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A Smart Agricultural Model by Integrating IoT

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Abstract: ***Internet of things (IoT) is a method consists of sensors or actuators or both that offer connectivity to the internet indirectly or directly. Internet of things (IoT) evolution used in smart farming to improve the quality of Farming. Farming is the backbone of the country economy; it contributes to the growth of the country's economic. The region farming becomes less productive due to the use of obsolete Agriculture technology. The paper shows, by modern technologies, control the cost, quality, and quantity of the farming. Accuracy in farming sensor monitoring network, is used greatly to measure agriculture information like humidity, soil PH, temperature, soil nutrition levels, water level etc. Rainfall and climate changes have been irregular over the past decade. Due to this, in the current era, climate-smart methods called smart farming is adopted by Indian farmers. Smart farming is a directed information and automated technology implement in the IOT. Internet of things is developing rapidly and widely applied in all wireless situations. This paper includes various features like detection of the server-based remote monitoring system, Humidity, and temperature sensing, Soil the Moisture Sensing etc. It makes use of sensors networks for measurement of moisture, temperature, and humidity instead of a manual check. Various Sensors are deployed in various locations of farms, to control all these sensors it has been used, one controller. The major objective is to collect real-time data of agriculture production environment that provides easy access for agricultural and advice on weather pattern, crops etc.***
Keywords: IoT, Sensor Network, Smart Agriculture technology, Remote Monitoring System

I. INTRODUCTION

In the last few years, much advancement has done in technologies likes Internet-of-Things, Big Data, cloud, and mobile computing. Today, the world is moving on in the direction of the smart world concepts like smart cities, smart homes, smart work etc. Due to the inappropriate maintenance, the crop was damaged that causes a massive loss for a farmer and hence, the smart farming concept was introduced. Farming is the primary livelihood of Indian villagers. With the advent of farming, there has been much advancement that has crop up to improve the yield and help farmers in solving issues and crop diseases. In the past decade, it is observed that there is not much development in the agriculture sector. The reason behind was very less digitization done with respect to Indian villagers in his field. Now, with IOT, which help in creating a digital system for farming which help them in farming and make decisions and help him predict undesired situations in advance? With this, he improves the quality & quantity of crops and which will be beneficial for farmers. Whereas Automatic finding is beneficial than this long procedure of observations by the skilled person, Automation system of the soil components detection where the outcome comes by just monitoring the change in soil makes it cheaper and accurate. And thus, the technology help as in early detection of soil condition which help find best time for seeding of plants and aware farmer at the early stage. The present learning focused on the integration of sensor monitoring techniques with IOT. It has been achieved by interfacing different sensors to Raspberry Pi -3 module. To avoid severe loss in agriculture various Sensors is used to measure parameters like soil moisture, temperature, and humidity, fertilizer and contributes to the productivity of the farm. Website has been designed through which farmer is able to look at the current status of the crops. Uses of new internet technologies are also giving comfort to handle agricultural work. Food prices are continuously increasing because crop rate is declined. It has pushed over 40 million people into poverty since 2010[1]. There are a number of factors which are responsible for this; it may be due to water waste, low soil fertility, fertilizer abuse, climate change or diseases, etc. It is very essential to make an effective intervention in agriculture and the solution is IoT in integration with Wireless sensor networks. It has the potential to change the way of development in agriculture and gives a great contribution to make it smart agriculture. The internet of things involves a three-tier system. It includes the perception layer, network layer, and application layer. Perception layer includes sensor motes. Information communication technology (ICT) enabled devices, sensor motes are building blocks of sensor technology. It includes cameras, RFID tags, sensors and sensor network used to recognize objects and collecting real-time information. The network layer is an infrastructure of the IOT to realize universal service. It directs towards the combination of the perception layer and application layer. The application layer is a layer that combines the IOT with the technology of the specific industry. The internet of things almost applied in all areas of industry, including smart agriculture, smart parking, smart building environmental monitoring, healthcare transportation and many more.

