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A SURVEY ON SMART DRIP IRRIGATION SYSTEM

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Abstract - *Drip irrigation is a technique in which water flows through a filter into special drip pipes, with emitters located at different spaces. In this, Smart Drip Irrigation system proposes completely automated system which reduces human efforts. In this system, an android mobile application remotely controls the drip irrigation system. The different sensors like humidity, temperature, soil will be deployed in the field to monitor the environmental conditions. The information based on environmental conditions is transferred to android app via base station. User features such as spatial views, custom charts, real-time data access, remote access, irrigation control, alerts, and plant models help to create a smart irrigation system that is user-centric .Proposed system removes drawbacks of previous systems like distance problem, range problem. The system focuses on Internet of things (IOT), so that the drip devices can be controlled automatically from anywhere. This approach is very beneficial and efficient for increasing crop production.*

1. INTRODUCTION

Agriculture is the largest livelihood provider in India. It also contributes a significant figure to the Gross Domestic Product (GDP).Irrigation plays an important role in agriculture. World's water resources are vanishing, use of proper method for irrigation is important and it is well known that irrigation by drip is very economical and efficient. Drip irrigation, also known as trickle irrigation or micro irrigation or localized irrigation, is an irrigation method allows water to drip slowly to the roots of plants, through a network of valves, pipes or emitter. Drip Irrigation prevents soil erosion, saves water and fertilizer can also supplied by it. During the last decade, reduction in the cost of hardware leads to emergence IOT and its usage in different applications from experimental phase to commercial levels. The Internet of Things (IOT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. Smart irrigation system is good example of Internet of things. It allows remote monitoring and controlling the field using the android device. Throughout the world, irrigation schedules are based on farmer's experience and changes according to weather fluctuation which can be handled by smart irrigation system. This approach requires PCs (Client/Server) along with additional devices like modems, buffers, etc. for internet connectivity and software support for TCP/IP protocols and control system interaction.

2. LITERATURE REVIEW

2.1.1 EXISTING SYSTEM

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.

Limitations of existing system:

a. Physical work of farmer to control drip irrigation
b. Wastage of water
c. Wastage of time

2.1.2 CLASSIFICATION OF GENERIC REMOTE CONTROL SYSTEMS

The idea of remotely controlling and monitoring of irrigation system and acquisition of weather related information is flourishing day by day with the use of latest technologies. There are many types of remote control and monitoring systems available.

The prime objectives of new generation agriculture system are :

2.1.2.1 Remote monitoring

a. Data from gauges and sensors (soil moisture, pressure, environmental, etc.
b. Status of irrigation valves
c. Status of pumping equipment

2.1.2.2 Remote control

Turning on and off Motor.

2.1.2.3 Information transfer

a. Automatic incorporation of environmental data into decision support systems and crop models.

b. Uploading maps to variable rate application equipment.
c. Weather, market, & operational information to remote locations & vehicles
d. Real-time information such as DGPS correction signals

2.1.2.4. Communication

Text, graphical, voice and video messages can be sent between peoples.
These systems are typically designed and installed for different purposes.

a) Using embedded system drip irrigation :

The automated control system consists of moisture sensors, temperature sensors, Signal conditioning circuit, Digital to analog converter, LCD Module, Relay driver, solenoid control valves, etc. The unit is expressed in Figure above. The signal send by the sensor is boosted up to the required level by corresponding amplifier stages. Then the amplified signal is fed to A/D converters of desired resolution to obtain digital form of sensed input for microcontroller use.

Advantages :

a. Human interaction is eliminated and replaced by a computer oriented programmed.
b. Reduce human efforts as compared to existing system.

Disadvantages :

a. Distance problem : We cannot control the drip irrigation from any where
b. Needs extra physical efforts.

3. SYSTEM DESCRIPTION

A system is developed for optimum water distribution in the fields through motor pump. The crop yield is maximized to a great extent by providing proper amount of water at suitable time intervals based on climatic conditions. The system offers attractive features like automatic control based on parameters specified through keyboard /SMS/ number of miscalls; provides protection against single phasing, over-current, over-voltage, dry running and probable bearing faults; alerts users in case of abnormal conditions like power failure, dry-running, etc. and provides audible indication through buzzer/ miscall on completion of task. The figure 1 shows the Block diagram of the scheme. Using keyboard the parameters of the system can be set or received in form of SMS/number of miscalls in specified duration from user mobile through serial cable connected to control system cell phone (Model Nokia 6610). Based on commands received microcontroller system sends signals to switch on / off motor through Starter using relays controlled by its ports. Three phase 5 hp,7 hp,10.5 hp induction motor working on Direct-on-line Starter are chosen for agriculture purpose

