

Plant Irrigation Using Digital Image Processing

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ABSTRACT: Human's interest in the heavens has been universal and enduring. Plant irrigation is the key to a successful garden. Long gone are the days of a manual watering or relying on a friend to water when you are on business or vocation.

This model helps to build controlled irrigation facility to help millions of people. This model uses sensor technology with micro controller to make a smart switching device. The model shows the basic switching mechanism of water motor using sensors from any part by sensing the moisture present in the soil and the temperature present in the surrounding atmosphere.

I. INTRODUCTION

The project we have undertaken is "Automatic Plant Irrigation System". This project is taken up as India is an agriculture oriented country and the rate at which water resources are depleting is a dangerous threat hence there is a need of smart and efficient way of irrigation. In this project we have implemented sensors which detect the humidity in the soil (agricultural field) and supply water to the field which has water requirement. Our project consists of three stages namely sensor circuit, micro control circuit and motor driver circuit. This microcontroller based design which controls the water supply and the field to be irrigated. There are sensors present in each field which are not activated till water is present on the field. Once the field gets dry sensors sense the requirement of water in the field and send a signal to the microcontroller. Microcontroller then supply water to that particular field which has water requirement till the sensors is deactivated again. In case, when there are more than one signal for water requirement then the microcontroller will prioritize the first received signal and irrigate the fields accordingly.

II. WORKING

🌱 THIRSTY LIGHT:-



International Journal of Innovative Research in Science, Engineering and Technology

An ISO 3297: 2007 Certified Organization

Volume 6, Special Issue 2, February 2017

National Conference on Recent Advancements in Engineering & Technology and Management 2017 (NCRAETM 2K17)

18th February 2017

Organized by

Sree Rama Engineering College (SRET), Tirupati- 517 507, India

The Thirsty Light is an intuitive digital plant moisture sensor that blinks an LED to alert the user when it is time to water a potted plant. It is designed to be unobtrusive when left in the soil of a plant, where it continuously monitors conditions, testing the moisture level once per second.

Features:

- Drypoint digital circuit
- Long-lasting LED
- Corrosion resistant probe
- 2 replaceable 1.5V batteries
- ABS plastic casing
- On/Off switch
- Designed in USA
- Made in China

Blinking Patterns:

1. No blink: Moisture detected
2. Slow blink: Starting to get dry.
3. Medium blink: Dry
4. Fast Blink: Very dry
5. Double blink w/ pause: Completely dry/Standby
6. Low battery voltage mode: Slow triple blink
7. Battery life: Depends on how much the light is allowed to blink. Optimal battery life is 12 months.

✚ DIGITAL IMAGE PROCESSING:-

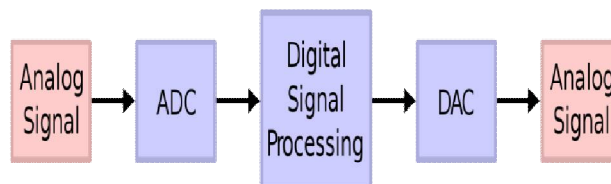


Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image. Usually **Image Processing** system includes treating images as two dimensional signals while applying already set signal processing methods to them.

Purpose of Image processing

The purpose of image processing is divided into 5 groups. They are:

1. Visualization - Observe the objects that are not visible.
2. Image sharpening and restoration - To create a better image.
3. Image retrieval - Seek for the image of interest.
4. Measurement of pattern – Measures various objects in an image.
5. Image Recognition – Distinguish the objects in an image

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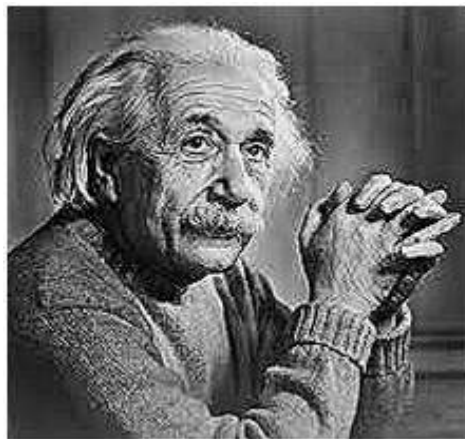
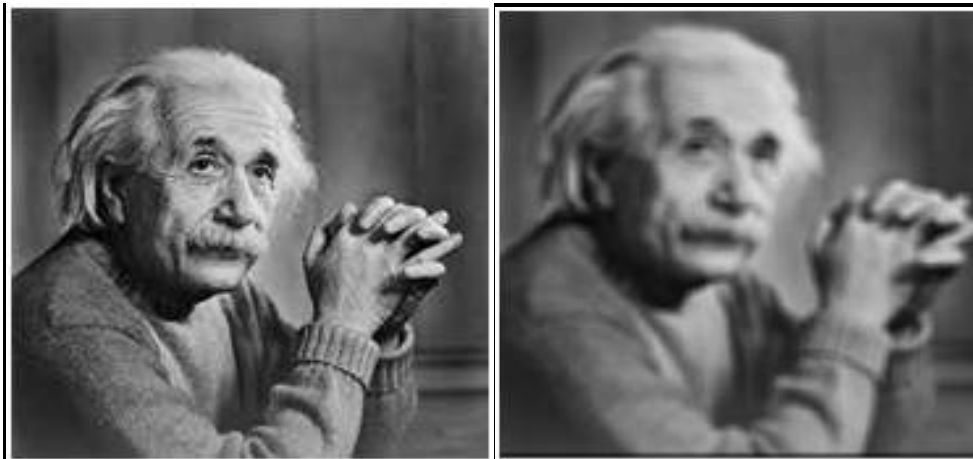
Volume 6, Special Issue 2, February 2017

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Applications of Digital Image Processing:-

Some of the major fields in which digital image processing is widely used are mentioned below

- Image sharpening and restoration
- Medical field
- Remote sensing
- Transmission and encoding
- Machine/Robot vision
- Color processing
- Pattern recognition
- Video processing.

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✚ GSM MODULE:-



Feature

- Fully compatible with AVR/PIC/Arduino/ARM/FPGA
- Super capacitor power supply for the RTC.
- Not only can use the button for power on , but also can use the digital pin of Arduino to power on and reset the SIM900 module.
- Quad-Band 850/ 900/ 1800/ 1900 MHz
- Control via AT commands
- Supply voltage range : 3.1 ... 4.8V
- Dimension:60 mm x 53 mm

Package Includes

- GPRS Module -ECom Pro
- 4 Frequency band Antenna
- 4 x Copper Cylinder

CONDITION:-

When the soil condition is less than the reference voltage, i.e., 5v, then the soil is considered as dry and instantly the 555 timer sends the logic signal 1 to the microcontroller. The microcontroller then turns on the motor driver circuit and prompts the motor to pump water to the plants.

APPLICATION:-

- Irrigation in fields, parks, gardens.
- Less consumption of water resources.
- Very efficiency for paddy fields.
- Farmer no need to depend on rainwater.
- Very useful to people who do not have time to water their plants because of their busy life schedule.

DISADVANTAGES:-

- Applicable only for small areas.

III. CONCLUSION

To install the device in the field, it is better to use solar energy. To reduce the power consumption, use logical device to activate the system only at required times and system should be idle for remaining.

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