

Improvement In Agriculture And Irrigation Techniques Using Microcontroller

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Abstract: Agriculture is the most important sector in the Indian Economy but doing farming is quite very difficult and it needs to be precise with all the supplies of nutrition. The project emphasis on the automation of agriculture and to make farming very easy using advanced technologies. Our project focuses on main aspects of modern farming. This paper covers the descriptive about the process and consist of devices like Water level control, Temperature sensor, Soil moisture sensor, Shade net, motor control and Exhaust fan. Firstly, Automatic tank level control for the storage tank ensures sufficient amount of water storage. Secondly, the use of shade net reduces the risk of crop destruction due to external parameters like untimely rain, hailstones or excessive temperature. This will also increases the crop yield by temperature regulation in the shade net. Fresh water irrigation in the agricultural land is of highly importance. Since there is a heavy demand for the fresh water, reduced and optimal usage of resources is encouraged which can be provided by the usage of automation technologies and its apparatus like irrigation, sensors and remote operation. Emerging trends in agriculture aims at ensuring higher productivity and less damage to the land which led to soil nutrient management, where the fertilizers can be met based on local requirements with go green technology. Providing latest technologies in nutrient management along with the sophisticated sensor control will mentor in getting high productivity and profitability.

Keywords: Water level controller, Shade net, Temperature sensor, Soil moisture sensor, PIC16F877A Microcontroller, Motor controller

I. INTRODUCTION

Arduino shields away a lot of complexity which is the major advantage to get started, but limits you later. It also makes you understand that how certain things work more difficult, but that's inevitable. The Arduino libraries are not very efficient in certain parts, waste RAM and CPU cycles. Agriculture is being a natural phenomenon that relies mostly on the nature, and man can never predict or control nature. For instance let it be rain, drought, sunlight availability, pests control, etc. Even in implementation of IoT system we cannot implement SMART agriculture. Faulty sensors or data processing engines can cause faulty decisions and that may lead to over usage of water, fertilizers and other wastage of resources. The current IoT systems are not scalable or reliable and their initial costs are too high which the farmers cannot afford [6-12].

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II. PROPOSED SYSTEM

Power supply:

5V of power supply is used for this hardware system.

PIC16F877A Microcontroller:

The chip technology created a specialized form of microcontroller chip known as PIC microcontrollers. The descriptor PIC stands for "peripheral interface controller," though that term is never used today. A microcontroller may be a compact personal computer designed to manipulate the operation of embedded systems in motorcars, robots, workplace machines, medical devices, mobile radios, rendition machines, home appliances, and various other devices. A typical microcontroller consists of a processor, memory, and peripherals. Using this PIC MICROCONTROLLER, the process will be error free and it is relatively simple to design and install. It mainly controls the entire system and devices.

Moisture sensor:

Moisture sensor senses moisture content in the soil. Soil wet sensors live the meter water content in soil. Since the direct measuring activity of free soil wet needs removing, drying, and coefficient of a sample, soil wet sensors live the meter water content indirectly by exploitation some other property of the soil, like electrical phenomenon, stuff constant, or interaction with neutrons, as a proxy for the wet content. The relation between the measured property and soil wet should be label and will vary betting on environmental factors like soil sort, temperature, or electrical conduction. Reflected microwave radiation is littered with the soil wet and is employed for remote sensing in geophysics and agriculture. Portable probe instruments are often utilized by farmers or gardeners.

Temperature sensor:

Temperature controller is used to maintain a particular temperature in the shade net. The temperature controller circuit is used for maintaining temperature to a desired value as per the crop requirement.

Water level sensor:

It is one of the significant operations. Level sensor senses the water level in the tank. If the level in the tank is below a Mid-level, level sensor signals the Microcontroller and motor is turned on. When the water reaches high level, the motor is automatically turned off. In the tank, the water is always maintained at the High level. The amount of water given to the field is determined by the Mid-level which is adjustable.