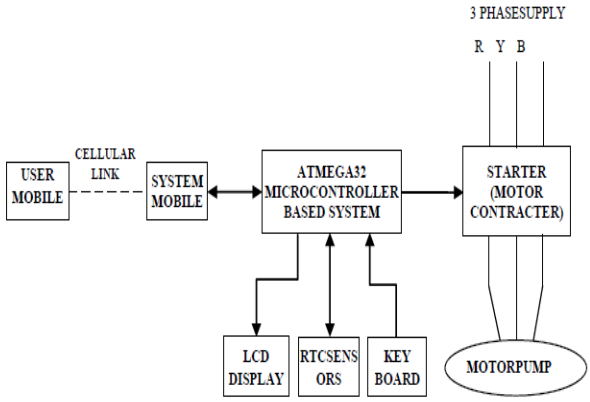


Figure 1. System Block Diagram

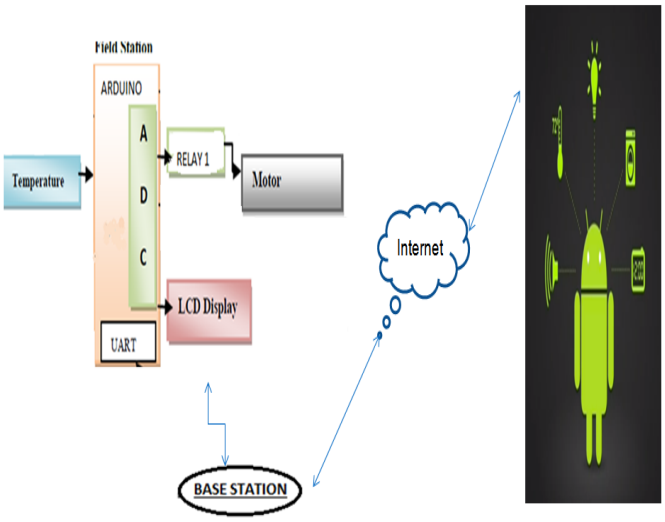
Cell phone Interface:

1) **SMS Approach:** SMS is store and forward way of transmitting messages to and from cell phones. The major advantage of using SMS is provision of intimation to the sender when SMS is delivered at the destination and ability of SMSC to continue efforts for delivery of message for the specified validity period if network is presently busy or called user is outside the coverage area

2) **Miscall Approach:** The operational cost of communication between user and control system cell phones is further reduced by using concept of miscall where in no charges are incurred by using only ring signal for information transfer. Miscalls are treated in two situations one is calling party disconnects after receiving ring tones and second one when called party does not respond to call within mentioned 5 minutes. The system cell phone is designed to send specified number of miscall(s) within five minutes duration to user cell phone to report various conditions.

3. PROPOSED METHODOLOGY

SYSTEM ARCHITECTURE



The application starts its execution by generating a secure connection between drip irrigation system and android device over the internet. For setting up this connection, an authentication procedure takes place between the two. In proposed system shows micro-controller which gathers the sensors values for soil at various points. These values are shown in software using 3D plots. A base station interface is provided for easy programming of the hardware. The 3D graphs generated for sensor values located across the entire field will helps us to visualize and take decisive actions for the particular situation.

3.1 PROPOSED SYSTEM FEATURES

1. Smart irrigation based on type of environment condition based irrigation rather than schedule based.
2. Low cost drip irrigation system
3. Conveyance and water application lines with emitters.
4. Long range connectivity. It provided everywhere and anywhere connectivity.
5. System productivity increases and water consumption reduces.
6. User friendly handling.

4. CONCLUSION AND FUTURE WORK

This system gives one way of controlling drip irrigation remotely. Using these system productivity increases and water consumption reduces. The system drip irrigation components remotely. The propose system is beneficial for farmers and avoid the wastage of water as well as no manpower is required and system is relatively quick. This system requires frequent maintenance for efficient operation. The future of drip irrigation appears to be good. As competition for water resources and the need for water conservation increases, applications of drip irrigation should also increase. This system offers the ability to very precisely place water, nutrients, and other chemicals in the plant root zone at the timing and frequency needed. In this system use of precised devices can provide the more efficient way to control the drip irrigation system. With proper design, installation, and management, drip irrigation systems can provide good and reliable performance in future. The future is in Internet of things and it will be adopted worldwide.

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