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IoT Based Automated Irrigation Using Sensors

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***Abstract* – This paper presents that the Cultivation Management System mansion here is based on cloud. The architecture of system allows user to achieve the above mentioned activities in prearranged time so that farmers can examine their farm field data details from anywhere in between the range. Monitor system mainly consist Hardware module that situated in farm or farm field that has various sensors, devices, ICs for data transformation and transfer. Then Cloud implemented as Software as a Services (SaaS) so that the Android smart phone used as a remote control to make Arduino based automated irrigation system easy-to-use.**

The system design includes a soil moisture sensor placed in different direction of farm field that provides a voltage signal proportional to the moisture content in the soil which is compared with a predefined threshold value. On basis of this comparison result the appropriate data are fed to the ATMEGA-328" microcontroller which is on ARDUINO- UNO processor, which is linked by HC-05 module to an Android phone. Android phone allows the user to switched on/off the drive motor. System has a potential to be used in the real time precision agriculture application.

Keywords: Arduino, SaaS, Cloud, ATMEGA-328

1. INTRODUCTION

India is mainly known for agriculture, and it can play vital role in economic growth and development. To become a farmer is not easy task.

It is the science or practice of farming, including cultivation of the soil for the growing of crops. Cultivation is the process of trying to acquire or develop a quality or skill. Cultivation is most over and over again used to talk about the ways that farmers take care of crops. To avoid such burden from farmer, and to achieve such functionality farmers require a System which will be able to gather the information, from farm such as Temperature level, water level and soil moisture via various sensors.

Furthermore, system should process this information to provide functionality to the farmers. To enable system accessible from anywhere it needs to be centralized and connected to Internet. Here, the concept of Cloud Computing come.Thus, to manage all these functions Cultivation Management System comes into picture. This system allows farmers to view farm (or farm eld) information such as sensors values, devices connected, etc.

II. RELATED WORK

The proposed automatic irrigation system deploys the well-established combination of the android operating system and the Arduino Uno that are compatible in terms of providing a wireless remote control. The various sub-

systems that are Arduno, sensors, motor and their interconnection that constitutes the automatic irrigation system. The sub-systems include the soil moisture sensor, Arduino Uno processor board, drive system that includes power controller, motor and irrigation pump, the Bluetooth module HC-05 and Android smart phone.

The aim of this project is analyze the environmental factor in prescribed time and manage the water supply for proper cultivation of plants according, from anywhere without going to the farm through the Android smart phone. To increase the production by achieving the Proper cultivation. To analyze the environmental factors, the soil moisture, temperature, and man-age the water supply for proper cultivation of plants. To implement smart irrigation over the traditional one as it is very slow and unreliable for above steps. To achieve the above mentioned activities in prescribed time so that farmers can view their farm details from anywhere .To collect real time value of required environmental factor through various and sensors to take appropriate action according the condition of soil through the proposed system To implement cloud as Software as a Services so that user can access the information from anywhere within range and the Android application through user can monitor system and form details.

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III. LITERATURE SURVEY

Android phone. Android smart phone allows the user easy remote control for irrigation system to switched on, o the drive motor. System has a potential to be used in the real time precision agriculture application.

In this paper author present a prototype for fully automation accessing of irrigation motor where Prototype includes number of sensor node placed in directions of farm eld. Each Sensors are integrated with a wireless networking de-vice and the data received by the \ATMEGA-328" microcontroller which is on a \ARDUINO-UNO" development board.

The RASPBERRY-Pi is use for send messages through internet correspondence to the microcontroller process. The objectives of this paper were to control the water motor automatically and select the direction of the own of water inpipe with the help of soil moisture sensor. Finally send the information (operation of the motor and direction of water) of the farm eld to the mobile message and g-mail account of the user.

WSN based temperature monitoring application. The main feature of authors proposed network is to continuously monitor the temperature in the 128 node High Performance Computing Cluster for its smooth functioning. The wireless sensor node senses and transmits the current value of temperature to the base station.

This paper explains about the various steps involved in the experimental implementation and maintenance of the temperature monitoring network for High Performance Computing cluster at Computer centre, IGCAR.

The performance analysis of the network is also discussed. In this paper an authors proposed systems main aim is to implement a cost elective automated gardening system. This system helps in solving the above problem by being client and using fewer resources. The system uses low cost client soil moisture, light and temperature sensors to decide when and how much water will be provided to the potted plants. Programming languages like embedded C and python is used to con gure the microcontroller. The data would be displayed through a GUI created using processing. The user will also be able to control the entire system remotely as well as monitor the sensor readings.

