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Survey of Smart Irrigation System

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Abstract

Today we are living in 21st century where automation is playing important role in human life. Automation allows us to control appliances automation not only provides comfort but also reduces energy, efficiency and time saving.

Basically this paper will focuses on the Irrigation systems used in India and routinely activities of farmers which are taking place in the farm and use of available technology for these day to day works to make farming easy and efficient. Farming is growing crops for their food and raw materials by people. Farming is a part of agriculture. As we all know the use of android is increasing day to day we are trying to develop a system which can

1) Sense the parameters from field.
2) Transfer to Android mobile handset.
3) User can control those parameters.

Keywords: Android, Irrigation, Control.

Introduction

Agriculture started at least 10,000 years ago, but no one knows for sure how old it is. The development of farming gave rise to the new revolution whereby people gave up the migration for food and settled in particular areas that became cities.

Irrigation is a scientific process of artificially supplying water to the land or soil that is being cultivated. Traditionally in dry regions having no or little rainfall water had to be supplied to the fields either through canals or hand pumps, tube wells. But this method had severe problems such as increase in workload of farm labor and often it lead to problem such as over-irrigation or under-irrigation, and leaching of soil.

Importance of irrigation:-

The rainfall of some countries dependent on the monsoons. Rainfall controls agriculture. But the agriculture is said to be, "the gambling of the monsoon" as the monsoon rainfalls are uncertain, irregular and uneven or unequal. So irrigation is essential for agriculture.

The following are the primary reasons of irrigation.

(1) About 80 per cent of the total annual rainfall occurs in four months, i.e. from mid-June to mid-October. So it is essential to provide irrigation for production of crops etc, during the rest of the eight months.

(2) The monsoons are uncertain. So irrigation is necessary to protect crops from drought as a result of uncertain rainfall.

(3) It does not rain equally in all parts of the country. So irrigation is necessary for agriculture in less rainfall areas.

(4) Soils of some areas are sandy and loamy and therefore porous for which a major portion of rainwater sinks down very quickly. So, sandy and loamy soils can't retain water like the alluvial soil and the black soil. That is why irrigation is essential for farming in the areas having, sandy and loamy soils.

(5) The rain-water flows down very quickly along the slopes of hillsides. So irrigation is necessary to grow crops in such areas.

Traditional Methods of Irrigation:-

The water available in wells, lakes and canals is lifted up by different methods in different regions, for taking it to the fields. Cattle and human labour is used in these methods. So these methods are cheaper, but less efficient. The various traditional ways are

Moat (Pulley system)

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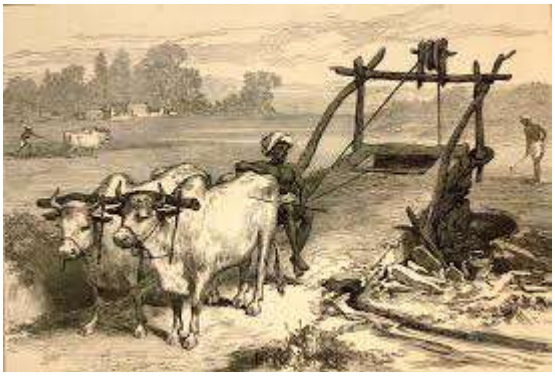
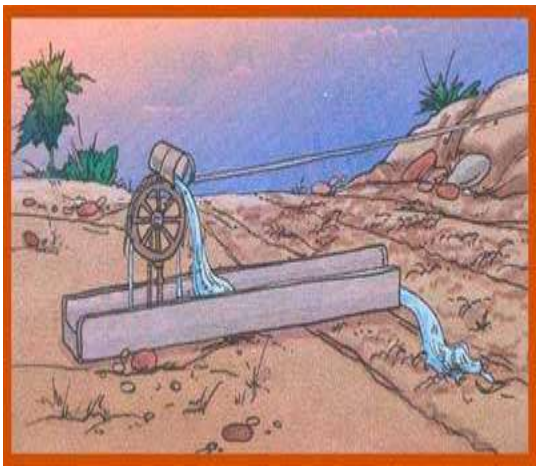


