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Overview of Automatic Farming & Android System

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ABSTRACT

India is the country of agriculture. Agricultural sector is very very important as far as Indian villager's point of view. Productivity of agriculture field's does not depend on excess of water sprinkled to the field, but depends on better matching of water supply with crop demand and uniform environmental conditions that are suitable for farming. To determine the crop water demand it is essential to estimate the soil humidity. Under irrigation or over-irrigation system leads to excessive or less water supply which may cause worse results i.e. yield reduction. The project is based on activation or deactivation of appliances wirelessly through a software stack called Android which is used for mobile devices that include an operating system, middleware and key applications. The Android provides the tools necessary to begin developing applications on the Android platform. Mobile phones are become an integral part of us serving multiple needs of humans. In this project Commands to the device are given by authenticated person, who will activate or deactivate the irrigation motor and also provide current status of appliances which in turn gives uniform environmental conditions that are suitable for farming.

Keywords:- Android, Irrigation, Monitoring And Controlling System, Microcontroller

I. INTRODUCTION

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. Conventional irrigation methods 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.

To develop android based automatic Farming system capable of controlling many electrical appliances in an irrigation or field using android platform with a mobile handset, where data transmission is carried wirelessly. That's why design Wireless transmission media using Wi-Fi transceivers and its interfacing peripherals for wireless data communication between Mobile Handset and appliances is our need. Hence to create a database of user interface in order to characterize the electric signals to atomize farming system. And to develop the GUI interface to monitor and change the current status of field on any android smart phones. Another important point is not only monitor the temperature and maintain moisture level in the field for proper growth of plants but also save water, Energy and man power in the agriculture Sector. So we design such a system that will be efficient and effort reducing of the farmer.

Hence we design the System which is operated manually as well as automatically from remote locations by using Android.

II. LITERATURE REVIEW

. A wireless drip irrigation system using soil moisture sensors is presented in [6] by Mahir Dursun et al (2011) and in [7] by V.I. Adamchuk. This paper describes an application of a wireless sensor network for low-cost wireless controlled irrigation solution and real time monitoring of water content of soil based on soil moisture sensors. Data acquisition is performed by using solar powered wireless acquisition stations for the purpose of control of valves for irrigation. The designed system has 3 units namely: base station unit (BSU), valve unit (VU) and sensor unit (SU). In [5] Chavez et al. (2009) discussed limitations of the conventional PLC based irrigation control systems and a new approach to automate the irrigation is presented which uses a Single Board Computer (SBC) using the Linux operating system to control solenoids connected to individual or groups of nozzles based on prescribed application maps. The main control box houses the SBC connected to a sensor network radio, a GPS (Global Positioning System) unit, and an Ethernet radio creating a wireless connection to a remote server. A C-software control program control the overall working of system. Innovative GSM Bluetooth Based Remote Controlled Embedded System for Irrigation [2] proposes a system where GSM/Bluetooth based remote controlled embedded system is used for irrigation. The system sets the irrigation time depending on the environmental factors and can automatically irrigate the field [2]. Information, regarding the status of power supply, is

exchanged between the system using SMSs on GSM network. Subhodip Maulik [8] proposes the realization of a low cost wireless visual sensor node for blue tooth based measurement network, designed in such a manner that the energy consumption will be less. The sensing nodes are generally in sleep mode and only awaken when triggered by a pulse from a central weather station. In [9] Rajesh et al., to overcome the problem of power distribution provided an overview of wireless sensor network by managing the equal power distribution by using zigbee network sensor. He compared Bluetooth and Zigbee and concluded that ZigBee helps to keep costs down, ensure interoperability, and is a future-proof investments made by both utilities and consumers. In [2] Pavithra D. S presented a GSM based Automatic Irrigation Control System for Efficient Use of Resources and Crop Planning by Using an Android Mobile. The user communicates with the centralized unit through SMS. The centralized unit communicates with the system through SMS which will be received by the GSM with the help of the SIM card. In [1] Y.R.Dhumal a Green House Automation using Zigbee and Smart Phone. The aim of the paper is to control the devices or equipment's from the remote place through a web page.

III. SIGNIFICANT OF IRRIGATION

1. Control of Drought and Famines Insufficient, uncertain and irregular rain causes uncertainty in agriculture. The period of rain is restricted to only four months in a year, June to September, when monsoon arrives. The remaining eight months are dry. There is some rainfall during the months of December and January in some parts of the country. Even during monsoon, the rainfall is scanty and undependable in many parts of the country.