This paper presents a mobile application for healthcare which process data from humidity and temperature sensors. The mobile app is based on cloud computing SaaS (software as a service) cloud computing model. The cloud computing infrastructure based on sensors is used in this paper for deploying application which provides patients monitoring (moisture, temperature or blood pressure).

The data is sent and stored in dedicated server for being analyzed later by doctors or caregivers. The advantages of sensor-cloud come also from using of PaaS (platform as a service) and IaaS (infrastructure as a service) models.

IV. PROPOSED SYSTEM MODEL

In this system, there are exist 3 entities:

1) WETHER CONTROL SYSTEM
2) SERVER USER

A. The system will execute using below procedure

i. Arduino

The proposed system consists of an Arduino (microcontroller) which controls the various sensors with the help of relays and also helps in providing the data over the web. The data collected by these sensors will be available to any computing device (mobiles, computers) through a GUI interface and maintains a log of all the activities taken by the system[13]. The system can also receive any command from the device accessing it.

ii. Router

Routers have been used in the system to have an e client transmission of data over the channel. The data is available to the user anytime and anywhere.

iii. Sensors

The system is having four sensors connected to the Arduino depending on the external factors they contribute to the plant growth. The sensors include soil moisture, temperature, light and water level sensors.

iv. The solenoid

It is an electromagnetic part of a valve, comprised of a coil, core tube, core and enclosure. The selection of 2-way, 3-way and 4-waysolenoid valves, designed to handle the Most demanding uid control applications.

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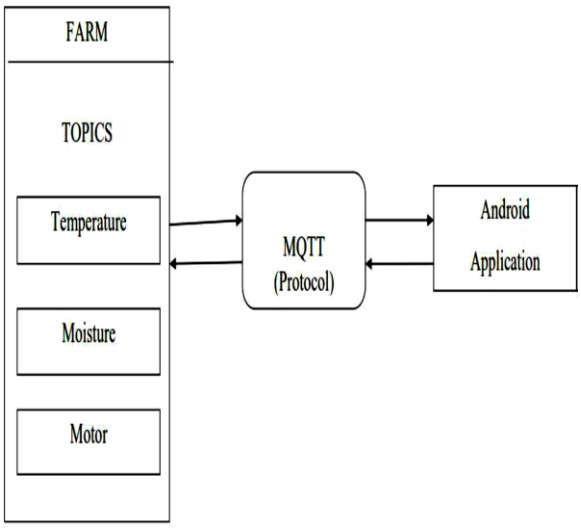

Fig1. Proposed System Architecture

B. Mathematical Module

System Specification

S = fS, s, X, Y, T, fmain; DD; NDD; ffriend; memory shared; CPUcountg S(system):- Is our proposed system which includes following tuple. s(initial state at time T) :- GUI of search engine. The GUI provides space to enter a query/input for user.X(input to system) :- Input Query. The user has to rst enter the query. The query may be ambiguous or not.

The query also represents what user wants to search.Y(output of system) :- List of URLs with Snippets. User has to enter a query into search engine then search engine generates a result which contains relevant and irrelevant URLs and their snippets. These are the total number of steps required to process a query and generates results.

V. SIMULATION RESULTS

Data encryption performance base on data size for the system performance evaluation, calculate the matrices for accuracy.

The system is implemented on Android with INTEL 2.8 GHz i3 processor and 4 GB RAM. First window of result is for valve selection to on and off.

This is after Login and Registration part.Here is the output window shows the result by detecting temperature and soil of current date and time. We have other options also like view previous data, valve setting and crop suggestion.

VI. CONCLUSION AND FUTURE WORK

We conclude that Cultivation Management System based on cloud is very effective system for the user which cultivates the plants on farm field or in Green house.

By this farmer can examine their farm field information and detail from anywhere in between this range. The monitor tool gives soil moisture details, water level, temperature information, etc. If such environmental factors are monitored and proper actions such as to on/off water motor, etc.

It can be help to increase in productivity by using such automated irrigation system consist of Moisture sensors, temperature sensor, Aurdino processor which sends information on android application via Bluetooth device HC-05.

VII. FUTURE WORK

Proposed system can be extending in future by adding feature for remotely monitoring sensors that can detect crop growth and livestock feed levels. In future adding of feature that remotely manage and control their smart connected other irrigation equipments in proposed system.