The Survey on Smart Agriculture Using IoT

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ABSTRACT
IoT technology helps in collecting information about conditions like weather, moisture, temperature and fertility of soil, Crop online monitoring. IOT allows farmers to get connected to his farm from anywhere at anytime. Wireless sensor networks are used for monitoring the farm conditions and micro controllers are used to control and automate the farm processes. Wireless cameras have been used to view remotely the condition of the form. A smart phone empowers farmer to keep updated with the ongoing conditions in any part of the world.

Keyword
Internet of Things (IoT), Interfacing Sensors, water management, WPAN, SVELTE.

1. INTRODUCTION
In India around 80% of people depends upon farming. Smart Agriculture is one of the solution to this problem. To highlighting features of this project includes water management, weather forecasting, canal controlling in both automatic and manual modes and all these data are stored and displayed in a mobile application. The alert SMS and notification is send to the user based on the fixed criteria. By Controlling all these operations by an mobile which is connected to internet and It will provide better performed by interfacing sensors, Wireless Fidelity etc.

2. PROBLEM IDENTITY
Due to the weather condition, water level increasing Farmers get lot of distractions which is not good for Agriculture.Water level is managed by farmers in both Automatic/Manual using that mobile application. It will make more comfortable to farmers.

3. RELATED WORKS

3.1 Smart Water Management Using IOT
This project helps us to manage the water level and where we can use in the Society easily. The level of water is maintained by sensor which is presented inside the tank and the data will stored in the cloud using mobile application. Users can view the level of water thorough mobile phones; according to that motor will be work automatic and manual. If the water level is low automatically motor gets switched on if it's up to fill then it will shut down the motor[1]. In our proposed system, Using Mobile phones we can monitor the water level and we can control from anywhere and anytime. It can also used in different industries to maintain the different type of liquids in the tank they can view and maintain the update information through the mobile application. User can also get alert notification according to their fixed criteria. It can also be implemented for flood propane like install this facility in Dams and bank of rivers etc[2].

3.2 Hybrid Intrusion Detection Architecture for Internet of Things
In this world, Internet of things (IoT) is an emerging paradigm where we can connect all the things and control in anywhere at any time. A novel intruder deduction architecture model which we are proposing for IoT to find out the anonymous activities in a particular area. This model is based on map reduce to find out multiple intruders in the fields. It wall alert the user by giving alert notification through the mobile application. The Iinternet of things is a worldwide network where we can connect all the devices and control from anytime and anywhere in a wide range of technologies[3]. The main concept of this proposed system is to make a solution for insecure nature of internet to become a much more secure in Iot thorough Mobile application. The results, which alerts the user by alert notification whenever anonymous detection is founded out. It will also find out multiple intruder detection simultaneously. Using unsupervised OPF it will detect (inner attack) and misuse-based intrusion is used to find out (external attack). It can also able to detect the cybercrime attack through IoT[4].

3.3 Real-time intrusion detection in the Internet of Things
In the IOT resource-constrained things are connected to the unreliable and untrusted Internet via IPv6 and 6LoWPAN networks. Even when they are secured with encryption and also authentication, these things are exposed both to wireless attacks from inside the 6LoWPAN network and also from the Internet. Since these attacks may occur, Intrusion Detection Systems (IDS) are necessary. In the implementation and evaluation, the primarily target routing attacks such as spoofed or altered information, sinkhole, and selective-forwarding[5]. The evaluation shows that in the simulated scenarios, SVELTE detects all malicious nodes that launch the implemented sinkhole and/or selective forwarding attacks, the true positive rate is not 100%, and there are also some false alarms during the detection of malicious nodes. Also, SVELTE's overhead is small enough to deploy it on constrained nodes with limited energy and memory capacity. And To guard against global attacks it has design and implements a mini-firewall. The detection algorithms in

SVELTE currently target spoofed or altered information, sinkhole and selective forwarding attacks. However, it is flexible and can be extended to detect more attacks. Therefore, it is to complement SVELTE with novel and/or available intrusion detection techniques that are feasible to use in the context of the IoT[6].

