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LITERATURE SURVEY ON *IoT ENABLED SMART FARMING APPLICATION*

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SURVEY ON IoT ENABLED SMART FARMING APPLICATION

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ABSTRACT

One of the important applications of Internet of Things is Smart agriculture. Smart agriculture reduces wastage of water, fertilizers and increases the crop yield. In the current agriculture system the specification such as temperature, moisture, humidity are detected manually which increases the labor cost, time and also monitoring cannot be done continuously. In this paper irrigation process is done automatically using different sensors which reduces the manual labor. Here a system is proposed to monitor crop-field using sensors for soil moisture, humidity and temperature. By monitoring all these parameters the irrigation can be automated.

LITERATURE REVIEW:

I. Patil VC, Al-Gaadi KA, Biradar DP, Rangaswamy M (2012) Internet of things (Iot) and cloud computing for agriculture: an overview. Agro Informatics Precis Agric (i):292–296.

- ❖ This research work explains the importance of cloud computing in IoT and the importance of these two technologies in Agricultural System.
- ❖ In this paper, it is discussed that IoT is closely correlated to cloud computing. The relation between IoT and cloud computing was explained in such a way that IoT gets influential computing tools with cloud computing.
- ❖ In this research work, an agricultural information cloud is assembled. In this agricultural information cloud, smart agriculture system is constructed through the assemblage of the Internet of Things and RFID.
- ❖ Component of IoT generates a large amount of data like data generated by using RFID, sensors, wireless communication etc. this large amount of data handled by agricultural information cloud.
- ❖ It is concluded that, in the agricultural information network, hardware resources are integrated into the resource pool for achieving the dynamic distribution of resources and to balance the load, it improves the efficiency of resource use.

II. Mohanraj I, Ashokumar K, Naren J (2016) Field monitoring and automation using IOT in agriculture domain. Procedia Comput Sci 93:931–939.

- ❖ In this paper, an application prototype for precision farming using a wireless sensor network with an IoT cloud is proposed.
- ❖ In this work, an alert system for the control of water stress of plants using IoT technology was presented.
- ❖ The first part of this paper described the steps of the creation of the decision support system intended for an agricultural community in order to be able to estimate the quantities of water required.
- ❖ For irrigation management, the farmer will on the benefit from a dashboard software in the form of a graph, to monitor in real time the variations of the soil conditions and on the other hand, a process of notification by SMS will be transmitted via the application when a critical level is reached to avoid water stress.
- ❖ This application can be improved to make it a very sophisticated one envisages the integration of the method of evapotranspiration to calculate the water requirement of a plant per day in the system of decision support.

III. Yan-E D (2011) Design of intelligent agriculture management information system based on IoT. In: Proceedings of the 4th international conference on intelligent computation technology automation ICICTA 2011, vol 1, pp 1045–1049.

- ❖ In this research work, many challenges related to the agricultural domain were, addressed. An architecture was also framed for meeting these challenges.
- ❖ According to the text of this paper, farmers should be guided on the right time during different stages of crop growth.
- ❖ In this research work, a knowledge base is created. This knowledge base has various crop details. These crop details speak about knowledge acquisition, market availability, geospatial data flow and the weather prediction data.
- ❖ Monitoring module includes monitoring of various stages of growing plant, calamity check, planning for irrigation, crop profit calculation, etc. Per day need of water of a plant is calculated using evapotranspiration method.
- ❖ This method is based on the devised algorithm. At last, a comparative study was prepared among several applications existing developed system, having properties like efficiency, the knowledge base, reliability and monitoring modules.

IV. Bo Y, Wang H (2011) The application of cloud computing and the internet of things in agriculture and forestry. In: Proceeding of the 2011 international joint conference on service science IJCSS 2011, pp 168–172.

- ❖ This paper discusses the various applications of IoT and cloud computing in the field of agriculture and forestry.
- ❖ According to the text, the use of IoT plays an important role in smart agriculture.
- ❖ The basic technologies of IoT like laser scanner, RFID, photoacoustic electromagnetic sensors, etc. these technologies can be used to make great innovations in agricultural.
- ❖ Basically in agricultural information transmission, precise irrigation, intelligent cultivation control, agricultural product safety, and many more. This paper also focuses some applications of IoT in forestry.
- ❖ IoT can play an important role in forest identification and wood tracking and its management.
- ❖ Finally, this paper concludes that the integration of IoT and cloud computing has become a tendency.

V. Li J, Gu W, Yuan H (2016) Proceedings of the 5th international conference on electrical engineering and automatic control, vol 367, pp 1217–1224.

