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# A Review of Different Methods For Implementing Smart Agriculture On An Iot Platform

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**Abstract:-**
*Nowadays, everything is feasible using the Internet of things, which relates everything present in this universe together using the Internet. Using different sensors and massive data, different information is collected, which is considered useful. IOT platform is very beneficial for making any system smart and environmentally friendly. Adequate water management techniques are used to increase agriculture of any yield which needed proper water irrigation management. For proper water management, a wireless sensor networks system has to be used. Wireless sensor network has given us a decreased price; better control, easier to use an irrigation system to improve farming by implementing WSN in the field has enhanced farmers ' efficiency and productivity. This method can help assess field parameters, i.e., state of soil atmospheric condition (temperature, humidity, biomass of plants and animals, and shocks during product transport. Advanced irrigation system where water irrigation system can allow water to sprinkle smoothly through the solenoid valve to the roots, either on the exterior layer of the soil or straight on the base area. Our research aims to frame an infrastructure that grants the rapid development of multiple divergent IOT applications with minimum technical skill. Our research aims to present a software-centric agricultural representation and implementation of IOT.*

**Keywords:** *Internet of thing, smart farm, wireless sensor network, Irrigation system*

## I. INTRODUCTION

People are gaining education and information about technologies in the current day. They use social websites and use more websites, where periodic updates occur, resulting in enormous information collection. Below figure1 shows the combination of Iot and agriculture.


**Figure 1:Combination of Iot and agriculture**

ICT and agriculture arise from widely different human needs. Still, the first domain is of the utmost significance to the second domain to encourage modern, complex processes for agricultural companies. Application of ICT in agriculture has been an evolving field for several years, seeking to improve agricultural procedures through advanced information and communication innovations. Agricultural aspects such as crop management and control, quality management, food transport, and food preservation can be enhanced by taking their domain-specific requirements into account and translating them into the appropriate functional design, development, and applications by ICT experts. Over the previous few years, several efforts have been made to integrate end-to-end ICT solutions into farming business processes. Smart agriculture, precision farming, Farm Management Information Systems (FMIS) are all terms that use advanced, previously unused information and communication instruments and systems to introduce the notion of sophisticated processes into farming processes.

Because of spatial and temporal variations, potential developments in the field of precision farming have been analyzed. For such developments, examples of present site-specific farming techniques were described using dynamic, real-time, adaptive techniques, and future directions [1-2]. Concerning current alternatives, a significant amount of effort is focused on wireless sensor network solutions for tracking crop conditions during manufacturing, product auto-identification, and product condition tracking transportation [ 3–5]. The primary activities generally dealt with in Precision Agriculture and Greenhouse Management is information monitoring, data processing, inference of information, and eventually transfer of information back to the farm or greenhouse and execution of the generated actions. In essence, a typical solution consists of a wireless sensor network living on the farm or greenhouse. At the same time, at the other end, there is a database and a processing element, such as an expert system, which processes the accessible information and produces activities for the farmer, often in an

automated manner. Modern farming and greenhouse management and business control processes involve different stakeholders, companies, and inner back-end systems. Nowadays, the complexity of these company procedures is the most important challenge that needs to be addressed. The literature has already outlined several advanced alternatives and architectures of Farm Management Information Systems[6–9]. However, most of the present schemes limit their functionality to a very restricted part of the overall business process, isolating the company's actors and thus being unable to maximize future outcomes.

