



RESEARCH ARTICLE

EFFECTIVE USE OF WATER IN IRRIGATION SYSTEM USING MACHINE LEARNING

*Yashika Mahajan, Mrunalini Pachpande, Ruchita Sonje, Swati Yelapure and Manisha Navale

Department of Computer Science, NBN Sinhgad School of Engineering, Pune, India

ARTICLE INFO

Article History:

Received 28th October, 2017
Received in revised form
23rd November, 2017
Accepted 17th December, 2017
Published online 19th January, 2018

Key words:

Irrigation, Internet of things (IoT),
Wireless Sensor Network,
Mobile and cloud computing.

Copyright © 2018, Yashika Mahajan et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Yashika Mahajan, Mrunalini Pachpande, Ruchita Sonje, Swati Yelapure and Manisha Navale, 2018. "Effective use of water in irrigation system using machine learning", International Journal of Current Research, 10, (01), 63873-63875.

ABSTRACT

In this work we present the prototype and proof of concept of automated water distribution system in irrigation. The system is capable of displaying greenhouse and irrigation scheduling parameters. Irrigation can wirelessly be automated by the sensor node by activating irrigation based on sensor values and predefined irrigation parameters. Our Irrigation system try to make the use of water efficiently. Use of IoT will help us to automate the system and Machine Learning will help system to decide amount of water needed depending upon various factors.

1. INTRODUCTION

In the approach of innovations such as IOT and machine learning, there is pace of change from conventional farming to present day agriculture will keep on being quickened. There are enormous issues regarding to farming such as low use of water to farm and in reverse in administration level, Joining of water and manure water system shrewd huge data is set up to advance IOT, cloud computing, machine learning etc. Current view of advances in remote sensor organize applications are used to utilize system and distinguished horticulture as potential territory organization together with an audit of elements impacting the outline of sensor systems for this application. At the end when large number of these small sensors either connected haphazardly or in general they should act connectively to perform detection of landscapes are out of scope or not. The ebb and flow advancements will water the farm depending upon need. Various factors are considered such that on the off chance that is program to switch on by 10 am it will switch on not standing when rain happens, it will amid that time. Afterward dampness sensor came into picture which will check water is present or not. Depending upon that factor water framework gets naturally on. If any case, if climate office does prediction of rain sooner, watering the plants can be postponed.

2. LITERATURE REVIEW

After studying different methodologies claimed that each methodology has its own benefits. Major domains are introduced in following sections.

2.1. Crop Water Requirement in Wireless Sensor Network

For gaining precision Data aggregation method is used to gain precision of water usage in irrigation. It results in improvement of precision of emission signals to reduce energy consumption.

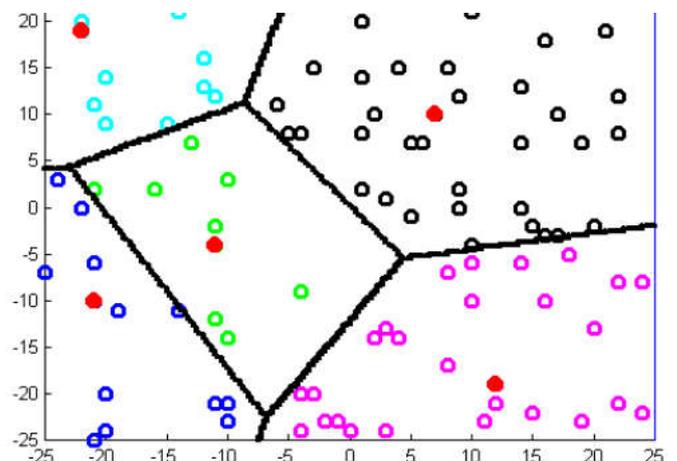


Fig. 1. Data transfer model based on cluster structure

*Corresponding author: Yashika Mahajan,
Department of Computer Science, NBN Sinhgad School of
Engineering, Pune, India.

2.2. GSM and Soil Sensors

Soil sensors provide information about moisture or water level in soil depending on that the water will be given to plants. Sensor used is : GSM used to collect information related weather data. Wastage of water has been decreased by collecting climate information into framework.

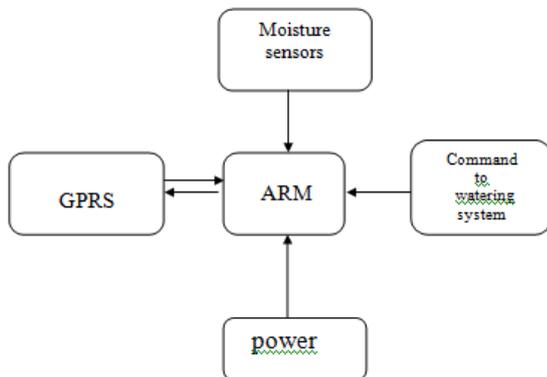


Fig. 2. Block Diagram of watering System

2.3. Using cloud Data Mining and Android

Cloud gives the information related to growth of crop fields and information related to weather, fertilization etc. Based on data prediction and forecast of water requirement for crops were done. Overall process was automated as follows:

