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AUTOMATIC SOLAR POWERED IRRIGATION SYSTEM

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Abstract :- *For climate observing framework and water system controller, we have to gauge Soil dampness, Sunshine and Rain fall and so forth. The key goal of this venture is to write about a created indigenous ease time based comparator based water system scheduler who performs client characterized capacities and yields charges to determine fitting actuators (transfer, solenoid valves, engine). A dirt dampness sensor was demonstrated, reproduced and tried for accomplishing, with ease, exact and solid estimations. A minimal effort superior and little temperature sensor is utilized, with the same PCB circuit it can quantify stickiness moreover. The tipping container rain check is utilized to quantify rain fall. After a pre-set measure of precipitation falls, the lever tips, dumping the gathered water and sending an electrical flag. An anemometer is a gadget utilized for estimating wind speed, and is a typical climate station instrument. Consequently ebb and flow inquire about spotlights on exactness farming, soil preservation and product water system booking and water amount control for expanding water utilize productivity. There is a need to grow new indigenous water system controller to enhance cultivate profitability and info utilize effectiveness of water and different supplements. This framework exhibits the outline and improvement of Irrigation controller System worked around comparator. The framework comprises of controller, LCD and driver circuit hand-off to switch on/off an engine.*

Keywords:- *Microcontroller, Soil moisture sensors, Relay, Crystal Oscillator, Voltage Regulator 7805*

I. INTRODUCTION

The climate station is an office, either ashore or ocean, with instruments and hardware for watching barometrical conditions to give data to climate conjectures and to examine the climate and atmosphere. The estimations taken incorporate soil dampness estimations are kept free. Manual perceptions are taken at any rate once day by day, while robotized perceptions are taken in any event once 60 minutes. Climate conditions out adrift are taken by ships and floats, which measure somewhat extraordinary meteorological amounts, for example, ocean surface temperature, wave stature, and wave period. Floating climate floats dwarf their moored forms by a critical sum. Water is an essential segment of all known life on Earth. Water can both manage life in amend amounts and undermine life when it isn't accessible. Water thus is a valuable characteristic asset that must not be squandered. On the off chance that a lot of water is connected the issues emerge comprising of spillover, disintegration, misuse of water and expired vegetation. On the off chance that too little water is connected diverse issues emerge, for example, turf burnout. The key in water system is striking to redress adjust for ideal vegetation with ideal utilization of water. A water system controller is a gadget to work programmed water system frameworks for example, grass sprinklers and trickle water system frameworks. Most controllers have a methods for setting the recurrence of water system, the begin time, and the span of watering. A few controllers have extra highlights, for example, numerous projects to permit distinctive watering frequencies for various sorts of plants, rain defer settings, input terminals for sensors, for example, rain and stop sensors, soil dampness sensors, climate information, remote activity, and so forth. Soil dampness sensor is a sensor associated with a water system framework controller that measure soil dampness content in the dynamic root zone. At the point when associated with ordinary framework water system time tickers, soil dampness sensors can abrogate planned watering occasions by intruding on the water system controller circuit when sufficient dampness is distinguished in the dirt. The sensors have client movable dampness content set-focuses that permit one of a kind watering administrations in view of plant species, soil compose, as well as regular rainfall. The Rain enters the authority cone, goes through a trash sifting screen, and gathers in a single council of the tipping basin. The pail tips when it has gathered a measure of water equivalent to the addition in which the gatherer measures 0.01" or 0.2mm. As the container it causes a switch conclusion and brings the second tipping pail chamber into position. The rain water depletes out through the screened depletes in the base of the collector.The whole at the purpose of estimation of both the immediate and diffuse segments of sun powered irradiance. The sensor's transducer, which changes over occurrence radiation to electrical current, is a silicon photodiode with wide unearthly reaction. From the sensor's yield voltage, the support computes and shows sun powered irradiance. Sensirion's group of surface mountable relative moistness and temperature sensors.The sensors incorporate sensor components in addition to flag handling on a minor impression and give a completely adjusted advanced yield. A one of a kind capacitive sensor component is utilized for estimating relative moistness while temperature is estimated by a band-hole sensor.