It is an entirely one-by-one step process for creating any firm or organization's efficient and rewarding big data solution that wishes to embark on the big data adventure. This leads to a better decision-making solution using a descriptive, predictive, inquisitive, and prescriptive analytical technique that needs action to produce improved results[10 ]. The main thing that agriculture needs most is water. In leaky channels, some water can be wasted, which will impact crop yield and loss. There are many types of plants that have distinct intakes (water consumption). To this end, we need to supply the plants with the water in the necessary amount and at the right moment to avoid the loss of water supply and crop development. It is essential to obtain soil moisture data at various concentrations and crop features [11].To evaluate the soil water content available to the plant, a simple model based on meteorological forcing is used. Multiplying the Evapotranspiration reference crop with the crop coefficient can detect (calculate) the real water demand for any crop. The most apparent way to reduce water scarcity in distinct areas is to increase water production from current water resources and generate more food with less water [12]. Agriculture has been significantly enhanced, and there is also an automated system invention in which plant growth can be monitored, and WSN systems controlled[13 ].WSN's primary task is sensing information from the distant place needed and transmitting sensed information via wireless networks that the receiver can observe. The WSN is the best thing that can be used in the agricultural sector to handle distributed information gathering in any environment that can be solved, and most importantly, to guide farmers in gathering/gathering information in real-time. To transfer the collected data to the mobile farmer via GSM technology, the WSN system can be shared with other low-energy devices[14].

## II. RELATED WORK

The existing study has shown that a few agricultural systems with restricted functionality have been created. In this section, related research on sustainable farming systems has been provided.

In this paper, the author described sophisticated kinds of analytics. Four kinds are available: Descriptive, Inquisitive, Predictive, Prescriptive Analysis. The outcome will happen in the earlier phase. The outcome should be represented and visualized carefully. Although many workplace issues are produced, such as related technical amount, memory problem, etc. The other thing is that the meaning or viewpoint point is also part of it from unstructured or semi-structured information. Unstructured data will be analyzed in this visualization. Next, in big data projects, efficient, timely data extraction is like a motto[10].

There may be distinct paths fields for the information gathered, processed, represented. The corresponding field of information or data fetching is beneficial for the necessary project.

Now it's about evaluating the project. There is a need to evaluate huge inputs of data, and eventually, their quality controls expected results. Does the project allow stream processing to be assessed? Parallel processing, i.e., promoting distributed computing, will be easily incorporated with visualization tools. Storage is the basic property needed in the database project. The storage property should support scalability. It should run familiarly when adding new stuff to it. It is used by nearly famous companies like Google and Amazon to take care of these.

Agriculture is the core of the occupation of India.

Managing crops is the fundamental care that needs to be taken.

The development of technology has made the work simpler. We can predict crop status using Big Data and Remote Sensing Technology, and we can behave accordingly.

In this paper, the author proposed a methodology for the management of agriculture. Farmers need to get a particular region labeled in the first phase of methodology to detect that region alone and receive updates. Land cover is described as physical coverage such as the differentiation of crops, forests, and buildings. Apart from this farmer, soil such as grassland, bare land, moist soil, and dry soil should be mentioned so that water requirements can be assessed. If the land is big, various techniques of classification must be applied [11].

The authors spoke about the classification technique and the types of soil cover, and they were: automated, manual, hybrid. The next step is the information collection. This meteorological data was collected to assess the need for water. We can also get the climatic and physical parameters from the agro weather stations[11]. Satellite pictures are regarded to calculate some information that benefits meteorological services worldwide. Remote sensed data would add value to crop management, such as the Normalized Vegetation Difference Index (NDVI), the Leaf Area Index (LAI). For some room, obtaining information and choices from the data gathered may be lacking. Using the latest technology called "Wireless Sensor Networks" and "Zigbee"[14] can fill this room. By using these writers of the method, a methodology was suggested to obtain periodic field data. The parameters on which writers focused are temperature and humidity. They

were intended to obtain up-to-date temperature and humidity data. Both sensors have characteristics, ability, and functionality, respectively [14]. Sensors should be positioned in the farm field; sensors can detect the current temperature and humidity. And the heard information will be sent to mobile consumers. The below Figure shows Smart farming in IoT[15]. The below figure2 shows the features of smart farming. It is possible to obtain information by sitting at home. But if any activities in the sector need to be taken can happen. By simply clicking on his phone, the user can perform any activities at that moment by sitting in his location.