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II. LITERATURE SURVEY

The analysis in agriculture space is increased in varied aspects to boost the standard and amount of productivity of agriculture. Researchers are worked on many alternative comes on soil attributes, totally different weather likewise as reconnaissance crops. Some comes worked on actual farm fields and a few worked on polyhouses. Researches of Financier University worked on plant nursery mistreatment Wireless device Technology [2]. Wireless device Network based mostly polyhouse watching system is explained in [3] which build use of setting temperature, humidity, greenhouse emission level and adequate light-weight detection modules. This polyhouse management technology provides automatic adjustment of polyhouse. In [4] authors have projected development of wsn based mostly higher than mentioned parameters for agriculture mistreatment ZigBee protocol and GPS technology. In some comes like [5] authors have designed Associate in Nursing enforced an approach in development of crops watching system in real time to extend production of rice plants. This technique has used motes with sensors to see leaf condition. Presently use of IoT has been projected in [6-8]. IoT offers platform to researches to keep up real time information and send alerts right away to farmers. IoT implementation offers easy accessibility to info that comes from device nodes. IoT is additionally used for product offer chain business method. Cloud design offers extra support to IoT in maintaining massive information of agriculture info viz. History information, soil properties, fertilizers distribution, image cultivation through camera and data collected through sensors, recording info etc. Authors have analysed collected information for locating correlation between setting, work and yield for traditional work model construction. Watching for adverse signs and fault detection [11]. In [9] authors have mentioned the applying of knowledge mining with the assistance of rail tool and analysis model mistreatment of machine learning algorithms.
In [10] authors have focused on crop watching. Info of temperature and downfall is collected as initial abstraction information and analysed to scale back the crop losses and to boost the crop production. They need used improvement technique to point out progressive refinement for abstraction association analysis. though authors mentioned higher than have projected several models in agriculture domain, the effective model is required that uses new technologies Associate in Nursingd provides an integrated approach to watch environmental conditions sporadically and varied soil properties of farm field through IoT devices and store these details at the central place within the cloud storage which ends in massive –data over the time [11]. It's additionally usable by multiple vendors or farmers United Nations agency enquire regarding crop yield maximization. Farmer will analyse this information for fertiliser necessities for current crop. It'll facilitate for good climate solutions and disaster bar.

III.PROJECTED DRAWBACK STATEMENT

This paper presents projected model for sensible agriculture to develop real time observation system for soil properties like temperature, moisture, pH scale and to implement call support consolatory models for tormenter warning, Crop malady identification victimization image Analysis and SMS primarily based alerts. It'll even be doable to regulate varied operations of the sector remotely from anyplace, anytime by mobile also as net application.

IV.PROJECTED DESIGN

Proposed system has 3 modules –

A. Farm aspect
B. Server aspect
C. Consumer aspect.

Farm aspect preparation is as shown in figure1. It consists of six ways as follows.

1) Sensing native agricultural parameters.
2) Identification of location of sensing element and knowledge assortment.
3) Transferring knowledge from crop fields for deciding.
4) Call support and early warming supported knowledge analysis, domain data and history generated.
5) Deed and management supported call.
6) Crop observation via camera Module.

The solar battery provides power for the sensors charging and server system put in outdoors, in order that the system is applicable in associate degree agricultural atmosphere albeit no external power is equipped. IOT serves the farm field through sensing native agricultural parameters, reliable transfer of information and intelligent call support and early warning", that corresponds to the 3 layers of IOT, namely as follows

