



International Journal of Intellectual Advancements and Research in Engineering Computations

Automatic irrigation system based on solar power

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ABSTRACT :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.

KEYWORD : Microcontroller, Irrigation, Soil Moisture Content, Automated Irrigation Mechanism

I. INTRODUCTION

As we know that Indian economy is one of the largest developing economies of the world. The agricultural sector has its largest contribution in the Indian economy. To achieve maximum utilisation of man power and to obtain maximum profit in a given stipulated there is a need in the upgradation of various engineering techniques that are being used today. Thus maintaining proper amount of water level in the soil is one of the necessary requirements to harvest a good crop that can be a source of various types of nutrients whether micro or macro for their proper growth. If we talk about Indian farmers they are worst hit by the famines that occurs due to failure of crops depending upon various drought factors. Rain plays the key role in deciding the future of these crops as well as the farmers every year. The over utilisation of ground water has drastically reduced the ground water level in the last 15 years. So it is the need of hour to utilise each and every drop of water wisely so that it can also be used by our coming generations also. Also we should develop some new methods that use the renewable sources of energy. The development of these new techniques are going to reach our goal of sustainable development as well as to cut off the emission of greenhouse gases to a minimum level. As the name of our project that is AUTOMATIC IRRIGATION SYSTEM with the help of the Solar power is a step to utilise some new engineering techniques. This technique will be a very good option for the small and medium farmers who suffer every year just because of failure of crops that took place every year. The implementation of this technology has a wide scope in the nearby future.

II. OBJECTIVE AND SCOPE

The main objective of this project was to design a small scale irrigated system that would use water in more well-organized way in order to prevent excess water loss and minimize the cost of labor. The following aspects were considered in the choice of design solution

- Installation cost
- Water saving
- Human intervention
- Reliability
- Power consumption
- Maintenance
- Expandability

A critical Consideration in the segment costs, since cost define the viability and feasibility of a project. The water saving was also an important feature, since there is demand to decrease water loss and to Maximize the efficiency used. The Power consumption must also be monitored.

III. LITERATURE SURVEY

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 fact 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.

IV.EXCISTING SYSTEM:

In this excisting system the wastege flow of water for irrigation system is high and the current consumption for irrigation is high



V. PROPOSED SYSTEM

Here in this paper an experimental scale within rural areas where there is an

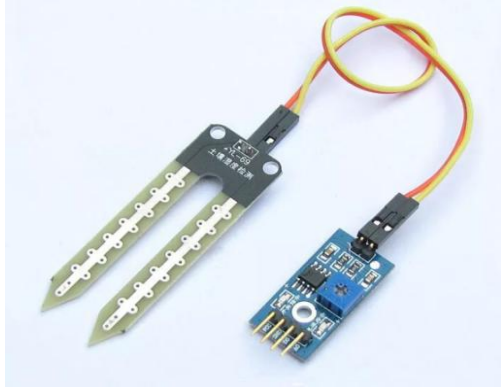
enormous disposition of irrigation system which is executed using arm controller and wireless communication. The main of this implementation was to demonstrate that the automatic irrigation system can be used to optimize /reduce water usage. It can also be a photovoltaic irrigation system which consists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

VI.SOIL MOISTURE

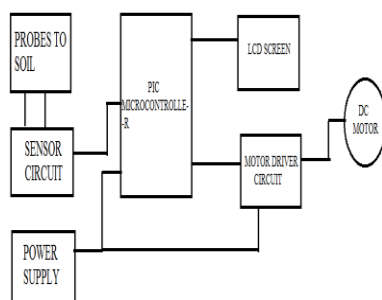
Soil moisture is a vital component in the atmospheric water cycle, both on a small agricultural scale and in large-scale modelling of atmosphere interface. Vegetation and crops always be contingent more on. The moisture available at root level than on rainfall incidence. Water budgeting for irrigation 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 occurrence of fog.

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.



VII. BLOCK DIAGRAM AND WORKING



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.

VIII. SOLAR POWER

Solar power is the alteration of energy from sunlight into electricity, either directly by means of photovoltaics (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.

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.

IX. 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.

X. COMPONENT REQUIRED

1. Hardware Requirements

- PIC Microcontroller
- Operational amplifier
- LCD display
- Relay
- Water Pump
- Voltage Regulator
- Current sensor
- Moisture sensor
- Diodes

Capacitors

Resistors

LED

Crystal

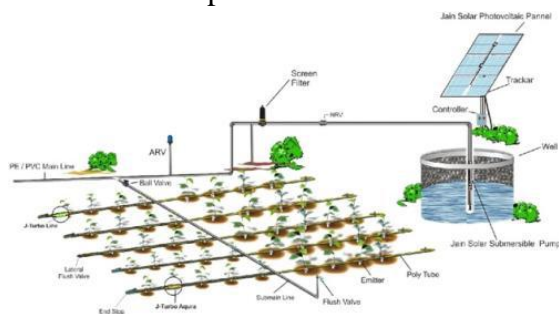
Transistor

2. Software Requirements:

C language

XI. 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 percent.



XII. 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.

XIII. 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.

XIV. 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 warned.

XV. RESULT

Irrigation becomes easy, accurate and practical with the impression above shared and can be executed in agricultural fields in future to endorse agriculture to next level. The output from moisture sensor and level system plays wide role in producing the output.

XVI.CONCLUSION: The main applications for this project are for farmers and gardeners who do not have abundant time to water their crops/plants. It also covers those farmers who are wasteful of water during irrigation. The project can be extended to greenhouses where manual management is far and few in between. The principle can be extended to create completely automated gardens and farmlands. Collective with the principle of rain water harvesting, it could lead to massive water savings if applied in the right way. In agricultural lands with severe

shortage of rainfall, this model can be effectively applied to attain great results with most types of soil.

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