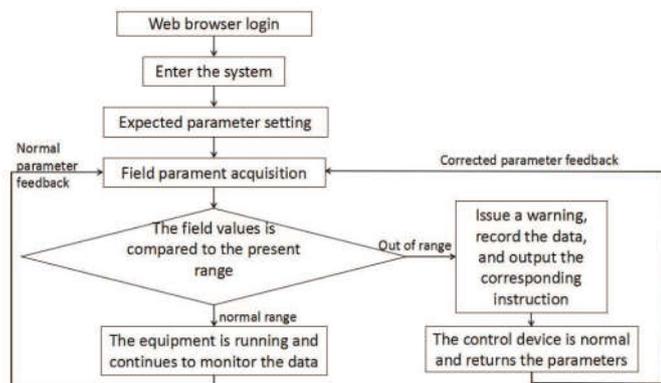


Fig. 3. Overall Software Flow

3. PROPOSED SYSTEM

In our paper we are trying to develop the irrigation system which is automated that is we will automate the watering system for the plant. The technologies such as IOT will used. IOT will help to robotize the system and machine learning will decide the amount of water required by the plant. The water needed by the plant can be decided using different factors such as moisture, temperature, age of the plant, type of the plant, soil of the plant. Scheduling parameter require for irrigation are to be display by the developing system. Scheduling parameter such as temperature, soil CO₂ and humidity sensor value. Hence our system will provide the water to the palnt automatically as per the plant requirement and ot as per the farmer or user requirement our development system focuses on crop growth which will be monitored. The temperature value humidity of soil are processed using IOT technology. These values will provide the amount of water required. Our system is

not the farmer based system. Even though the farmer is not available system will function on its own. The flow of the system is as follows. Firstly we need to create the user application where registration process can be done by the farmer. In this the threshold values is set by the farmer. Threshold value is related to the sensors. The server receive the sensor value read by the sensor. Threshold values is compared with the sensor value. If water supply is needed, server will notify the farmer. The sprinklers will be turned on to supply the water.

3.1. ESP8266 Module

We need wifi supply to get the sensor value therefore this module is used. ESP8266 has built in wifi network and TCP/IP protocol stack. All the function used by the networking from another application server is offloaded and application hosting id done.

3.2. IOT System Monitoring

IOT and wireless sensor will identify the quality of the water. To develop this area the above information is important as sharing of different aquatic organism between different breeders and organizations. The better plant development is shown by using the IOT system. Overmore it also shows worst development, what conditions are harmful etc and provide the optimized resources to develop the plant in proper way.

3.3. Multifractal Downscaling Model

The performace of the downscaling model of coarse satellite product is affected because of the anthropogenic nature of the irrigation. This create heterogeneity in the distribution of soil moisture to filter out the crop plant effect and analyze the scale in variance in quantitative manner, we use theta datasets. The natural system is mimicked because downscaling model attenuate effect of irrigation by theta fields.

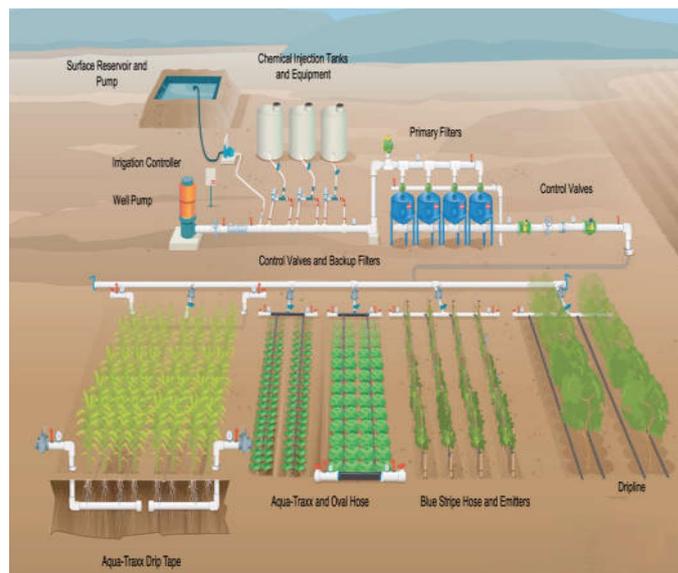


Fig. 4. Architecture diagram

4. CONCLUSION

A novel method is introduced which is simple in terms of algorithm and will gives more accuracy compared to existing

methods. We have Tried to collaborate two domains i.e. Machine learning With IOT which will give us an advantage to automate the irrigation system with properly distributing the adequate amount of water required by the plant.

5. REFERENCES

- Design of Remote Irrigation System in Farmland based on the cloud Platform Fei Hu1, Lei Shao1 Key Laboratory for Control Theory & Applications in Complicated Systems Tianjin Robotics and Automation (ICRA) Karlsruhe, Germany, May 6-10, 2013 University of Technology, Tianjin 300384, E-mail: 839492695@qq.com
- Research on the Model for Crop Water Requirements in Wireless Sensor Networks Shaohua Wan School of Information and Safety Engineering Zhongnan University of Economics and Law Wuhan, China shwanhust@gmail.com
- Smart Irrigation: A Smart Drip Irrigation System Using Cloud, Android And [4]. Michael T. Wolf, Christopher Assad, Matthew T. Vernacchia, Joshua Fromm, and Henna L. Jethani,” Gesture-Based Robot Control with Variable Autonomy from the JPL BioSleeve”, 2013 IEEE International Conference.
- The Construction of the Integration of Water and Fertilizer Smart Water Saving Irrigation System Based on Big Data Peng Zhang College of Water Conservancy and Civil Engineering Shandong Agricultural University Taian, China tazhangpeng@163.com Qian Zhang College Of Water Conservancy and Civil Engineering Shandong Agricultural University Taian, China Zhangqian864@163.com
- Weather based Smart watering system using soil sensor and GSM Sudheer Kumar Nagothu Assistant Professor GMR institute of technology, Rajam Srikakulam (Dt), Andhra Pradesh