- ❖ In this research work, a platform Phenonet is developed using an open-source platform called OpenIoT.
- ❖ Phenonet is basically a semantically enhanced digital agriculture use case.
- ❖ This paper demonstrated the applications and efficiency of Phenonet in a number of use cases.
- ❖ The researchers demonstrated that how an Open IoT platform can help to handle the challenges encountered by the Phenonet application.
- ❖ In project Phenonet, the basic concept of the collection, validation, processing, annotation, and storing of data captured from smart sensors in the field has been proposed.
- ❖ The related semantic queries, reasoning, and experimental results are presented.

VI. Dlodlo N, Kalezhi J (2015) The internet of things in agriculture for sustainable rural development. In: 2015 international conference on Emerging trends in networks computer communication (ETNCC), pp 13–18.

- ❖ In this research work, possible applications of the Internet of Things in agriculture for sustainable rural development has been identified.
- ❖ Various business opportunities related to agriculture domain and its benefits that can be generated, using the Internet of Things is discussed in this text.
- ❖ This literature is intended to stimulus strategy on the acceptance of IoT in agriculture and rural development.
- ❖ According to the literature, developers can use IoT technologies to build country-specific technologies based on the agricultural domain.
- ❖ Development of technology will uplift the standard of people and support poverty alleviation.
- ❖ This application can be improved to make it a very sophisticated one envisages the integration of the method of evapotranspiration to calculate the water requirement of a plant per day in the system of decision support.

VII. Lee M, Hwang J, Yoe H (2013) Agricultural production system based on IoT. In: 2013 IEEE 16th international conference computer science engineering, pp 833–837.

- ❖ In this paper, an application for precision agriculture, a customized architecture for agriculture, based on IoT is presented.
- ❖ This is a cloud-based IoT architecture. This project is applicable to various precision agriculture applications.
- ❖ The research proposed a three-layer architecture.
- ❖ The first layer collects the environmental information and supplies for needed actions.
- ❖ The second layer is a gateway layer, this layer connects the front-end and back-end via Internet or network in which data can be stored and processed.
- ❖ Researchers built a prototype of this architecture to test and illustrate its performance.
- ❖ The efficiency of the proposed architecture is demonstrated by the performance evaluation results.

VIII. Patra L, Rao UP (2016) Internet of things-architecture, applications, security and other major challenges. In: 2016 international conference on computing for sustainable global development (INDIACom), pp 1201–1206

- ❖ This paper explains the architectural components of Internet of Things, shows some application areas where Internet of Things is applicable, discussed about some challenges that have to be discussed.
- ❖ These challenges include the security issues that require consideration like extensive deployment, standardization, interoperability, security of data, efficient spectrum usages and unique identification, gathered objectsafety, security, and energy consumption.
- ❖ IoT getting rapid momentum due to advances in sensing, actuating, and RFID technologies.
- ❖ It aims at blending the virtual world with the real world seamlessly.

Problem Statements:

- This paper focused on a basic trade that is Agriculture, which is closely related to the welfare of any nation and the people's livelihood. In India, Agriculture sector is shrinking day by day which disturbs the ecosystem's production capacity.
- There is a burning requirement to resolve this problem in the area to reestablish vitality and place it back on higher progression.
- The reemerging of the worldwide recession has caused flows across both the developed and the developing economies. Agriculture domain required to be more competent and irreplaceable to ensure universal food security. Farmers of India are at excessive detriment in terms of technology, size of farms, government policies, trade, etc. The Internet of Things technology can diminish some of the problems of Indian farmers.
- While in the world, agriculture is experiencing industrialization, it is very significant to develop "agricultural information network". Agricultural information network has become the trend of enlargement for the world's agriculture.
- In concern of the Indian agriculture development, "agricultural information network" is a major concern in stimulating agricultural development and its transformation.
- In India, there are many problems in the agricultural information system. For example, here more importance is given to hardware instead of software and cannot deliver high eminence information to get production requirements of farmers.
- Besides, information is not adequately used by the farmers of India and the influence of information on a rural area, agriculture, and farmers are not remarkable.

- The demand and supply of agricultural products has not been controlled properly, because of the demand and the consumption of the agricultural crops could be anticipated quantitatively, nevertheless, the deviation in crop and production by the weather change, change in cultivated area of farms, damage by insects, disease in crop, etc., could not be truly predicted.
- To change this situation and endorse the speedy development of agricultural information network, it is required to use the Internet of Things to appreciate smart agriculture.

TEAM DECLARATION:

To overcome these problems, our team are on discussion and taking some better ideas in the upcoming brainstorming sessions and on planning to do IoT-based agriculture system helps the farmer in monitoring different parameters of his field like soil moisture, temperature, and humidity using some sensors. On our project, we are planning for each of the farmer can make the decision whether to water the crop or postpone it by monitoring the sensor parameters and controlling the motor pumps from the mobile application itself.