II. LITERATURE SUREY

In this report, soil moisture sensor, temperature sensors positioned in root zone of plant and opening unit handles the sensor info and transmit data to a web submission. One algorithm was developed for measure threshold values of temperature sensor and soil moisture sensor that was planned into a microcontroller to control water amount. For power photovoltaic panel was used. Another facto like cellular Internet interface used that allowable for data assessment and irrigation planning to be programmed through a web page. The automatic system was tested for 30 days and save 90% compared with modern irrigation system. Because of its energy autonomy and low price, the system has the possible to be valuable in water limited geologically isolated zone. In this paper, soil moisture content has been sensed using acoustic based technique was developed. The main propose of this technique is growth for measure soil moisture in real time method. The technique based on association between two quantities i.e. speed of sound and the degree of permeation with water in soils. This experiment found that the speed of sound reductions with the moisture content following, contingent on the kind of soil This paper design a model of automatic irrigation arrangement which is based on microcontroller and solar power was used only for source of power supply. Several sensor are placed in paddy field. Sensors sense water level unceasingly and give the data to farmer through cellular phone. Farmer controls the motor without going in paddy field. If the water level reaches at danger level, routinely motor will be off without conformation of farmer.

Agriculture is the source of living of majority Indians and it also has a countless influence on economy of the country. The objective of our project is to reduce this manual involvement by the farmer by using an automated irrigation system which purpose is to enhance water use for agricultural crops. The inspiration for this project came from the countries where economy is based on agriculture and the climatic conditions prime to shortage of rains & scarcity of water. The farmers working in the farm lands are only dependent on the rains and bore wells for irrigation of the land. Even if the farm land has a water-pump, manual involvement by farmers is required to turn the pump on/off when needed. The project is intended to cultivate an automatic irrigation system which controls the pump motor ON/OFF on sensing the moisture content of the soil. In the field of agriculture, use of appropriate technique of irrigation is essential. The advantage of using this technique is to reduce human intervention and still certify proper irrigation. A software application was developed by predetermining the threshold values of soil moisture, temperature and water level that was programmed into an arm controller. This paper presents the controlling and monitoring the level of water and detecting the soil moisture content.

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In India, agriculture plays an important role for development in food production. In our country, agriculture are depends on the monsoons which is not sufficient source of water. So the irrigation is used in agriculture field. In Irrigation system, depending upon the soil type, water is provided to plant. In this paper, automatic irrigation system based on ARMs and RF module. All the system will be setup using ARM and RF module. The most important factor of this system is RF module which is used to send and receiving the message to the controller. This system used three nodes which communicate each other and irrigate paddy field automatically. The aim of our project is to modernizing agriculture technology by programming components and built the necessary component for the system. The system is real time based and extracts the exact condition of paddy field. There is one central node used which to control other node. The main function of RF module is to pass the message to the node and operate the system**.**

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Agricultural sector is backbone of Indian economy as population increases demand of water also increases. Usually lots of water wastage takes place in the land, due to improper method of irrigation. A solar-based smart irrigation system enables user to monitor the relative soil moisture at many different location throughout the field to more precisely scheduled irrigation cycle. By using solar energy, we can save the electrical energy. The sensing system is based on feedback control mechanism with microcontroller unit depending upon the varied requirement of different crops we can irrigate our field.

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Cost effective solar power can be the answer for all our energy needs. Solar powered smart irrigation systems are the answer to the Indian farmer. This system consists of solar powered water pump along with an automatic water flow control

using a moisture sensor. It is the proposed solution for the present energy crisis for the Indian farmers. This system conserves electricity by reducing the usage of grid power and conserves water by reducing water losse

III. SYSTEM DESING

Here in this paper an experimental scale within rural areas where there is an enormous disposition of irrigation system which is executed using arm controller and wireless communication. The main of this implementation was to demonstrate that the automatic irrigation system can be used to optimize /reduce water usage. It can also be a photovoltaic irrigation system which consists of a solar powered that is the soil moisture sensor and temperature sensor placed under the soil where plants roots are reached which is a distributed network. The system has a water level sensor which will indicate the presence of water level in tank. A software application was advanced by programming the verge values of soil moisture water level that was automated into a microcontroller.

SOIL MOISTURE:-

Soil moisture is a vital component in the atmospheric water cycle, both on a small agricultural scale and in large-scale modelling of atmosphere interface. Vegetation and crops always be contingent more on. The moisture available at root level than on rainfall incidence. Water budgeting for irrigation planning, as well as the actual preparation of irrigation action, requires local soil moisture data. Knowledge of the degree of soil wetness benefits to forecast the risk of flash floods, or the Soil water contented is an expression of the mass or volume of water in the soil, though the soil water potential is an expression of the soil water energy status.

The relation between content and potential is not general and depends on the features of the local soil, such as soil density and soil texture. The basic system for measuring soil water content is the gravimetric method. Because this method is based on direct measurements, it is the standard with which all other methods are related. Unfortunately, gravimetric sampling is destructive, rendering repeat measurements on the same soil sample difficult. Because of the difficulties of accurately measuring dry soil and water volumes, volumetric water contents are not usually determined straight.

