Scheduling, Controlling And Monitoring of Agricultural Devices Using Android Application

Mukesh Choudhary, Sumeet Dhone, Akshay Jadhav, Chetan Dhandal, Prof. J. M. Nighot

Abstract—Remote control systems are a very useful way to control and monitor devices rapidly and effortlessly. This paper proposes a new architecture for remote control of agriculture devices and provides security to the farm through online-streaming. Proposed system makes use of few technologies which allow remote control of the agricultural motor, pesticides thereby making a farmer's work much easier and less dependent of the conditions present. As outcome of this paper an Android application running on a smart phone, connected to the server vie internet is build. This server can be controlled through a .small java application written in Java.

Index Terms— **Wi-Fi, Zigbee, SMS, javac, Direct current[DC] , GSM.**

I. INTRODUCTION

India is basically an agricultural nation, and most of its income depends on the a gricultural productivity. With the speedy development of agriculture in India, many automatic technologies have been introduced into agricultural productions [4].The total rainwater in a particular area may be either not enough, or badly timed [4]. In order to get the maximum profit, it is important to supply the best possible quantity of water, and maintain correct timing of water [4].Remote control systems are a very useful element to control and monitor devices quickly and easily [2]. Although the area of remote control is currently very popular issue, it may provide important advantages for testing software and hardware developments in several real devices [1]. It can also allow professional management of various different type devices, perform security tasks etc. [1].The main idea behind the proposed architecture is to design system, which would be used as a platform which provides the services needed to perform remote control of agricultural devices. The farmer should be able to on/off the motor, decide the pesticides proportion and monitor the farming activities remotely. Many times user misses their farming tasks because he/she is not able to remember all the activities and their correct timing on which it is necessary to perform that activity. This system should provide reminder to the user so that their farming activity will take place on time. If the user fails to give the stop command due to network failure, the java machine should be able to stop the motor automatically after specific time slot.As outcome of this paper a proof of concept will be implemented an Android application for user to control the devices and same application on computer which works as a server.

II. NEED

Irrigation is an essential thing in many agricultural cropping systems in semiarid and dry areas and efficient water applications and management are major concerns. The central idea of this project is to develop low cost intelligent remote monitoring system using mobile with emphasis on its utilization in rural areas. The need of developing this project is basically to avoid the drawbacks of the existing system. In order to get the maximum yield, it is essential to provide the optimum quantity of water, and maintain correct timing of water. This is possible only through a efficient irrigation system-by collecting water during the periods of Excess rainfall and releasing it to the crop as and when it is needed [4].Traditional system have some disadvantages like Overhead of hardware, Less cost effective because of expensive hardware, do not have alert facilities, limited functions and facilities. There are common incidences of burning of motor due to and dry running of motor. Repairing cost of pump and non-supply of water during motor failure period cause large reduction in yield of crop. For avoiding these drawbacks and for providing the additional functionalities we need to develop this project.

III. LITERATURE SURVEY

It is found that most of the research carried out in agriculture field belongs to the following categories:

a. GSM-SMS protocols using GSM module independently or in grouping with internet Technologies [5].
b. Monitoring using the Wireless technology such as Bluetooth, Zigbee, WI-FI [3] and Radio Frequency Devices.
c. Monitoring using Wireless Sensor Networks [6].

A. Working of the existing system

Now a day, the use of mobile phones for development of remote control application for the induction Motor-pump which is used in the agriculture for irrigation is increased. Due to frequent power cuts and abnormal voltage conditions in India, it is necessary to distribute water efficiently to the fields during normal conditions. This is carried out by exchanging the information between the user phone and GSM in the form of missed calls and messages [4]. This system is developed with Ardino Uno Microcontroller which in connected to the GSM, sensors and the motor[4]. The temperature sensor is used to detect the temperature of the environment and capacitive sensor to sense the water flow in the pipe. The microcontroller includes the protection against overcurrent, dry running and single phasing. It is expected that this application provides easy access of motor to a great extent.

a. Short Messaging Service (SMS):

The remote user sends text messages or SMS[5] including commands to the receiver. GSM receiver receive messages sent from the user mobile phone's receiver decodes the sent message and sends the commands to the microcontroller. Microcontroller gives commands to the devices connected i.e. the water pump motor will switch ON/OFF.