3.4 Survey data on cost and benefits of climate smart agricultural technologies in western Kenya

The data is collected to assess the climate smartness, profitability and returns of soil protection and rehabilitation measures. The data were collected from many households[7]. These households were selected using simple random sampling technique from a primary sampling frame of 180 farm households provided by the ministry of agriculture through the officers. It was administered by trained research assistants using a structured questionnaire that was designed in Census and Survey Processing System (CSPro). And also the data was exported to STATA version 14.1 for cleaning and management purposes. The data are hosted in an open source data verse to allow other researchers generate new insights from the data[8].

3.5 A Model for Smart Agriculture Using IoT

Climate changes and rainfall has been regular over the past decade. Due to this, climate-smart methods called as smart agriculture is adopted by many Indian farmers. Smart agriculture is an automated and directed information technology implemented with the IOT (Internet of Things). IOT is developing rapidly and widely applied in all wireless environments. The sensor technology and wireless networks integration of IOT technology has been studied and review.A combined approach with internet and wireless communications, Remote Monitoring System (RMS) is done. Main aim is to collect real time data of agriculture production environment that provides easy access for agricultural facilities such as alerts through Short Massaging Service (SMS) and on weather pattern, crops .In this the wise agricultural model in integration with ICT[9]. ICT have always mattered in Agriculture domain. Village farmers may have planted the “same” crop for many years, weather patterns and soil conditions pests and diseases changed. By using the proposed approach, received updated information allows the farmers to cope with and even benefit from these changes. It is really challenging task that needs to provide such knowledge because of highly localized nature of agriculture information specifically distinct conditions. The complete real-time and historical environment information is expected to help to efficient management and utilization of resources[10].

3.6 Combined Radar–Radiometer Surface Soil Moisture and Roughness Estimation

A robust physics-based combined active–passive (C-AP), or active–passive, surface soil moisture and roughness estimation methodology is presented. Soil moisture and roughness retrieval is performed through optimization, minimization, of a joint objective function, which constrains similar resolution radar and radiometer observations simultaneously. A data-driven and noise-dependent regularization term has also been developed to automatically regularize and balance corresponding radar and radiometer contributions to achieve optimal soil moisture retrievals. Extensive Monte Carlo numerical simulations and assessment using field data have been performed both to evaluate the algorithm’s performance and to demonstrate soil moisture estimation. Unbiased root mean squared errors range from 0.18 to 0.03 cm Through extensive numerical simulations and tests on actual field data, it was shown that, in a C-AP context with noise- dependent self-regularization, soil moisture estimation with errors meeting the SMAP 0.04 cm3/cm3 volumetric water content accuracy threshold is possible. More specifically, unbiased RMSE for soil moisture using ComRAD data and the proposed objective function (3.d) are 0.031 and 0.018 cm3/cm3for Corn and Soybean, respectively[11]. Furthermore, with the available expanded information space provided by using multiple measurements of difference polarizations (HH, VV, and TB-H and TB-V), more than one unknown parameter can be retrieved. This is to develop and present a fully adaptive scheme where it becomes possible to obtain best soil moisture retrievals by fully utilizing the available radar and radiometer information and not rely on a single set of observations or models.Two features merit further detailed investigation. the effects of surface correlation length are not considered in this paper; the currently implemented forward scattering and emission models are the functions of only surface rms height. It is expected that, at L-band, variations in surface correlation length will have noticeable impacts on soil moisture estimation abilities[12].

3.7 Architectural Framework of Smart Water Meter Reading System InIoT Environment

Internet of Things (IoT) has provided a lot of opportunities to create domestic applications. Smart metering also one of its main application. Water is the previous resource for everyone using this smart metering we can able to maintain the water management and we can also reduce the wastage of water. We propose the architecture frame work for water metre, which it measures the water flow and heat measurements (STUF-280T) [13]. We are introducing the concepts in mediatek cloud sandbox which we are using as cloud platform. All the data’s and information are stored in the cloud and make the process very economical instead of making costlier. And also this Iot concept allows the user to access the data at anytime and anywhere. Smart meter allows the user to maintain the high data and analysis the cost of the process. Other technologies like ZigBee, Bluetooth and gsm are also analysis the same data but using this smart meter user can have Restful based web services for communicating between IoT cloud and water meter in terms of ecological sustainability [14].