Relay:

Motor is employed to point the on/off state of pump once soil is wet/dry. It is controlled by microcontroller as programmed. Stepper Motor is a specially designed motor which rotates in steps. Speed of stepper motor depends on the speed of electrical signal applied thereto. Different patterns will management stepper motor's direction and rotation sort. Mainly 2 varieties of stepper motors are on the market, unipolar and Bipolar. Unipolar is easier to operate, control and also easier to get which is cheap and easily available.

Shade net:

A good shade web should have high strength and will be sturdy. This will make sure that it'll not wear out presently and can last you many crop lives. Good agro shade web makers and agro shade web suppliers should be ready to provide you with bespoke agro shade nets as per length and dimension needed. The biggest profit and have is that the ultraviolet radiation stabilization feature that may ultimately defend the crops against the harmful effects of ultraviolet radiation radiations. A good shade web should provide optimum shade issue that protects the crops well. The shade web should be technically designed for higher yield.

III. METHODOLOGY

System architecture:

In this work, it automation of agriculture and to make farming easy using advanced technologies. Our project focuses on main aspects of modern farming. Firstly, Automatic tank level control for the storage tank ensures sufficient amount of water storage. Secondly, the use of shade net reduces the risk of crop destruction due to external parameters like untimely rain, hailstones or excessive temperature. This will also increase the crop yield by the temperature regulation in the shade net

Since there is a heavy demand for the fresh water, reduced and optimal usage of resources is encouraged which can be provided by the usage of automation technologies and its apparatus like irrigation, sensors and remote operation. Emerging trends in the agriculture aims at ensuring higher productivity and less damage to the land which may lead to soil nutrient management, where the fertilizers can be met based on local requirements with green technology. Providing the latest technologies in nutrient management along with sophisticated sensor control will mentor in getting high productivity and profitability.

IV. WORKING

Moisture sensor senses moisture content in the soil. Level sensors area unit accustomed management water level within the tank. Power offer switches fitly between star and mains as per handiness. Temperature controller is employed to take care of a selected temperature within the shade web. Level sensor senses the water level in the tank. If the level in the tank is below a Mid-level, level sensor signals the Microcontroller and motor is turned on. When the water in the tank reaches the high level, motor is automatically turned off. The water within the tank is usually maintained at the High level. The amount of water given to the field is

determined by the Mid-level which is adjustable. The temperature controller circuit is employed for maintaining temperature to a desired worth as per the crop demand. Firstly handiness of alternative energy are checked, then the wind energy and in absence of each mains power offer are used. This is controlled by using the microcontroller.

V. ADVANTAGES

- Saves water
- Improves growth
- Discourages weeds
- Saves time
- Helps control fungal diseases
- Adaptable

VI. RESULTS AND OUTCOMES

Water conservation through drip irrigation:

Our initial plan of project in Agriculture started with water issues of farmers. We determined to create a completely controlled irrigation system. Additional feature of this project with drip irrigation was soil wetness detection and activity the water to the sphere consequently.

Standalone power system:

Rather than exploitation electricity, this project provides change between typical energy sources i.e. wind energy consistent with their convenience.

Increased yield:

To avoid the injury because of uncertainty from environmental condition parameters like downfall, temperature, etc. this project provides a system that regulates temperature within the shade web.

VII. CONCLUSION

Higher monetary gains due to optimization of the system as a whole. Decreases losses due to ice, wind and untimely rain and extreme temperature by use of shade net. Required quantity of water is given to the sector simply by one click reduces the efforts of farmer drastically. Reduces the chance of manual fault or faults because of human error. In today's life creature is changing into therefore busy that he can't pay his attention to figure like installation. But plants and trees are the sources of O for creature and their existence is additionally vital from growth is additionally vital, but it is necessary that excess supply of water ought to be avoided to avoid wasting the water. By providing precise temporal arrangement for installation this may facilitate to avoid wasting water. Water saving is the main aim of our system and with the help of scheduling principle we have tried to achieve that, it will definitely help the human being to save water and in such some way it'll be useful for earth.



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