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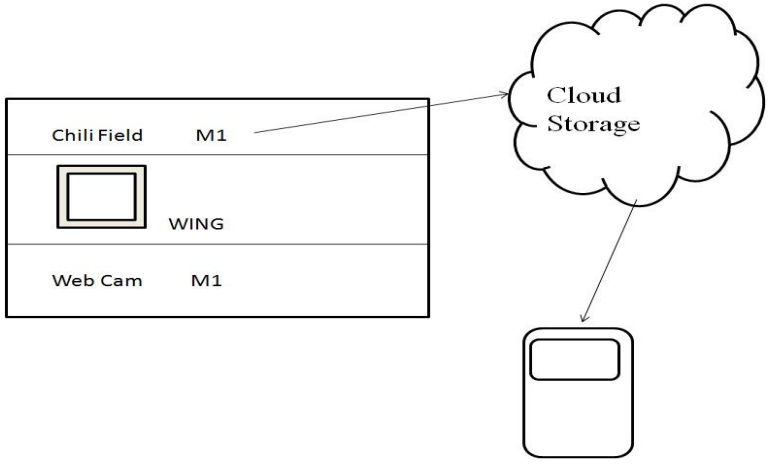
a) *Perception layer:* Primarily consists of Ubi-Sense atom as shown in figure two. Ubi-Sense atom (M) could be a generic sensing element board having Temperature and ratio, candlepower, atmospheric pressure, Proximity sensing and Buzzer. Ubi-Sense atom could be a generic sensing element board having Temperature and ratio, candlepower, atmospheric pressure, Proximity sensing and Buzzer. UbiSense reads values from sensing element, detects Proximity IR crystal rectifier associate decreed generates an alarm through Buzzer. It transmits the measured physical value from the Ubi-Sense atom over the Air. Net Cameras and DVR that work along for crop observation from that the observation of the stage of crop production and similarly spectral analysis of plant pictures is feasible to understand health condition of the plants in real time.

b) *Network Layer:* The network layer is chargeable for reliable transformation to application layer. It consists of Ubi-mote as shown in figure three compliant with IEEE 802.15.4 uses SoC with ARM Cortex money supply having External nonvolatile storage and supports to router and finishes device configurations like Ubi-Sense atom and appropriate for out of doors deployments. This method is able to do convenient wireless association and quick access to instrumentation at intervals a short-distance. ZigBee technique uses WINGZ (Wireless information processing Network entryway as shown in figure four for Zigbee fits small-size and cheap wireless network between WPAN and information processing network. It works as organizer device for the WPAN networks mounted on single board pc. It has its own unified management and observation console for varied wireless networks.

c) *Application Layer:* Within the application layer, the system will acquire and analyse weather info from the net, as well as prognosis within the previous days. The info stores sensors knowledge, streaming knowledge, earth science knowledge and environmental reference values for notifying conditions into every table, and creates average applied mathematics info by victimization the collected info. The DVR provides pictures taken from cameras to the net as streaming knowledge and stores them within the info. Once knowledge is gathered at the server, comprehensive analysis of such info is completed. It provides associate degree atmosphere that users will monitor knowledge processed by the parts through an internet browser anyplace and at any time. As an example by analysing soil wetness values, the system is in a position to stay spare amount of water required by the crop and at an equivalent time avoids an excessive amount of water which could drown the crops and cause waste.

V. PROJECTED METHODOLOGY

Farm field might have completely different crop areas. In this crop square measures UbiSense motes are put in. knowledge from Ubi-Sense atom are going to be transferred to Ubi-mote Server aspect module. Call web are going to be enforced for alerts, crop observation. Consumer aspect module consists of net application also as mobile application on golem OS as shown in figure five and figure half dozen.