3.8 An Internet of Things (IoT) based Sustainable Water Management

Increasing dependence on groundwater as a reliable source of water in the rural areas has resulted in its indiscriminate extraction without considering the recharging capabilities of the aquifers as well as other environmental factors. As the availability of groundwater is highly inconsistent and exhibits substantial variations across the country, management of groundwater resources in the Indian context is an extremely crucial proposition. In this paper, we are discussing about a sustainable water management system based on Internet of Things (IoT), which automates the water distribution and storage as well as regulation of water wastage[15]. The requirement analysis is performed for Gudipadu Cheruvu, a remote rural village in Andhra Pradesh, India, where frequent water scarcity issues occur. An IoT system designed for sustainable water management is proposed for the Gudipadu Cheruvu village. The results of the proposed design and its evaluation are described in this paper. We have reached out to the underserved communities facing water crisis and have

come up with a viable system that automates the functions as well as increases the sustenance of the source in the long run. The challenges while developing a system for the rural set up was multi-faceted. Illiteracy, lack of awareness and digital divide prevailing in the rural sector had to be confronted. Apart from these, developing a system for the low resource setup was also tackled. We have developed a system that will reduce human intervention in water management which is adaptable in both the urban and rural scenarios incorporating the sustainability factor[16].

3.9 Internet of Things (IoT) Enabled Water Monitoring System

Water is always a needy part of everyone's life. Due to environmental situation, water management and conservation will play a vital for human survivals. Recently , there were huge needs for consumer based humanitarian projects that could be rapidly developed using Internet of Things (IoT). This proposes an IoTbased water monitoring system that measures water level in real-time [17]. The prototypes are based on the level of the water can be an important parameter when it comes to the flood especially in disaster areas. A water level sensor is used to detect the water level and based on the fixed parameter, and if the water level reaches the parameter, the alert signal will be feed in real- time to social network like Twitter. A cloud server was configured as data repository. The ultra-sonic sensor could be replaced by precise water level sensor. So that the system can perform more efficiently and gives higher accuracy of water level detection instance[18].

3.10 Smart Agriculture using IoT and WSN based modern technologies

In India about 70% of population depends upon farming and one third of the national capital comes from farming. The highlighting features of this concept includes smart GPS based remote controlled robot to perform tasks like weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance, weather forecasting, water management, canal controlling in both automatic and manual modes and all these data are stored and displayed in a mobile application. Based on the fixed criteria, the alert SMS and notification is send to the user. Smart warehouse management which includes temperature maintenance, humidity maintenance and theft detection in the warehouse[19]. Controlling of all these operations can done by an application which is connected to internet and operations will be performed by interfacing sensors, Wireless Fidelity etc. The sensors and microcontrollers are successfully interfaced with raspberry pi and it proves that it is one of the solution to field activities, irrigation problems, and storage problems using remote controlled robot, smart irrigation system and a smart warehouse management system respectively[20].

3.11 Computers And Electronics In Agriculture Field Through Software Computer Science

It presents the updated view of IoT application for agro-industrial and environment fields. And it is found that most of them relied heavily on heterogeneous components and wireless sensor networks. The selected references were combined into four application domains they are monitoring, controlling, logistics, and prediction. And these references were compiled to create usage of sensors, actuators, power sources, edge computing modules, communication, storage, and visualization stages. Finally, the solution were complied into an IoT architecture that represents a wide range of changes in agro-industrial and environmental fields. However, it seems reasonable to assume that future solutions will need to fully embrace Cloud services and new ways of connectivity in order to get the benefits of a truly connected and smart IoT ecosystem[21].

3.12 IOT based monitoring system in Smart Agriculture

Even now different developing countries using the traditional ways and backward techniques in agriculture sector. A little technological advancement has increased the production efficiency significantly. And to increase the productivity the inventive approach is introduced. Smart farming with Internet of Things (IOT) has been designed. By developing a motor vehicle which can be operated on both automatic and manual modes which can be used for various agriculture activities like cutting, spraying, and weeding etc. The controller will monitor the temperature, humidity, soil fertility, and water management to the field. By using green energy and smart technology the agriculture sector will find a better way to increase the productivity [22].

4. CONCLUSION

The system enables effective soil, water, moisture, intruders detection parameters has been monitoring and updating using IOT. This enables effective soil maintenance and pump controlling mechanism. This overcomes the manual operations required to monitor and maintain the agricultural farms in both automatic and manual modes.

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