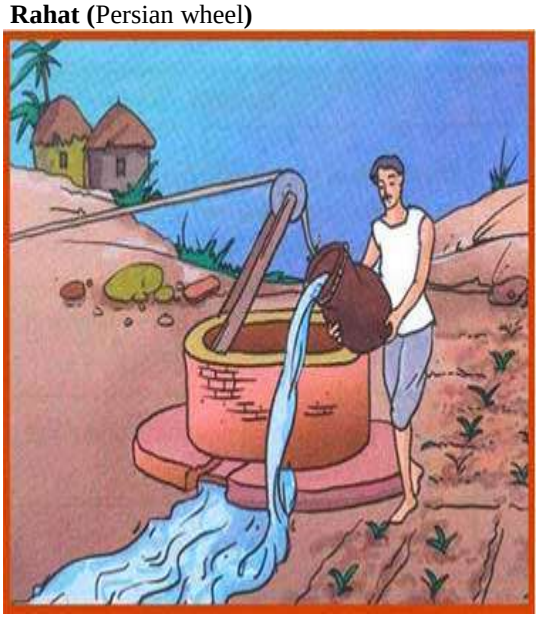
A moat or pulley system of irrigation is one that involves pulling water up from a well or other water source in order to water plants and other crops. It is not often in use as it can be time consuming and may not always be as efficient as other methods of irrigation. On the other hand, it does not cost a lot of money to install a moat or pulley irrigation system as it does not require vast technology or machinery invested in it

Chain pump



These ancient Chinese irrigation systems use round metal discs and a long loop of metal chain to water soil and plants. Each metal disc runs through a pool of liquid, and each disc collects some water during this process. When the chain is pulled, the metal disc rises up to the top, and the water held inside pours out, hydrating the earth and flora. This low-cost method of traditional irrigation has been practiced for centuries.

Rahat (Persian wheel**)**



What exactly is a Persian wheel? Also known as Rahat (in Urdu), it's a simple water lifting device, where a number of small pots are attached to a long chain. Two gear wheels make up the system and as the first one is revolved, the pots each dip and swallow water from the well and soon after pours itself out to a metallic shaft which in turns empties into an intricate network of troughs that distributes water adequately through the cropped area. It is believed that the technology originated in Egypt and as world shrunk through extensive trading, it spread to India and China.

Modern methods of Irrigation

1. **Sprinkler System:** This system is more useful on the uneven land where water is available in smaller quantity. The perpendicular pipes, having rotating nozzles on the top, are joined to the main pipeline at regular intervals. When the water is allowed to flow through the main pipe with the help of a pump, it escapes from the rotating nozzles. It is sprinkled on the crop as if it is raining. Sprinkler is very useful for the sandy soil

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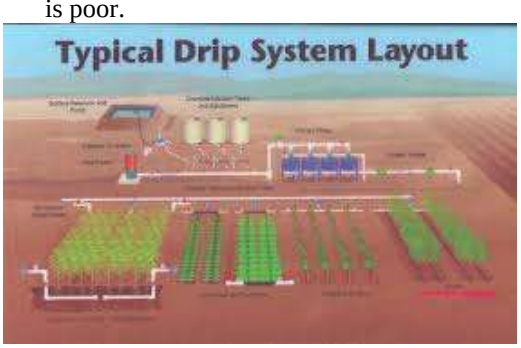
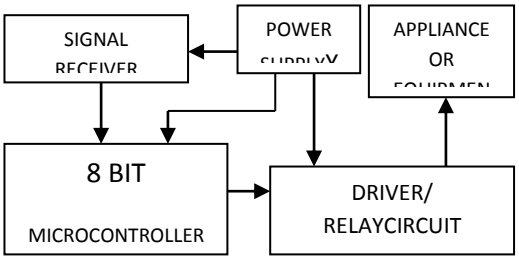
2. **Drip System:** In this system, the water falls drop by drop just at the position of the roots. So it is called drip system. It is the best technique of watering fruit plants, gardens and trees. This system consists of a main pipe to which lateral pipes are joined. The specially prepared nozzles are attached to these lateral pipes to water plants drop by drop. Water is not wasted at all. So, it is a boon in regions where availability of water is poor.



