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Water Irrigation and Spraying System Using Agriculture Autonomous Robot

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Abstract: *The aim of this paper is to build a multipurpose agriculture robot which can perform work such as automatic irrigation system, spraying pesticide on plant using hollow cone nozzle. Automatic irrigation system on sensing soil moisture content is intended to create an automated irrigation mechanism which turns motor on and off on detecting the moisture level. For avoiding manual spraying of pesticides actual farm and it will achieve by replacing human by robot for that we have design robot in agriculture.*

Keywords: ATMEGA16, moisture sensor, L293D, DC motor, L393 comparator, nozzle, sprayer.

I. INTRODUCTION

Now a days the traditional agriculture system involves hard work of farmer, wastage of resources like fertilizers, water and pesticides. Due to more physical efforts and less profits youngsters are run away from agriculture field and building their future in other fields. But as the population increases day by day, we are lagging to fulfil the needs of world. To fulfill those requirements we are decided to design an agriculture system with autonomous robot which does not require any human efforts and completing all task autonomously. Also reduces the diseases related to pesticides and fertilizers. In agriculture uses 85% of available fresh water resources. Worldwide and this percentage will continue to be dominant in water consumption because of population growth and increased food demand. Due to scarcity of water and As there are very few water resource increased resource we had upgrades technology and invent new technology for sustainable use of water for crop in agriculture. The mechanised system to make the work more accurate, on time, and efficient. Robot perform the work very uniformly and this robot are less costly.

This paper represents the design and construction of an autonomous robot for water irrigation and spraying system. This robot is designed as a base for developing the water irrigation system and spraying system to enable the automation in agriculture such as irrigation system and spraying system. We have design single robot for both purpose and modification of any of the individual tasks. One of the important profession in India is farming so it is essential to look out for Automation in field work to reduce man power.

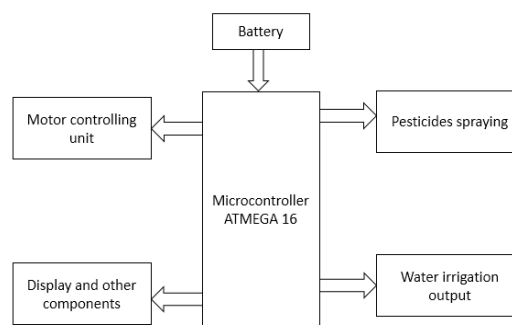


Fig 1. Block diagram of autonomous agriculture robot

A. Irrigation System

Soil moisture sensor is a simple consisting of two conducting plates which act as a probe. It measures the moisture content present in the soil. The resistance between the two conducting plates varies inversely with the moisture content in the soil. This change in resistance can be used as a measure of the moisture content in the soil. The sensor is used in series with a fixed resistance to form a voltage divider network whose output varies with the moisture content in the soil. The output voltage can be processed through an ADC and used according to need of application.

Robot check the moisture of soil using moisture sensor. Water Irrigation system which is used to provide regular water to the plant using LM393IC and save the water. If there is need of water then robot supplies water to plant through water pipe. Single tank is used for water supplies and spraying pesticides.

We need water in each field and Shortage of the water is main problem in every field and is needed for every human beings, animals etc. but high quantity of water is required in agriculture field

B. Spraying System

If any type of diseases are occurred on leaf of plant .then this robot is used to spray the pesticides using hollow cone nozzle. This is spraying pesticides on crop production. Pesticides are manufactured by the different types of chemicals and this is very harmful for the health of living being. Number of diseases caused due to pesticides For example asthma autism, birth defects and reproductive dysfunction diabetes Parkinson's and Alzheimer's diseases, and several types of cancer. The spray system consists of a large tank for holding the pesticides, and using two nozzle spray the pesticides to the sections of plant to the both right and left side of the robot.

II. LITERATURE REVIEW

In existing system farmer has to work physically to control the drip irrigation system. Traditional instrumentation based on discrete and wired solutions, presents many difficulties on measuring and control systems especially over the large geographical areas. Every time excess of water is given to the fields if conventional irrigation system is used.

A. Limitations of Existing System

- 1) Physical work of farmer to control drip irrigation
- 2) Wastage of water
- 3) Wastage of time

The Microcontroller based drip irrigation system proves to be a real time feedback control system which monitors and controls all the activities of drip irrigation system efficiently. The present system is a model to modernize the agriculture industries at a mass scale with optimum expenditure. They can provide irrigation to larger areas of plants with less water consumption and lower pressure. Using this system, we can save manpower, water to improve production and ultimately profit.[4]

The Soil moisture content based irrigation system was developed and successfully implemented along with flow sensor. Salient features of the system are Closed loop automatic irrigation system, temperature and water usage monitoring. User can easily preset the levels of the Moisture and is regularly updated about current value of all Parameters on LCD display. In future other important soil parameters namely soil pH, soil electrical conductivity will also be incorporated in the system. [5]

B. Advantage

- 1) This system reduce the man power and saves the time.
- 2) The main purpose of these system is to find out the proper requirements of the crop.

III. RESULT

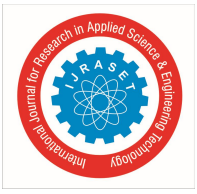
Thus we have design a simulation diagram in Proteus software. Then we find that interfacing between hardware and software. This type of system is very helpful for agriculture purpose where need to spray the pesticide to different crops. Currently we use a system that increase the human effort and it also not comfortable. This pesticide sprayer robot move in fields and robot has sensors to detect the plants on both sides. Because of that human need to take less efforts and this is very comfortable for them. Because of this robot every work done by automatically using some programming.

IV. CONCLUSION

Automatic water irrigation and spraying system was implemented using atmega16 microcontroller unit. Microcontroller continuous check water level using sensor and on /off the motor. This robot is used for two purpose so whenever the water irrigation is required then this robot performs the water irrigation task, and when farmer want to do the spraying task then robot performs the spraying. This system reduce the man power and saves the time.

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