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Automation of Irrigation System

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Abstract: ***Agriculture is very important in India and India attaches great importance to it. Efficient irrigation methods can reduce water consumption and increase yields. Farmers today use manual irrigation methods that include regular watering. This process is inefficient as it results in overwatering or underwatering. Overwatering leads to wasted water, increased energy consumption, leaching of nitrogen and other micronutrients, and wasted time. The main goal is to change irrigation structures and help farmers in farming.***
Keywords: Irrigation, sensors, over-irrigation, drip, micronutrients.

I. INTRODUCTION

Agriculture uses 70% of water, more than industry and other sectors. This increased demand for water and electricity in agriculture leads to the development of new technologies. To use water wisely, it is important to know effective irrigation methods. Of the 70% of the water used by farmers, 40% is lost to the environment through poor irrigation systems, evaporation, and poor overall water management, which can also lead to harmful soil erosion.

New technologies in irrigation systems mainly focus on the efficient use of water. The main purpose of this project is to provide plants with sufficient water to support their growth. This increases the moisture content of the soil, thereby increasing the yield. With the proposed system, farmers no longer need to monitor their fields, freeing them from constant checks. Watering is automatic as needed, reducing human intervention in the watering process.

A. Literature Survey

Primary research is conducted in several stages to understand existing system problems, requirements, and ways to overcome them. The proposed system consists of moisture sensors in the soil at the roots of plants that measure soil moisture levels and relay the information to the Arduino. This value is compared to the threshold. Then the Arduino turns the motors on and off.

Literature review and background research 1981 Bureau survey. Small scale photovoltaic irrigation pump systems: a technical and economic review. UNDP Project GLO/78/004. Intermediate Technology Power, London, UK … Automatic Irrigation Control Research: State of the Art and Recent Results R Romero, JL Muriel, I Garci - Agricultural Water, 2012 - Elsevier

Automatic … then specific The post outlines more than just how to apply irrigation. We have developed automatic irrigation control based on sap flow measurements (Fernandez et al., 2008a,b,c).

Applied Machine Vision for Plants: A Review Involving Field Use in Automated Farm Operations CL McCarthy, NH Hancock, SR Raine - Intelligent Service Robotics, 2010 - Springer

Previous publications focus on robust machine vision in field environments. The Possibility of Realizing Vision Solutions Jimenez A, Ceres R, Pons J (2000) A review of computer vision methods for fruit localization Fleck S, Nackaerts K, Muys B, Coppin P, Weiss M, Baret F (2004)

II. MODELING AND ANALYSIS

The main objective of this project is to develop a system that saves water, time, and electricity when watering. It increases agricultural production with less water, minimizes manual intervention in irrigation operations by increasing speed, protects plants from fungal attack, and ultimately facilitates handling.

All these properties make these methods a sustainable option for improving the efficiency of agriculture and irrigation. The sensor is placed on the ground and measures the amount of water in the soil. The soil moisture content is measured using the relationship between electrical resistance and moisture content.

The measured value is sent to the Arduino, which compares this value with the threshold. If the value is below the threshold, turn on the motor to pump water to the plants via the drip irrigation system. If the value is greater than the threshold, the engine will be turned off. The system uses a pair of LEDs to indicate motor position. When the engine is on, one LED lights up with a green light and one red LED.

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Fig -1: Block Diagram

Indicates that the engine is stopped.

1) The pump turns on when water is available and turns off automatically when enough water is supplied.

2) Soil status (dry, wet), temperature, and pump status are displayed on the LCD screen.