Following drawbacks are noticed in this system are as:
(a). Some illiterate farmers found difficulty in typing keywords for sending control SMS.
(b). Operational cost increases due to bidirectional flow of SMS between system and user mobile (average 4 SMS/day/mobile).
(c). SMS are dependent on network traffic. So sometimes, messages use to take invariably long time defeating the basic purpose of system

b. Missed Call

The operational cost of communication between user and control system cell phones was further reduced by using novel concept of miscall where in no charges are incurred by using only ring signal for information transfer[4]. A voice call is treated as miscall when either calling party disconnects after receiving ring tones or called party does not respond to call

IV. PROPOSED SYSTEM ARCHITECTURE

For user to control the agriculture devices an android application is provided which is running on smart phone. In this it includes the application for water pump motor on/off, pesticide controller and user can schedule their tasks using this application. In this system we are using internet for connecting user with the server machine. This server has a java application which gives commands to the microcontroller and provides video streaming of farm to the user. For capturing the video of activities going on in farm we are using webcams. All these devices such as microcontroller, webcams are connected with the server through USB cables and connecting wires.
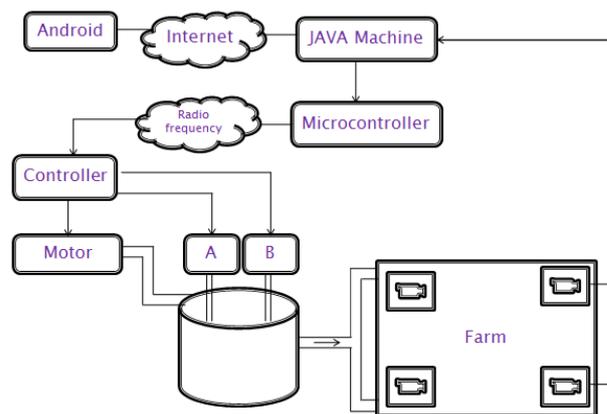

Fig. 1 System Architecture

A. Components:

a. Microcontroller:
Microcontroller is used to control the operation of various machines and devices according to the program or given instructions in the memory or ROM(Read Only Memory) of the Microcontroller. The working of Microcontroller is controlled by program that is called Firmware and is written in ROM. Some latest ROMs can be Re-Programmed, but mostly it does not require.

b. Stepper Motor:
A stepper motor (or step motor) is a brushless DC electric motor that divides a full rotation into a number of steps. The motor position can then be commanded to move clockwise or anticlockwise and hold at one of these steps without any feedback sensor, as long as the stepper motor is warily sized to the application.

c. Webcam:
A webcam is a video camera that feeds its image in realtime to a computer or computer network. Unlike an IP camera (which uses a direct connection using Ethernet or (Wi-Fi), a webcam is generally connected by a USB cable. Webcams are mostly used for the establishment of video links; allow computers to act as videophones or video conference server. We are commonly using a video camera for the World Wide Web because of that it is called webcam. Other well-liked uses include security observation, video broadcasting, and for capturing the social videos.

V. IMPLEMENTION

Automation in farming is achieve on platforms like Android and Java. User will login first and will have access to the motor and pumps which are controlled using a microcontroller. This microcontroller use handled by a small piece of embedded code done in embedded C and threading algorithm in java at server side.

At user side continues internet connection is required. Author has created online MySQL database server to stores the information receiving from reading status of scheduling. The database operations are performed through the Structured Query Language (SQL). Server will continuously communicate with database and operate equipment's accordingly.

VI. RESULT

If user is operating system for first time then firstly he will be allotted with user name and password by admin. After login in user will fill some basic information i.e. First name, Last name, Email Id etc. Fig. 4 shows the necessary fields which user must fill while signing up. After sign up users all data gets store at server. The user name and password provided at a time of sign up is used for login to application.

Fig.4 User page

Fig.5 Scheduling

After login in user will add new schedule, or delete exiting schedule.to add new schedule two fields are must 1.starting time & 2. Ending time .
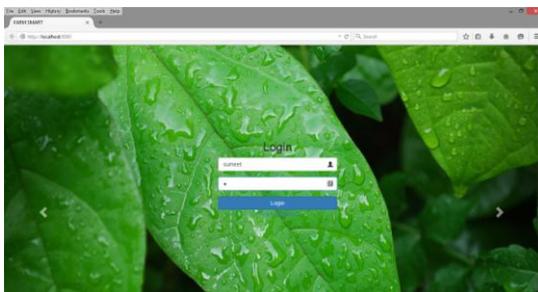

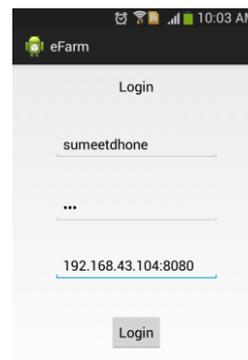Fig.2 Login Page

Fig.3 Home Page
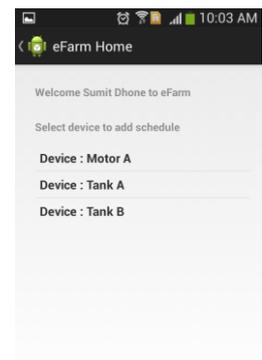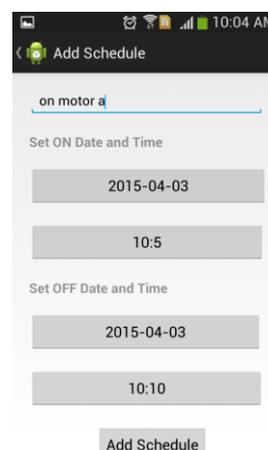

