

# IOT based Smart Irrigation System for Precision Agriculture

Prasanth R<sup>1</sup>, Rahul D<sup>2</sup>, Sharan S C<sup>3</sup>, Suresh P<sup>4</sup>

<sup>1,2,3</sup>UG Student, Department of Computer Science, KPR Institute of Engineering and Technology, Arasur, Coimbatore, India

<sup>4</sup>Assistant Professor, Department of Computer Science, KPR Institute of Engineering and Technology, Arasur, Coimbatore, India

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**Abstract** -Precision Agriculture are growing day by day with the help of some technology for communication and control technologies in agriculture. The Internet of things, Cloud Computing and Edge Computing are the major important roll to enhance Precision Agriculture connectivity. The crop field are monitored with the help of some iot devices and sensor. The Edge computing plane will collect sensor data from the field crop. To interact with field crop Cyber Physical System (CPS) are used in edge plane .Then the Cloud will collect the current data and past data from the edge plane and then analysis the data and then it will response based on the data. So that there will be increase in production of food and it will reduce the usage of water in the field crop.

**Key Words:**Precision Agriculture,Cloud Computing, Internet Of Things, Edge Computing, Cyber Physical System.

## 1. INTRODUCTION

Internet of Things is one all told for most well-liked subjects these days where sensors and wise devices facilitate the supply of information and communication. In IoT, in an exceedingly} very alone amongst one in each of the most ideas is wireless device networks throughout that information is collected from all the sensors in an exceedingly network characterized by low power consumption and an outsized vary of communication. throughout this study, degree style to look at soil status, temperature and status on very little farms is provided. The foremost motivation for this study is to decrease water consumption whereas increasing productivity on very little agricultural farms and precisions on them. This motivation is a lot of propelled by the actual fact that agriculture is the backbone of some cities and most villages in most of countries. What's a lot of, some countries trust farming as a result of the most provide of monetary gain. putt the above-mentioned factors into thought, the farm is split into regions; the planned system monitors soil status, status, and temperature at intervals the individual regions pattern wireless device networks, internet of things and sends a report back to the tip user. The report contains, as an area of the information, a 10-day prognosis. we have a tendency to tend to believe that with the on prime of information, the tip user(farmer) cantons of with efficiency schedule farm cultivation, harvesting, irrigation, and fertilization.

## 1.2 PRECISION AGRICULTURE

Precision agriculture is in addition known as sensible farming, it's website-specific crop management (SSCM) perhaps affirming management construct supported perceptive, activity and responding to repose and intra-field variability in crops. the benefits of exactitude agriculture embrace hyperbolic gain and reduced environmental impact inside the first years, PA consisted within the main of map-based technologies victimization geo-statistical ways like GIS and satellite remote sensing and additionally the most application of PA was to manage chemical use device use wasn't widespread since sensors were either too expensive, too inaccurate or untouchable for the applications required. Surveys throughout the primary 2000's showed that few farmers used PA technologies and additionally the most barriers to the adoption of these ways were the dearth of technologies to influence the massive amounts of information, the dearth of scientific validation, high costs and no coaching job or technology transfer This has changed with the event and testing of paradigm PA systems, the quick development of IoT and huge information, and additionally the decreased worth of sensors. IoT solutions in agriculture presently group A cycle of i) observance through sensors, ii) analysis and springing up with, and iii) sensible management, all connected by a wireless network connected to a cloud service. Brobdingnagian information analytics and machine learning could also be applied to the data to help produce acquainted choices. This paper will take into consideration past feasibility studies in irrigation.