Using actuators, this can be performed. The functioning and management of agriculture have become like an independent operating scheme. Accessible to all types of sensors. Nowadays, we can only get all types of data by putting them in the farm estate. Some of the tools used in authors include soil moisture sensors, mote triggers for water sprinkler, soil pH, etc. It is possible to retrieve, analyze, and activate actuators from this precise value for some moment interval and stop automatically. Using CPS technology, the current changing world can be felt. CPS is a smart system that includes hardware, software, and physical components in which the world's evolving performance can be continually integrated and interacted. CPS is the result of process-mechatronics, software, personal computers, and engine control transdisciplinary engineering design. Such an embedded system responds to multidisciplinary surveillance of potato crops, resulting in enhanced management of agricultural precision. Although all methods are implemented, there is still no reduction in information service costs. The cloud storage server is suggested for this purpose. Various gateways send information collected by multiple sensors to the cloud server. The gateways are useful for collecting information from all field sensors positioned at various agricultural field places. The WSN collects information by monitoring the identification of radio frequencies and other sensing devices. The server functions as the layer of perception that senses and provides data about the place. For virtual storage, cloud computing technology is used.


**Figure2: Smart Farming**

## III. DIFFERENT METHODS of DISCUSSION

Making the system as a human is one that has been studied. Using information mining techniques, this can be achieved. Now IOT has enabled the intelligent thinking system to be built. The system should be convenient, efficient, and intelligent.IOT is going to link the entire universe. It is possible to retrieve and use any information from any source. Some techniques have been implemented to make the system smart, as outlined in figure1 below.

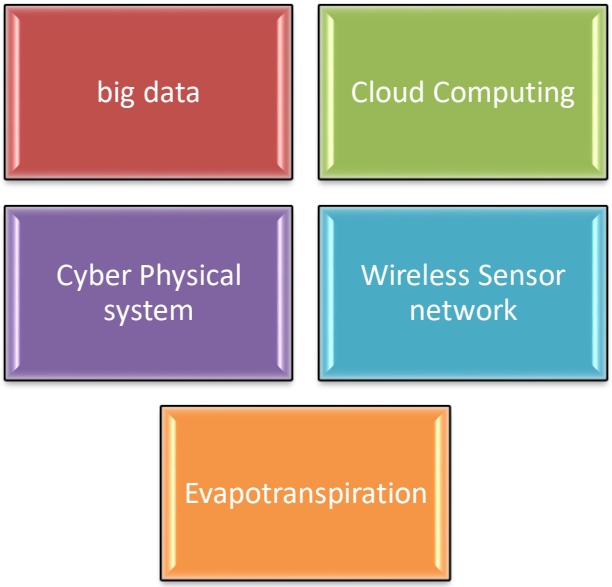


**Figure3: Smart Agriculture Techniques**

Description of above techniques which are used in different research:

- BIG DATA- Big Data Used for information collection and helps to make decisions such as water management.
- EVAPOTRANSPIRATION-Evapotranspiration and crop coefficient can be used to determine the water requirement of any crop.
- WIRELESS SENSOR NETWORK-It offers a cost-effective alternative for monitoring and controlling the pressure, temperature, humidity, and pH in the atmosphere.
- CYBER PHYSICAL SYSTEM-System integrates and interacts with computing and physical elements to detect the change's occurrence.
- CLOUD COMPUTING-Cloud computing IOT is useful in sensing geographical demands by monitoring land, and charging can be applied per usage, reducing costs.

## IV. CONCLUSION AND FUTURE SCOPE

We review different research on step-by-step processes for building big data research in the agriculture field associated with Iot. Crop management can be accomplished by supplying the necessary quantity of water, fertilizers, and any crop development updates can be obtained from anywhere. It is possible to connect machine-to-machine and access all meteorological data and apply and implement the solution.

Future job is to provide the field as well as returns with a security system. It is necessary to recognize the unregistered individual or any animal and send intimation information to the mobile farmer.

## V. APPLICATION OF IOT IN AGRICULTURE

- Crop Water management
- Pest management and control work
- Precision agriculture
- Food production and Safety

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