Intelligent Drip Irrigation System Based on Remote Monitoring

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Abstract— Intelligent drip irrigation is artificial technique of providing water to the roots of the plant. Drip irrigation system is based on remote monitoring as well as controlling. In proposed system both mobile and computer are monitor and control the drip devices. In Intelligent Drip Irrigation system, an android mobile sends commands to computer to control drip irrigation system, here different sensors like humidity, temperature, light etc. will use for detection purpose. These sensors send the real time values to micro-controller and micro-controller send these values to computer via serial communication. According to sensor values the graph will be show on computer and mobile and by using this graph user can switch on or off drip devices.

2. PROPOSED SYSTEM

At present, The project irrigation control using AT89S52 is designed to tackle the problems of agricultural sector regarding irrigation system with available water resources. Prolonged periods of dry climatic conditions due to fluctuation in annual precipitation, may appreciably reduce the yield of the cultivation. The expenses in establishing many of these crops and their relative intolerance to drought make an effective irrigation system a necessity for profitable enterprises.

In this project we are using AT89S52, Moisture sensor, AC submersible pump. A submersible motor will get switched ON/OFF depending on the soil moisture condition and status of motor can be displayed on 16X2 LCD. An IoT module is interfaced to the controller to update the information in the web server about the condition of the field.

- Expensive land leveling is not required.
- High efficiency due to uniform water distribution.
- Water saving irrigation intensity can be changed in accordance with the infiltration capacity.

3. IMPLEMENTATION

The IoT Based Intelligent Irrigation Control using Rain gun Irrigation System mentioned about using automatic microcontroller based rain gun irrigation system in which the irrigation will take place only when there will be intense requirement of water that save a large quantity of water.

These system brings a change to management of field resources where they developed a software stack called Android is used for mobile devices that include an operating system, middleware and key applications.

The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. Mobile phones have almost become an integral part of us serving multiple needs of humans.

This application makes use of the GPRS feature of mobile phone as a solution for irrigation control system. These system covered lower range of agriculture land and not economically affordable.

The System Supports excess Amount of water in the land and uses GSM to send message and an android app is been used they have used a methodology to overcome under
irrigation, over irrigation that causes leaching and loss of
nutrient content of soil they have also promised that
Microcontroller used can increase System Life and lower the
power Consumption.

There system is just limited to the automation of irrigation
system and lacks in extra ordinary features. In GSM based
Automatic Irrigation Control System for Efficient Use of
Resources and Crop Planning by Using an Android Mobile.

- The system supports water management decision, used
for monitoring the whole system with GSM(RS-232)
module
- The system continuously monitors the water level (Water
level Sensor) in the tank and provide accurate amount of
water required to the plant or tree (crop).
- The system checks the temperature, and humidity of soil
to retain the nutrient composition of the soil managed for
proper growth of plant.
- Low cost and effective with less power consumption
using sensors for remote monitoring and controlling
devices which are controlled via SMS using a GSM using
android mobile.

Methods:
A pipe with rain gun irrigation mechanism attached, is
connected to the water pump, the other end of the pipe is near
to the root of the plant. The flow of water is managed by
solenoid valve. The opening and closing of valve is done when
a signal is send through microcontroller. The water to the root
of plant is done drop by drop using rain gun and when the
moisture level again become normal then sensor senses it and
send a signal to microcontroller and the value is then closed.
The two mobile are connected using GSM. The GSM and
microcontroller are connected using MAX232. when moisture
of the soil become low moisture sensor sense it and send signal
to microcontroller, then the microcontroller gives the signal to
mobile and it activate the buzzer. This buzzer indicates that
valve needs to be opened by pressing the button in the called
function signals are sent back to microcontroller.

Algorithm:
It states the steps that the proposed system undergoes.
Step 1: Start the process.
Step 2: Initialize power is supplied to GSM.
Step 3: Check the moisture level (less than or more than).
Step 4: If the level will be more than a fixed criteria, no
need to irrigation.
Step 5: If Moisture level is less than a fixed criteria, start
irrigation.
Step 6: Initialization of pump and rain gun.
Step 7: After the process completed, It moves to original
state.
Step 8: Stop the process.

Another methodology is broad based and is relatively one
of the efficient system that has developed windows application
to monitor the field. Field is equipped with wireless
communication sensors that avails better facilitated sensor
communication and covers wider field area.

A conceptual system layout of distributed in-field WSN is
illustrated in below Figure. The system consists of five infield
sensing stations distributed across the field, an irrigation
control station, and a base station. The in-field sensing stations
monitor the field conditions of soil moisture, soil temperature,
and air temperature, whereas a nearby weather station monitors

Irrigation:
Automated irrigation system uses valves to turn motor ON
and OFF. These valves may be easily automated by using
controllers. Automating farm or nursery irrigation allows
farmers to apply the right amount of water at the right time,
regardless of the availability of labor to turn valves on and off.

In addition, farmers using automation equipment are able
to reduce runoff from over watering saturated soils, avoid
irrigating at the wrong time of day, which will improve crop
performance by ensuring adequate water and nutrients when
needed. Those valves may be easily automated by using
controllers [1].

Automating farm or nursery irrigation allows farmers to
apply the right amount of water at the right time, regardless of
the availability of labor to turn valves on and off.
micrometeorological information on the field, i.e., air temperature, relative humidity, precipitation, wind speed, wind direction, and solar radiation. All in-field sensory data are wirelessly transmitted to the base station. The base station processes the in-field sensory data through a user-friendly decision making program and sends control commands to the irrigation control station. The irrigation control station updates and sends geo-referenced locations of the machine from a differential GPS mounted at the cart to the base station for real-time monitoring and control of the irrigation system. Based on sprinkler head GPS locations, the base station feeds control signals back to the irrigation control station to site-specifically operate individual sprinkler to apply a specified depth of water [2].

4. EXPERIMENTAL RESULTS

- Save water, energy and manpower in the agriculture sector.
- Resource optimization technique is achieved in intelligent drip irrigation system.
- Provide the decision support for intelligent drip irrigation system.
- Automatically as well as manually system handling and detecting of water level.
- Increases the crop production and it uses the different sensors like temperature, light, humidity, soil moisture so it can be used in area where water resources are less.
- Complete elimination of manpower

5. CONCLUSION

This review is proposed to supports aggressive water management for the agricultural land. Microcontroller in the system promises about increase in systems life by reducing the power consumption resulting in lower power consumption. It is considered to be used at Cricket stadiums or Golf stadiums and also in public garden area for proper irrigation. Automated irrigation system has a huge demand and future scope too. It is time saving, led to removal of human error in adjusting available soil moisture levels and to maximize their net profits in accordance to factors like sales, quality and growth of their product.

REFERENCES


