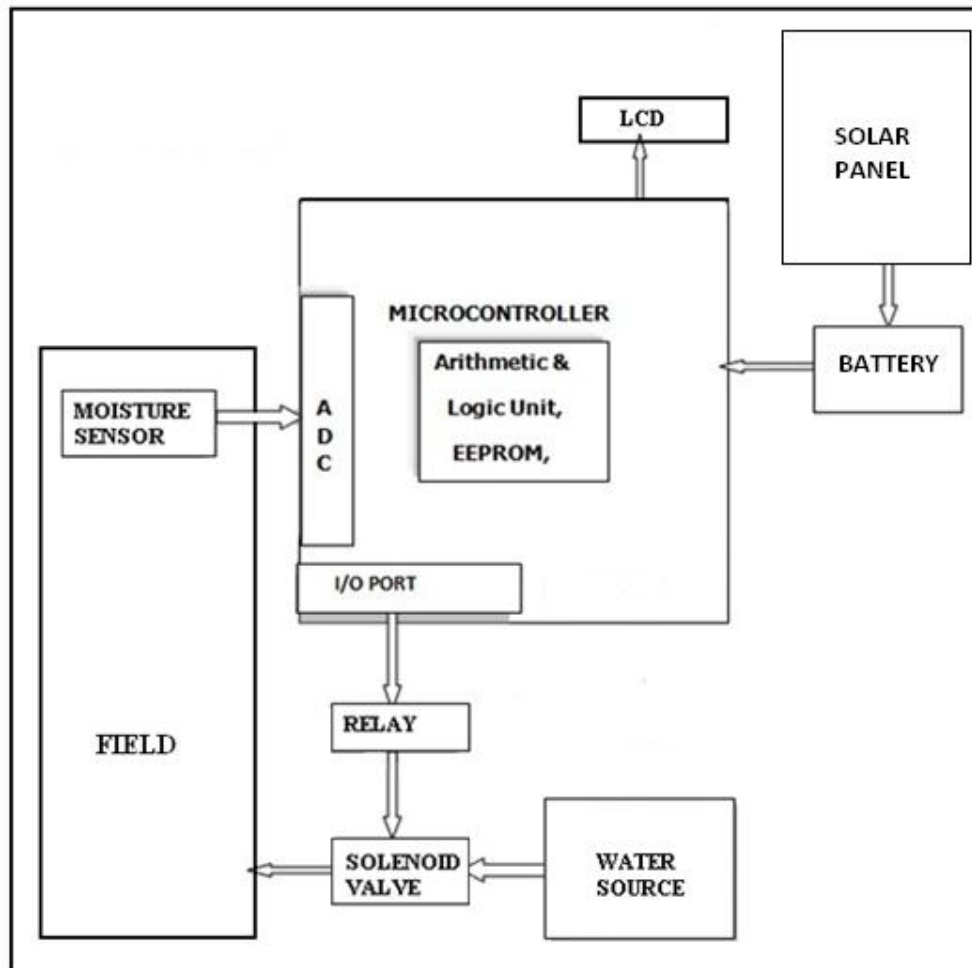


Fig.1 Block diagram of solar based smart irrigation system

Following are the significant segments utilized from which microcontroller based robotized water system framework has been manufactured.

1. solar panel
2. Soil moisture sensor
3. Relay
4. Liquid Crystal Display
5. Pressure gauge
6. Ni-Cd battery

1.Solar panel:

As we probably am aware, sun is the sustainable power source. Subsequently it is conceivable to mount sunlight based board close to the homestead. At that point it is extremely practical to agriculturist, since it not diminishes the cost of power yet additionally vitality transmission cost. The extent of sun oriented board changes as per territory of water system. Sun oriented board ingest the photon from the sun, with the assistance of photograph voltaic cell. It changes over sun oriented vitality into electrical vitality, which is additionally put away in batteries. Solar panel is an assembly of solar cells. Solar cell or photovoltaic cell is made up of silicon semiconductor. Electricity is produced when the sunlight strikes the solar cell, causing electrons to move around.

2. Soil Moisture Sensor:

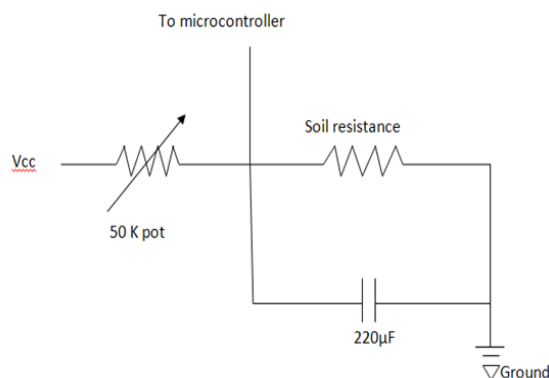


Fig.2: Circuit diagram of the soil moisture sensor

The dampness sensor is covered in the ground at required profundity. The working of the dampness sensor is basic and direct. The dampness sensor just faculties the dampness of the dirt. The adjustment in dampness is corresponding to the measure of current coursing through the dirt.