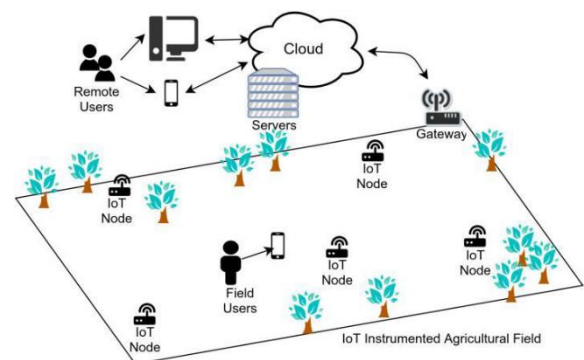


Fig-1: Precision Agriculture

## 2. CLOUD COMPUTING

Cloud computing has entered the thought of information technology, providing quantify ability in the delivery of enterprise applications and package as a Service (SaaS). Corporation's unit of measurement presently migrating their data operations to the cloud. Many cloud suppliers can afford your data to be either transferred via your ancient net affiliation or via a fervent direct link. The nice issue regarding an on the spot link into the cloud will make certain that your data is uncontained that the traffic is not crossing the online and so the standard of Service are controlled. Cloud computing in simple terms suggests that accessing data and programs from a centralized pool of calculating resource that may be ordered and consumed on demand. Sometimes clouds deployments space unit delineated in 3 altogether totally different models; Public, personal or Hybrid.

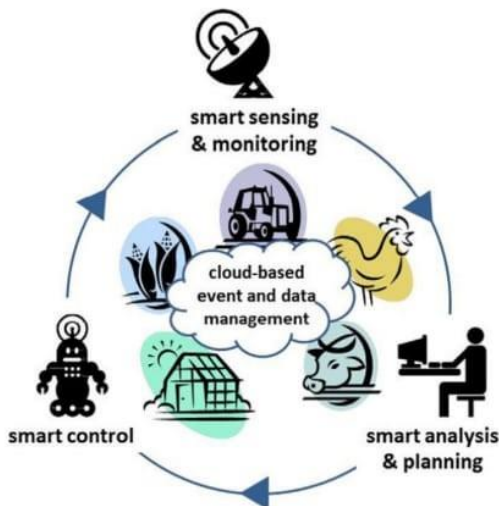


Fig-2: Cloud Computing

## 3. LITERATURE REVIEW

A paper within which soil parameters like pH, humidity, wet and temperature are measured for obtaining a high yield from the soil. This technique is absolutely machine-driven that turns the motor pump ON/OFF as per the amount of wet within the soil. The present field standing isn't intimidated to the farmer [1].

A paper to form irrigation system easier, the complexities concerned in irrigation is tackled with automation system victimization microcontroller and GSM. Supported the perceived values from soil wet, temperature and humidness sensors, and the GSM sends a message to the farmer once these parameters exceed the edge price set within the program. The nutrient content within the soil isn't determined by this method [2].

A sensible wireless sensing element network for watching environmental parameters mistreatment Zigbee. These nodes send information wirelessly to a central server, that collects information, stores it and permits it to be analyzed then displayed as required and even be sent to the shopper mobile. Forecasting and nutrient content isn't determined during this system [3]

We propose a versatile platform able to deal with soilless culture wants fully recirculation greenhouses mistreatment moderately saline water. It's supported exchangeable low-cost hardware and supported by a three-tier open supply software package platform at native, edge and cloud planes. At the native plane, cyber-physical systems (cps) act with crop devices to collect knowledge and perform time period atomic management actions. IoT protocols like message queue mensuration transport (MQTT) or strained application protocol are wont to communicate with Hertz, whereas next-generation service interface is utilized for southward and north access to the cloud. A multi-tier platform has been developed, based mostly on: (1) a Hertz native layer connected with greenhouse facilities; (2) a completely unique edge computing plane wherever to insert management modules in virtualized nodes close to the access network; and (3) a cloud phase supplied with higher computing and knowledge analytics resources to support crop management selections [4].

This work develops and checks a cheap sensor/actuator network platform, based mostly on the web of Things, integration machine-to-machine and human-machine-interface protocols. Edge computing uses this multi-protocol approach to develop management processes on preciseness Agriculture eventualities. The system developed provides new ways that} of access to info which is obtained simply with the communication services. Users will act with applications through straightforward conditional statements and quickly adapt to ever-changing processes requirements: the method management may be custom-made to real desires in less time [5].

A Wireless device Network has been designed and enforced that permits for agricultural atmosphere knowledge assortments like temperature, wetness, and lightweight. Every device node will transmit observance knowledge to the cloud. Data processing techniques were used with the aim of distinguishing activity patterns given the atmosphere conditions captured by the device network. The technology that was developed during this project is basically a support and management tool for the agricultural sector, whose results will reach alternative sectors. it's hoped that the prognostic system that's being developed influences directly with deciding in relevance the adequate management of the agro-ecological parameters of temperature, physical property, and ratio, that directly have an effect on within the traditional growth of crops[6].

