A Survey on Smart Irrigation System using IoT

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Abstract - Agriculture is the most important and backbone for all developing and developed countries. Smart Agriculture is an integrative way in which it target on expanding the cultivation of crops and also developing the flexibility of farmers to climate collision. Automatic irrigation can be done through an IoT. It helps the farmer to supply the water without their presence in the farm field. In this survey is mainly focused on automatic irrigation concepts. Some of the techniques are reviewed in the following literature survey for the benefit of farmer and also to increase the rate of agriculture. By using those techniques, the water conservation can be increased and also the work load can be reduced for the farmer.

Keywords - Irrigation system, IoT, Smart systems, Smart agriculture, Decision Support Systems.

I. INTRODUCTION

Agriculture is the harvesting of land for more crop growth and also improving the livestock. IoT - is the Internet of Things, where IoT is a shared network or things that interact with each other. Because of the water scarcity, the automatic irrigation steps can be made. In IoT many of the sensors are connected along with microcontroller. By using the sensor, the value can be assembled. Then the gathered datas are compared with the actual data base. According to that predefined data the irrigation is supplied automatically. The irrigation can be done both continuous and periodic wise based on the weather condition. Automatic irrigation is used to overcome the unnecessary water flow. Mostly the water is supplied through drip irrigation or the sprinkler. IoT applications are increasing the quantity, quality and cost effectiveness of agricultural production

II. LITERATURE SURVEY

A. Farm Field Monitoring and Irrigation Automation Using IoT

In this paper it mainly focuses on the irrigation purpose. By working under the mentioned sensors, the irrigation management can be performed perfectly .The collected value from the sensor and the irrigation controller are coordinate with Wi-Fi network. With the help of that specified application, the person can able to know the present situation of the land .Based on the current valuation, the water can be irrigated. As reported by weather forecasting, the water supply can be done to the farm field either periodically or continuously .Here naive Bayes algorithm is used to get the accurate result, the user can get the proper value like how much level of water needs to irrigate. With the guidance of that application, the farmer can built the decision at which condition they want to supply water [2].

B. Wireless Sensor Network and Internet of Things (IoT) Solution in Agriculture

This paper illustrates the automatic irrigation to improve the water conservation. Here RFID and WSN are used along with the ZigBee protocol. In this paper it replaces the function of human to human and human to machine to the Machine to Machine process. If the soil is dry then the RFID based on ZigBee Platform is used to send ID to the reader, then it recognize the node. After that, it sends the exact value of data for irrigation processes without human intervention. The farmer can get the information through system or mobile. Here the water can be supplied throughout the land by sprinkle method. In the automatic irrigation method 50% of the water can be reduced when compared to the manual irrigation. By applying this procedure, the yield of the crop is heightened [2].

C. Smart Drip Irrigation System using Raspberry pi and Arduino

This paper holds the concept about drip irrigation by applying both the raspberry pi kit, Arduino. Python language is written on both the kit. If less amount of water is identified by the sensor then a signal will be forward to pi, through the microcontroller. As soon as the report can be send to the e-mail, to turn ON the motor

for X minutes. Then the water is supplied only for X minutes, after that the motor become idle state .This setup having the water tank, in which it contain the ultra sound distance sensor to measure the water level in the water tank. By using this it contain the threshold value where the water tank does not leads to empty and also does not leads to overflow of the water. The cost for building this automatic irrigation method is cheap and easy to use [3].

D. A Decision Support System For Managing Irrigation In Agriculture

Here it examined the SIDSS. Depends upon the moisture level in soil and environmental condition, the water is supplied on weekly bases. This paper is focused only on the citrus cultivation. Traditionally the decision can be taken by the experienced farmers for better irrigation, but now decision support system, is used for better irrigation. two machine learning techniques PLSR and ANFIS are used under DSS. By using this method a person who does not have any idea about the agriculture can also able to irrigate the correct amount of water to the farm field [4].

E. IoT Based Auto Irrigation System Using Soil Moisture Sensor

In this paper the automatic irrigation is constructed with the support of pump motor. The motor will turn ON or OFF automatically. The signal received from the microcontroller and the soil moisture is used to turn ON the water pump. While begin the process, the power is supplied to the microcontroller. The level of the moisture and the humidity is noted. According to the moisture content, the water is supplied. If the sensed value is less than fixed value, the irrigation motor will turn ON. This can be controlled over the app or system using the internet connectivity. It is used to overcome the unnecessary water flow [5]. Santhi P et. al. have proposed the DGLCM for green Bio- Technology to increase the rate of agriculture [8].
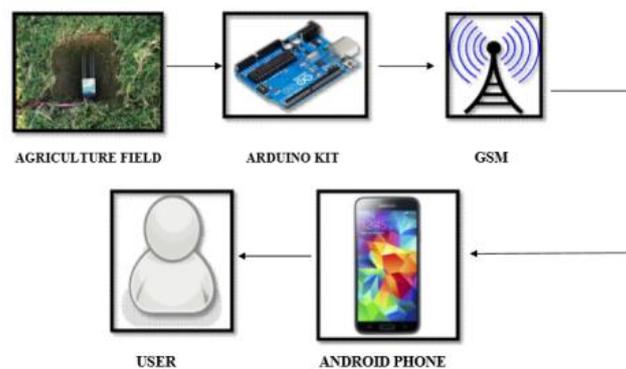

Fig. 1 Overview of Working

Table 1. Sample Output

Item	Condition	Min	Typical	Max	Amount of water
Output	Sensor in dry soil	0%	~	30%	High water
	Sensor in humid soil	30%	~	70%	Medium water
	Sensor in water	70%	~	85%	Low water
	Sensor in water	85%	~	95%	No water

III. CONCLUSION

In this paper many of the techniques are followed to maintain the automatic irrigation. To promote sustainable agriculture to all, this paper helps in promoting agriculture by effectively predicting the crop, monitoring the crop production and also the water supply to the crop. The information about the crop is given to the user for better monitoring during the cultivation. This helps in cultivation of crops by anyone and they need not be a farmer or an agriculturist. This development will be useful to anyone who wants to cultivate and will help them though they do not have basic knowledge about this field. In future, the classification [6] and object segmentation [7] is combined with IoT to achieve better efficiency.

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