3. Relay:

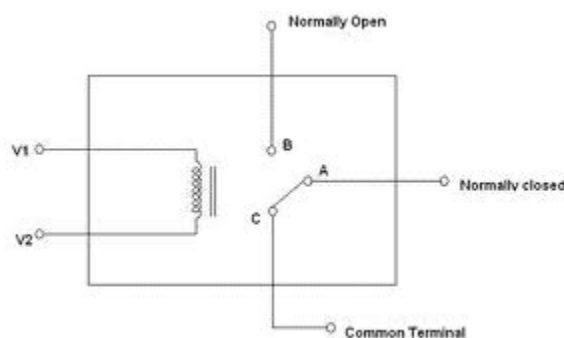


Fig.3: Block diagram of a relay

A transfer is an electrical switch that opens and closes under the control of another electrical circuit. In the first shape, the switch is worked by an electromagnet to open or close one or numerous arrangements of contacts. A hand-off can control a yield circuit of higher power than the info circuit. The above outline demonstrates the portrayal of a transfer. As a matter of course when there is no excitation in the loop the NC (Normally Closed) and C (Common Terminal) are associated through the contact inside. At the point when the curl is energized by giving the required loop voltage, the contact changes from the NC to NO (Normally Open) side. For this situation, the C and NC terminals are associated inside.

4. Liquid Crystal Display:

The LCD will show the letter sets, numbers, characters and images. The LCD utilized here is eight piece parallel write and the show measure is 16*2. Fluid Crystal Display is utilized for showing the dampness value. LCD comprises of three control pins and eight information pins. In view of the orders given to the control pins, information can be perused from or keep in touch with the LCD. The eight information pins of the LCD are associated with the PORTB pins RB0-RB7. Three control pins are associated with PORTC pins. RC0, RC1, RC2 are utilized for enroll select (RS), read/compose (R/W) and empower (E) individually.

5. Pressure Gauge:

The weight check is chiefly used to record the weight ceaselessly, which keeps the framework from issues. On the off chance that any blockage or spillage happened at sprinkler or anyplace in pipeline, it increments or declines the weight individually. With this, there is a plausibility of over-burdening of engine, wastage of water, hamper a framework. A few time, it is go about as a weight sensor yet for that reason it is important to find the weight measure in such places where it can quantify the weight always.

6. Ni-cd battery:

In this project Ni-Cd battery of 12v capacity is used. Ni-Cd batteries use Nickel hydroxide as positive electrode, cadmium as negative electrode, and an alkaline electrolyte.

IV. SYSTEM SOFTWARE:

Framework programming for information perusing and controlling the different gadgets is composed in Assembly dialect. Executing the product program the channel is consecutively examined. Filtering channel 1 information of comparing channel is perused, on the off chance

that it is high, it sends the high flag to the hand-off which changes the engine to 230 V supply. Engine progresses toward becoming ON, at a similar time Microcontroller sends information flag to the stepper engine 1 which opens the valve of area number 1 furthermore, water begins moving through the valve to the plants of area. The procedure stays in a similar state till the information of a similar channel does not change, if the information isn't high, at that point framework checks the following channel and the procedure rehashes as specified above for boundless day and age.

V. COMPARISON BETWEEN EXISTING IRRIGATION TECHNOLOGY AND SMART IRRIGATION TECHNOLOGY

- A) Existing water system controllers depend on settled calendar. Ranchers, Regions and business proprietors of green territories ordinarily set a watering plan that includes particular run-times and days, and the controller executes a similar calendar paying little heed to the season or climate conditions. From time to time an expert may physically alter the watering plan, however such changes are generally just made a couple of times amid the year, and are based upon the specialists' discernments instead of real watering needs. Savvy water system control innovation depends on ordinary atmosphere measure and real water need of plant. In this innovation water system happens when the water is required by plant. It supplies just that measure of water to the plant as plant needs.
- B) In ordinary water system control innovation, water system is done in the route in which vast measure of underground or surface water is squandered. In savvy water system control innovation water system is done in a way in which there is next to no shot of water wastage.
- C) The basic water system control technology doesn't consider the plant efficiency which did not depend on effective water system. It depends on view of expert. The brilliant water system control innovation considers every one of the parts of plants identified with water system. It depends on effective water system.
- D) Concerning highlights and life of shrewd water system controller the cost is worthy for each sort of agriculturists, districts and business green region specialists.

VI. ADVANTAGES:

1. As all electrical and electronic hardware utilized it doesn't produce contamination.
2. Saving of water obtaining in large amount.
3. Problem related to the load shading reduces as solar energy is used.
4. Human efforts are reduced & reduces time wastage in the system.

VII. APPLICATIONS:

1. In greenhouses.
2. In garden.
3. Small scale as well as large land holder (farmer) for irrigation purpose.

VIII. CONCLUSION:

The Microcontroller based irrigation system proves to be a real time feedback control system which monitors and controls all the activities of irrigation system efficiently. The present proposal is a model to modernize the agriculture industries at a mass scale with optimum expenditure. Using this system, one can save manpower, water to improve production and ultimately profit.

The Microcontroller Based Automated Irrigation System screens and controls every one of the exercises of dribble water system framework proficiently. Microcontroller Based Automated Irrigation System is a significant instrument for exact soil dampness control in exceptionally specific nursery vegetable creation and it is a basic, exact technique for water system. It likewise helps in efficient, evacuation of human mistake in altering accessible soil dampness levels and to augment their net benefits.

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