VI. CONCLUSIONS

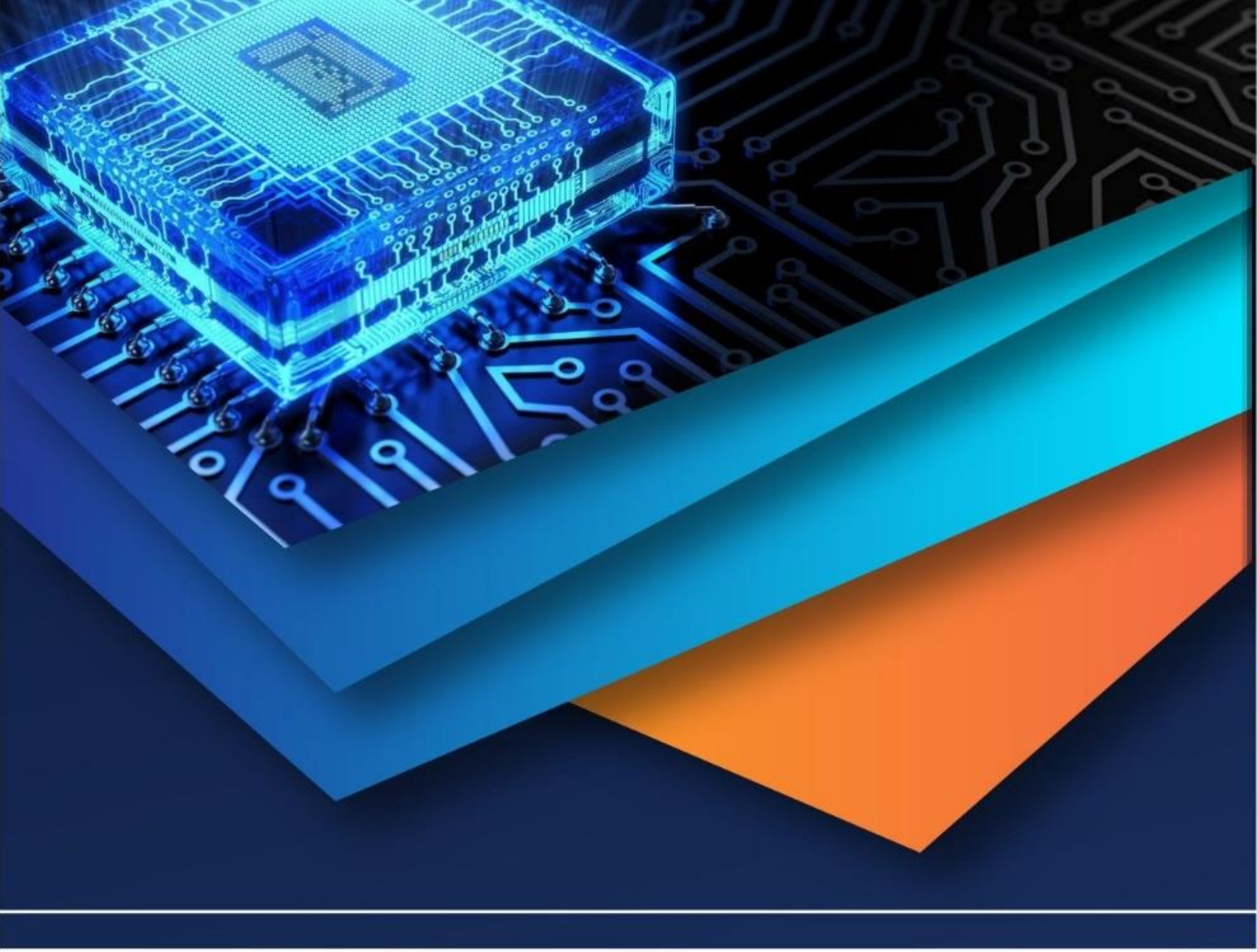
The paper proposes a wise agricultural model in integration with ICT. ICT have continually mattered in Agriculture domain. Village farmers might have planted the “same” crop for hundreds of years, however over amount, weather patterns and soil conditions and epidemics of pests and diseases modified. By victimization the projected approach, received updated info permits the farmers to address and even get pleasure from these changes. It’s extremely difficult task that must give such data as a result of extremely localized nature of agriculture information specifically distinct conditions. The whole period of time and historical atmosphere info is anticipated to assist to attain economical management and utilization of resources.

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