BLOCK DIAGRAM AND WORKING

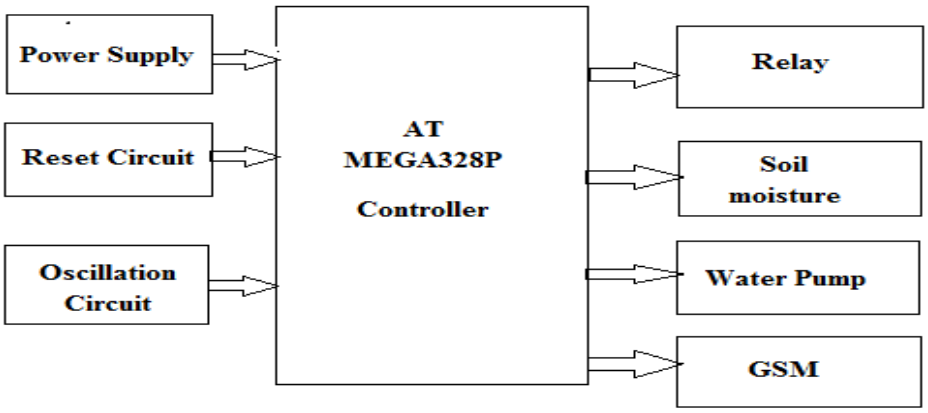

Fig. System Block Diagram

The above fig shows Microcontroller based irrigation system shows to be a real time feedback control system Which monitors and controls all the actions of drip irrigation system competently. The present proposal is a Model to update the agriculture industries on a small scale with best expenditure. Using this system, one can save manpower, water to advance production and ultimately profit.

SOLAR POWER :-

Solar power is the alteration of energy from sunlight into electricity, either directly by means of photovoltaic (PV), or indirectly by means of intense solar power. Solar energy is most abundant source of energy in world. Photovoltaic is an effective approach for using solar energy. The Solar powered irrigation system can be appropriate alternative for farmers in present state of energy disaster automatic system using solar power. The main objective of this project is to advance an irrigation system in field of agriculture by using solar energy.

NEED FOR IRRIGATION

(i) In term of populations India is the second largest country after China. So it is necessary to increase the production of food to feedstuff millions of people

(ii) There is uneven and indeterminate distribution of rainfall which cause drought.

(iii) For different water necessities of crops can only be met through irrigation amenities.

(iv) Being tropical country there is quick increase in the high temperature and evaporation. So, for abundant cause of water artificial irrigation is essential.

COMPONENT REQUIRED:-

1. Hardware Requirements
   1) Microcontroller
   2) LCD display
   3) Relay
   4) Water Pump
   5) Voltage Regulator
   6) Diodes
   7) Capacitors Resistors
   8) LED Crystal
   9) Transistor
2. Software Requirements:
   C language X.

SYSTEM DESCRIPTION*:-*

Measuring soil moisture is very significant in agriculture to help farmer for handling the irrigation system. Soil moisture sensor is one who resolves this. This sensor measures the content of water. Soil moisture sensor uses the capacitance to measure the water contented of soil. It is simple to use this sensor. Simply insert this rugged sensor into the soil to be tested, and the volumetric water content of the soil is stated in precent.

ADVANTAGES:-

The system is inexpensive in terms of hardware component and power consumption. The system helps in saving of water and electricity. It can be applied in large agricultural areas. The system helps in labor problem when there are no labors to work and eradicates man power. System can be swapped into manual mode whenever required. It is convenient to all climatic conditions and all sorts of irrigation.

APPLICATIONS:-

Irrigation can be completed in fields, gardens, farms etc. It is effective for diversities of crops. This application can be used for patient monitoring. The software application developed for this system can be used for domestic works such as tank storage. This system can be functioned automatically as well as manually.

IV. FUTURE SCOPE

Rain gun sensor can be added so that when it rains there won't be floods and this shield the field and evades floods. Rain water harvesting can be done and this harvested water can be used to moisten fields. Hooters can be used so that it gives siren at various occasions such as interruption detection, floods etc. Using IR sensors any object passing into fields can be detected and warne

V. CONCLUSION

In this paper, a solar powered sensor base automated irrigation model is proposed. We designed this model considering low cost, reliability, alternate source of electric power and automatic control. As the proposed model is automatically controlled, it will help the farmers to properly irrigate their fields. The model always ensures the sufficient level of water in the soil. Thus, this system avoids over irrigation, under irrigation, top soil erosion and reduce the wastage of water. Solar power provides sufficient amount of power to drive the system. To overcome the necessity of electricity and ease the irrigation system for our farmers, the propose model can be a suitable alternative.

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