Proposed system

Basically, this project is aimed to design automatic irrigation system for elderly, disable people with android platform. Theme of the project is activation or deactivation of appliances wirelessly through android applications, these commands are given by authenticated person, who will activate or deactivate the electric appliance (irrigation motor) and also provide current status of appliances



Overall block diagram

Any irrigation system consists of a number of electronic and electrical appliances and gadgets which can be controlled remotely. A digital code for a given key on the special control is electronically modulated and transmitted. At the receiver side the same is demodulated to extract the required control signal which is then fed to the microcontroller, depending upon the microcontroller programming particular to that received code an action is initiated. For a large irrigation it becomes difficult to attain the line of sight and in turn its range. Also as each appliance/equipment will have their own different control units, it becomes difficult to manage the number of controls and also is not user friendly. Hence we have proposed our system as explained follows.

Model Configuration

1) Microcontroller:

The microcontroller forms the heart of the system. Its responsibilities include reading the sensing

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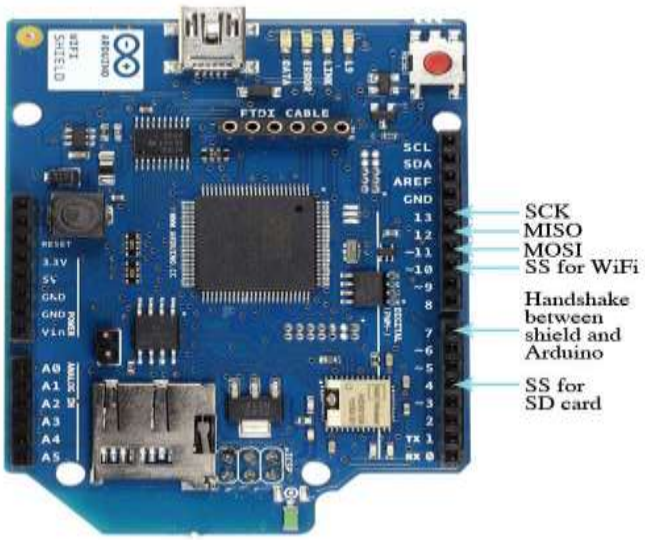
parameter from sensors and feed them to Ethernet module. Microcontroller makes refresh the android application with sensors reading by auto refresh in duration of 5 second.

The high-performance Atmel 8-bit AVR RISC-based microcontroller combines 32 KB ISP flash memory with read-while-write capabilities, 1 KB EEPROM, 2 KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external, interrupts serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/DConverter (8-channels
in TQFP and QFN/MLF packages),programmable wa tchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. By executing powerful instructions in a single clock cycle, the device achieves throughputs approaching 1 MIPS per MHz, balancing power consumption and processing speed.14 Digital I/O Pins (of which 6 provide PWM output), 6 Analog Input Pins, 32 KB Flash, 2 KB SRAM, 16 MHz clock

2) Communication module (Arduino Wi-Fi Shield)

The Arduino Wi-Fi Shield allows an Arduino board to connect to the internet using the 802.11 wireless specifications (Wi-Fi). It is based on the HDG104 Wireless LAN 802.11b/g System in-Package. An ATmega 32UC3 provides a network (IP) stack capable of both TCP and UDP. Use the Wi-Fi to write sketches which connect to the internet using the shield. The Wi-Fi shield connects to an Arduino board using long wire-wrap headers which extend through the shield. This keeps the pin layout intact and allows another shield to be stacked on top.



Arduino Wi-Fi Shield

Applications

Android is an operating system with a set of core applications including an email client, SMS program, calendar, maps, browser, contacts and others all applications are written using java programming language.[2]

Android has very wide range of applications now a day's android is used for controlling multiple applications.

Conclusion

We have done a Survey of smart irrigation system.

Here a proposed smart irrigation system using Arduino is more compact easy to control and saves time for farmers the hardware device includes circuitry to capture the input signals from farm and an embedded Wi-Fi module for transmitting the received signal information to an Android device for displaying the current status. The Software application developed for Android receives the data transmitted from the hardware device and shows the output according to the display settings configured by the user. Using Wi-Fi module, higher data transmission is possible. Android based Smartphone is most popular now. Android has emerged as a new mobile development platform, building on past successes and avoiding past failures of other platforms. Android was designed to empower the developer to write innovative applications.

These aspects of the idea make it very adaptable in farms as well as household purpose.

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