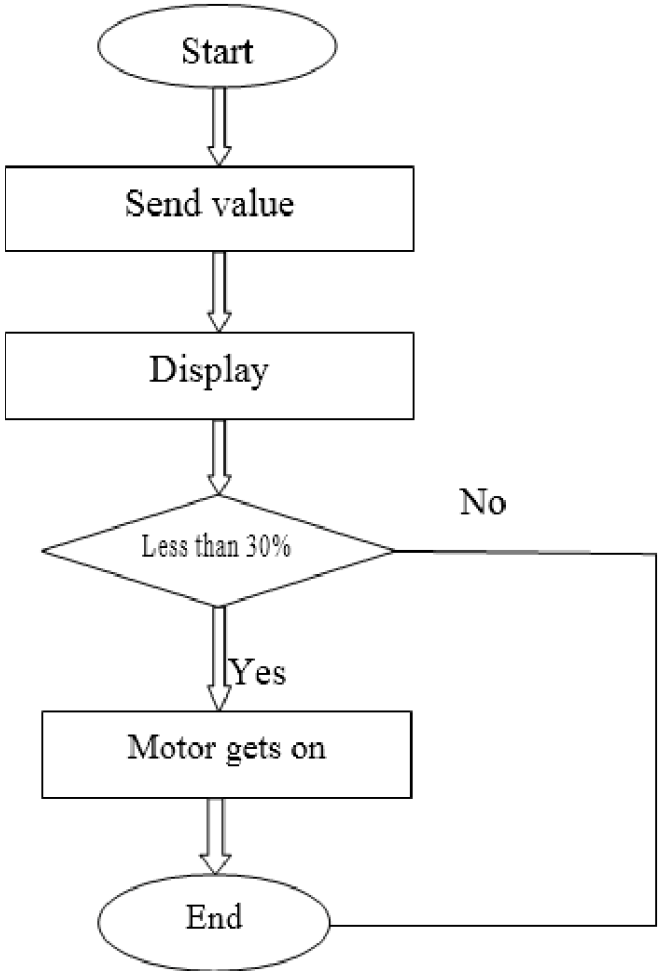


Fig -2: Flow Chart

III. RESULTS AND DISCUSSION

Based on soil moisture content, the irrigation process is automatic without human intervention, saving water and electricity.

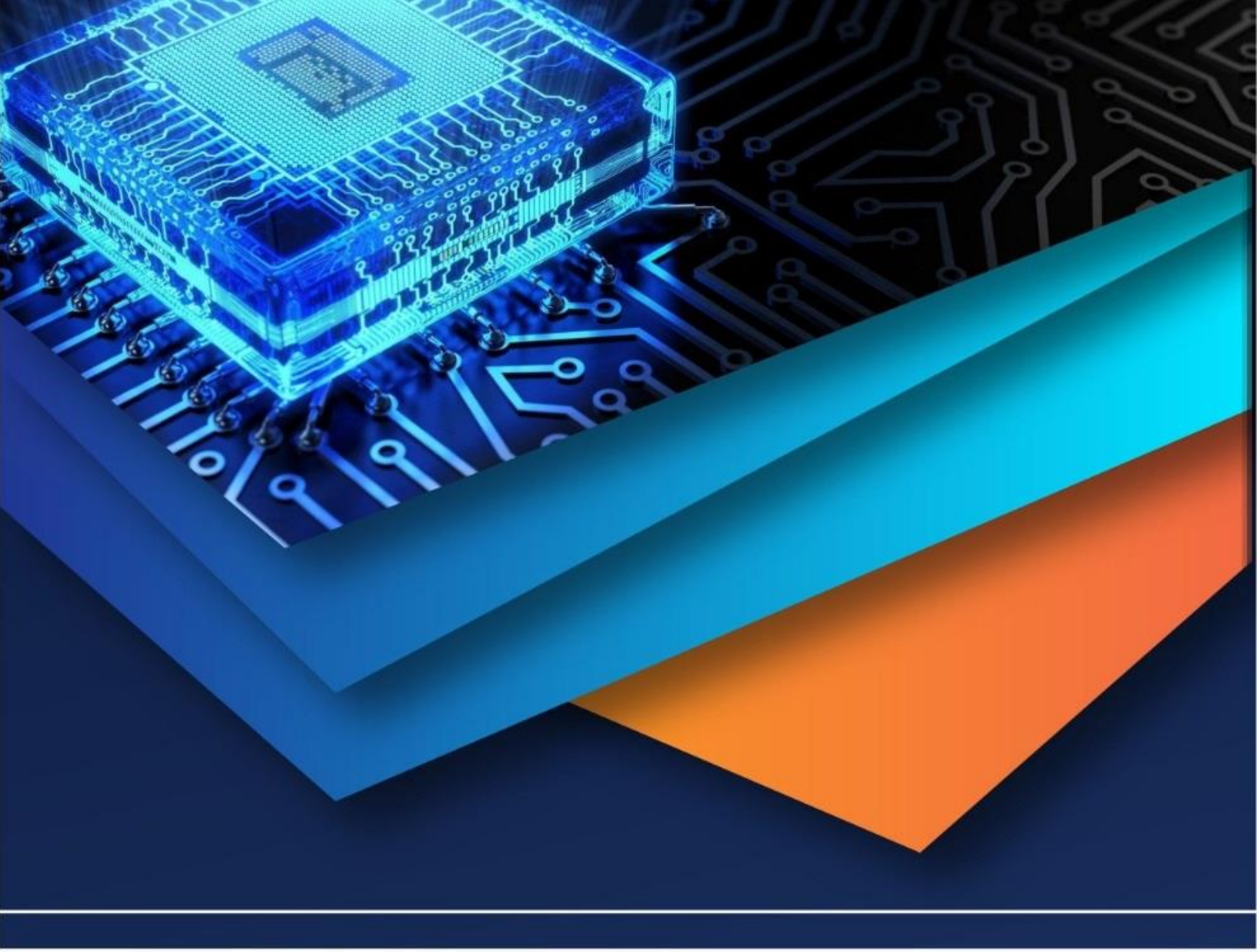
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IV. CONCLUSIONS

Automating an irrigation system with an Arduino Uno has proven satisfactory experimentally, successfully pumping water to plants when they need it. This process senses the water content of the soil and uses it to automatically maintain the water supply to plants without human intervention. This effectively saves time and water.

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