2. Sometimes the monsoon delayed considerably while sometimes they cease prematurely. This pushes large areas of the country into drought conditions. With the help of irrigation, droughts and famines can be effectively controlled.

3. Since India has a tropical and sub-tropical climate, it has potentialities to grow crops on a year round basis. However, since 80% of the annual rainfall is received in less than four months, multiple cropping is generally not possible.

4. Provision of irrigation facilities can make possible the growing of two or three crops in a year in most areas of the country. This will considerably enhance agriculture production and productivity.

5. Irrigation helps in stabilizing the output and yield levels. It also plays a protective role during drought years.

IV. PROPOSED SYSTEM

The android based Farming system is an automatic irrigation system which performs multiple operations in the field of agriculture; this project uses a centralized microcontroller which is programmed to receive the input signal of multiple sensors of the field. Once the controller receives this signal, it generates an output that drives a relay for operating the water pump and other circuitry which provides automatic control action on field.

If the user sees the moisture level of ever cannel has sufficient amount then user can switch off the motor easily using GUI.

An ANDROID mobile operating system is interfaced with the microcontroller to control the parameters of the field. The soil moisture sensing arrangement is made by using two aluminium coated metallic rods inserted into the field at a distance. Connections from the metallic rods are interfaced to the control unit. This signal is sensed to mobile handset which provides Graphical User Interface (GUI).
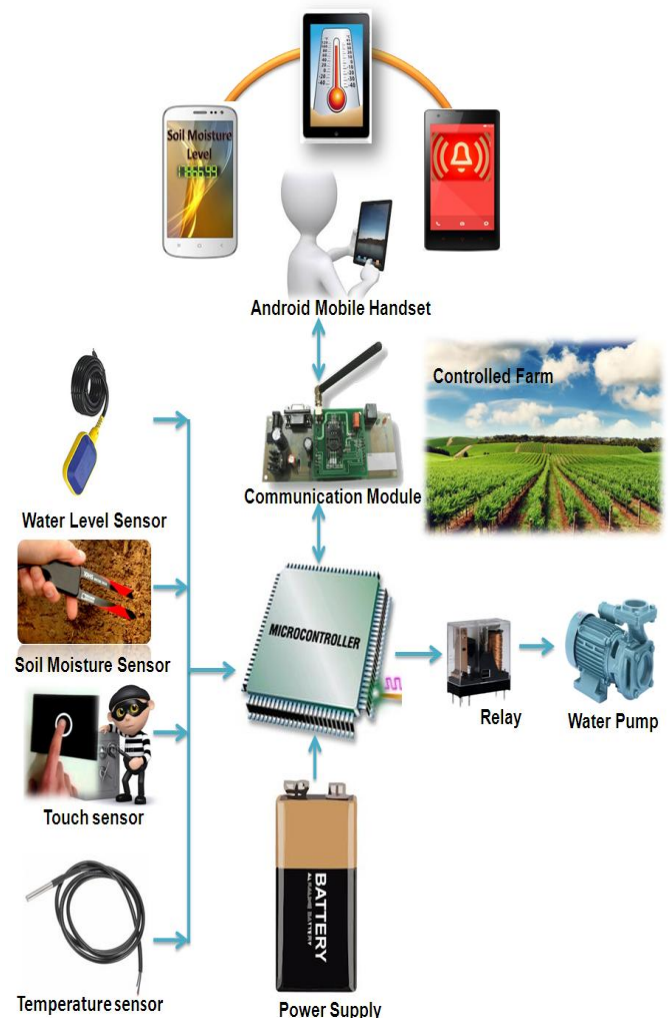

Figure 1: Functional diagram of Automatic Farming system

System design of android based automatic irrigation system includes hardware and software sections interfaced together using wireless communication.

The main element of the design consists of android enabled mobile handset, interfacing peripherals and WI-FI transceiver module and controller. The android enabled mobile handsets will generate the control command signals which are supposed to be used in system for appliance controls. This is done by using a mobile handset, analog signal are stored in the internal memory of the IC after being digitized using ADC blocks internally. This learning process need to be done for a number of touch commands. Once the learning/programming is completed. The IC is ready to accept the commands. A command issued by the user through touching the programmed switch and it will be digitized and compared with the digitized commands already stored in the internal memory of IC. When a match is received, microcontroller status will be updated accordingly. The microcontroller in turn will generate a specific data pertaining to a given appliance and command which will transmitted through wireless channel using particular mobile handset (transmitter).