Fig. 6 Android Login   Fig. 6 Schedule Page
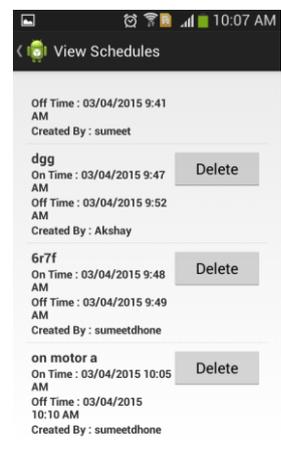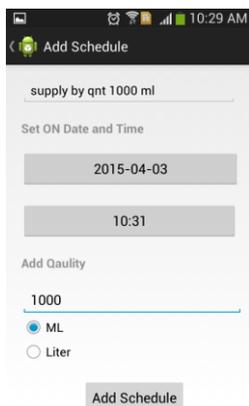

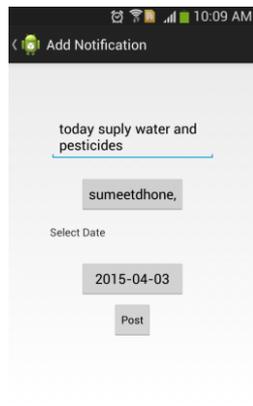Fig. 7 Schedule Page   Fig. 8 View Schedule Page

Fig. 9 Add Schedule   Fig. 10 Add Schedule

For security of farm the user uses live monitoring which is provided on android.

VII. CONCLUSION

From the convenience of android application, a farmer will be able to control the motor and pesticides proportion and monitoring the farming activities going on in the farm remotely. The project will allow for improving the efficiency of the irrigation process.

VIII. PROJECT SCOPE

It is useful for farmer, greenhouse owner to perform their task. This is fully automated system which works with less man power And user can perform the following things:

- Remotely on/off water pump using internet.
- Remotely provide pesticides to farm.
- Observe and look after the farm remotely.
- To schedule the daily farming activities.
- Reminders to farmer about their scheduled activity.
- Automatic on/off water pump if user fails to give command.

IX. ACKNOWLEDGMENT

We would like to take this opportunity to express our profound gratitude and deep regard to our project guide "Prof. J. M. Nighot", for his guidance, valuable feedback and for constant encouragement for the project. Working under him was extremely knowledgeable experience for us.

X. REFERENCES

.

[1] A. G. Villan and J. J. Esteve," Remote control of mobile devices in android platform"," Student Member, IEEE and Member, IEEE. J. U. Duncombe", Infrared navigation Part I: An assessment of feasibility, IEEE Trans Electron Devices, vol. ED-11, pp. 34-39, Jan. 1959.

[2] S. R. T. Jaya Bharathi chintalapati, " Remote computer access through android mobiles", Department of Computer Science Engineering, JNT University, INDIA, vol. 9, September 2012.

[3] S. M. H. Z. V. H. Archana Jadhav, Vipul Oswal, "VNC architecture based remote desktop access through android mobile phone", vol. 1. April 2012.

[4] S.Sumeetha,   D.Sharmila,   "Embeddedbased Remote Control Application using Mobile Phone in Irrigation", Bannari Amman Institute of Technology, Sathyamangalam, Tamil Nadu, INDIA,Jan-Mar 2012.

[5] Izzat Din Abdul Aziz, Mohd Hilmi Hasan, Mohd Jimmy Ismail, Mazlina Mehat and Nazleeni Samiha Haroon , " Remote Monitoring in Agricultural Greenhouse Using Wireless Sensor and Short Message Service (SMS)", Computer and Information Sciences Department Universiti Teknologi PETRONAS Bandar Seri Iskandar, 31750 Tronoh, Perak MALAYSIA .

Sumeet Dhone is a B.E. Computer Engineering student of K.J. College of Engineering & Management Research, Pune. Her interests are Android Development & Database Management.

Akshay Jadhav is a B.E. Computer Engineering student of K.J. College of Engineering & Management Research, Pune. Her interests are Hardware Development .

Mukesh Choudhary is a B.E. Computer Engineering student of K.J. College of Engineering & Management Research, Pune. His interests are Android Development & Web Development.

Chetan Dhandal is a B.E. Computer Engineering student of K.J. College of Engineering & Management Research, Pune. His interests is Web Development