The unwelcome person detection system is finished with the assistance of the PIR device wherever the bird's area unit repelled from going in the sector. The GSM module has been wont to establish a communication link between the farmer and also the field. the present field standing is intimated to the farmer through SMS and conjointly updated within the webpage. The farmer will access the server concerning the sector condition anytime, anyplace thereby reducing the person power and time. The most objective of this sensible irrigation system is to create it additional innovative, user-friendly, time-saving and additional economical than the prevailing system. Measure four parameters like soil wet, temperature, wetness and hydrogen ion concentration values {and therefore the conjointly the} system also includes unwelcome person detection system[7].

Precision agriculture includes a group of technologies that mix sensors, info systems, increased machinery, and knowledge management to optimize production by accounting for variability and uncertainties at intervals agricultural systems. Adapting production inputs site-specifically at intervals a field and one by one for every animal permits higher use of resources to take care of the standard of the atmosphere whereas up the property of the food provided. exactitude agriculture provides a way to observe the food production chain and manage each amount and quality of the agricultural manufacturer[8].

This paper presents Associate in Nursing ASCII text file technology based mostly sensible system to predict the irrigation necessities of field exploitation the sensing of ground parameters like soil wetness, soil temperature, and environmental conditions alongside the prognosis knowledge from the net. The sensing nodes, concerned within the ground and environmental sensing, take into account soil wetness, soil temperature, air temperature, Ultraviolet (UV) light-weight radiation, and the ratio of the crop field. This paper proposes an Associate in Nursing {based|based mostly|primarily based mostly} sensible irrigation design alongside a hybrid machine learning based approach to predict the soil wetness. The planned formula uses sensors' knowledge of recent past and also the weather forecasted knowledge for prediction of soil wetness of forthcoming days. The expected price of the soil wetness is healthier in terms of their accuracy and error rate [9].

A paper within which the wetness and soil wetness sensors are placed within the root zone of the plant. Supported the perceived values the microcontroller is employed to manage the provision of water to the sector. This method doesn't intimate the farmer concerning the sector standing [10].

#### 4. OBSERVATION AND DISCUSSION

The papers are discussing about the Automatic Irrigation System using different methods and real time soil monitoring system, and they are using some storage technology such as Cloud Computing, Edge Computing. The communication mediums are used to communicate between the sensor and control unit. These ideas are mostly used in normal crop field from these discussion we got an idea to use a real time monitoring system by using CNC machine for Precision Agriculture. This idea can be implemented in green house for increasing the food production and reducing the usage of water from this we can produce the quality food product in a certain time period.

#### 5. CONCLUSION

In this work, the progressive of PA and IOT technologies in agricultural eventualities, are analyzed. PA presents difficulties to be enforced by farmers. These embrace cultural perception, lack of native technical expertise, infrastructure constraints, knowledge, and technology gaps and high start-up costs. Farmers ought to be concerned with in the style and integration of these technologies in their facilities. to carry out this resolution there ought to be ways in which to facilitate such integration. This work proposes a completely new technique to integrate the farmer among the event of recent solutions victimization low processing technologies and innovative communication paradigms. associate degree design supported to new levels of communication and method nodes of the technological core of the projected technique. each level performs a bunch of interconnected functionalities. The projected infrastructure can be put in either in already automatic installations or among the style of recent facilities. Among the already automatic installations, the strategy introduces new prospects for the event of intelligent and interconnected management. Degree experimental work has been allotted during a greenhouse. Throughout this work, communication nodes are put in and a current service supported an alternative tree paradigm has been designed by a skilled user. The facilities that use the projected model produce climate management and irrigation subsystems practical and allow the farmer to vogue new integrated management rules. The new distributed communication model permits the farmer to analysis changes and enhancements. This experimental work initiates a current methodology of labor for the farmer global organization agency will use these new technologies additional simply. Future management rules and services using a machine learning platform and AI paradigms can permit to optimize and improve the results.

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