V. MICROCONTROLLER

Advance Virtual RISC Microcontroller from Atmel is one of the most widely used 8 bit Microcontroller in the world. The AVR is an 8 bit RISC single-chip microcontroller with Harvard architecture that comes with some standard features such as on-chip program ROM, data RAM, data EEPROM, timers and I/O Ports. Most AVRs have some additional features like ADC, PWM, and different kinds of serial interface such as USART, SPI, I2C, CAN, USB, and so on. AVR are generally classified into four broad groups: Mega, Tiny, Special Purpose, Classic

Mega Family are widely used .These are powerful microcontrollers with more than 120 instructions & lots of different peripheral capabilities, which can be used in different designs.

Some characteristics are as follows: Program memory: 4k to 256k bytes Package: 28 to 100 pins, Extensive peripheral set, Extended instruction set [4].

VI. ANDROID OVERVIEW

Android is an open-source platform founded in October 2003 by Andy Rubin and backed by Google, along with major hardware and software developers (such as Intel, HTC, ARM, Motorola and Samsung) that form the Open Handset Alliance. In October 2008. The software suite included on the phone consists of integration with Google's proprietary applications, such as Maps, Calendar, and Gmail, and a full HTML web browser. Android supports the execution of native applications and third-party apps which are available via Google Play, which launched in October 2008 as Android Market. Nowadays android became the best-selling Smartphone.

We now proceed to presenting an overview of the Android Platform and the components of an Android application. As Shown in Figure 2, the Android platform is composed of 4 layers: Applications at the top, an Application Framework layer that provides services to applications, e.g., controlling activities or providing data access, a Library/VM layer, and, at the bottom, the Linux kernel .[3]
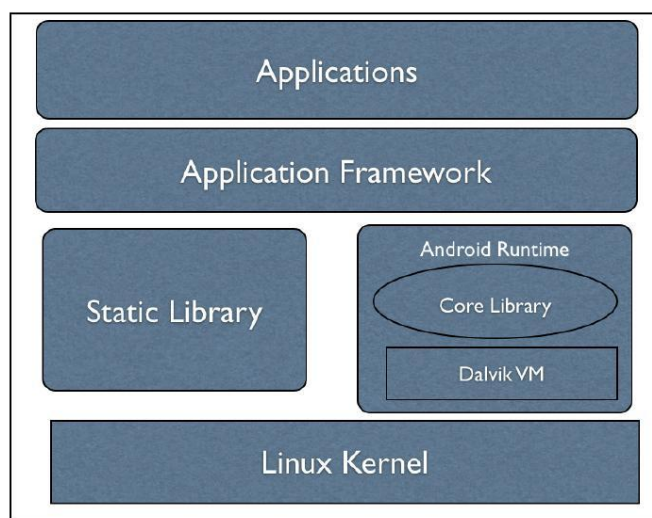
Fig.2: Android Architecture

VII. CONCLUSION

Conventional Flood-type methods consume a large amount of water, but the area between crop rows remains dry and receives moisture only from the incidental rainfall, hand pumps whereas this irrigation technique slowly applies a small amount of water to the plant through cannels.

A few concluding comments:

1. The system increases the crop productivity and reduces farmer's workload.
2. There is efficient usage of water.
3. The time consumed is less there by giving more throughputs.
4. Controls the growth of weeds, saving the fertilizer.
5. Erosion of soil could be stopped totally by using this type of a system.
6. Leads to development of a cost effective irrigation control system. Saves electrical energy.

This system supports aggressive water management for the agricultural land. This architecture is based on the

capabilities of current and next-generation microcontrollers and their application requirements. Microcontroller used for the system is promising that it can increase system life by reducing the power consumption resulting from lower power consumption.

General automation system is used at irrigation. Activation or deactivations of appliances depend on touch command processed by processor. Better performance is observed under electromagnetic interference also. As mobile handset can be operated till certain higher temperatures, it would work continuously. This automation system will be used for disabled and people at long distance and farms.

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