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Agriculture Crop Monitoring System

Mrs T. Rupa Rani[1], Laxmi Prasanna.Ch [2], Sagar Prashanth T[3] ,Bhargav.M[4]

Assistant Professor[1],UG Student[2], UG Student[3], UG Student[4]

Department of Computer Science & Engineering,

St .Peter's Engineering College, Kompally , Hyderabad

Abstract*-Internet of things (IOT) is Internet transforming the agriculture sanctioning the farmers with the wide selection of techniques like preciseness and property agriculture to face challenges within the field. IOT technology helps in collecting info concerning conditions like weather, moisture, temperature and fertility of soil , Crop on-line watching enables detection of weed, level of water, gadfly detection, animal intrusion in to the sphere, crop growth, agriculture. IOT averages farmers to urge connected to his farm from any place and anytime. Wireless sensing element networks square measure used for monitoring the farm conditions and small controllers square measure used to control and automatise the farm processes. to look at remotely the conditions within the type of image and video, wireless cameras are used. a sensible phone empowers farmer to keep updated with the continued conditions of his agricultural and mistreatment IOT at any time and any a part of the globe. IOT technology will scale back the price and enhance the productivity of ancient farming.*

Keywords—component, formatting, style, styling, insert (keyword).

I. INTRODUCTION

In 1995, "thing to thing" was coined by Gates. In1999, IoT (Internet of Things) was come back up by EPC international.IOT interconnects human to issue, issue to issue and human tohuman. The goal of IoT is bring out an enormous network bycombining differing types connected devices. IoT targets 3aspects Communication, automation, price saving during a system.IOT empowers individuals to hold out routine activities exploitation internet and therefore saves time and price creating them a lot ofproductive. IOT permits the objects to be detected and/orcontrolled remotely across existing network model. IOT inenvironmental observation helps to grasp concerning the air andwater quality, temperature and conditions of the soil, and alsomonitor the intrusion of animals in spheriot can evenplay a major role in exactness farming to boost theproductivity of the farm.

II.LITERATURE SURVEY

Balaji Banu [1] designed a wireless detector networks toobserve the conditions of the farming and increasing the cropyield and quality. Sensors square measure wont to monitor completely differentconditions of atmosphere like water level, humidity,temperature etc., The processors ATMEGA8535 and ICS8817BSr, analog to digital conversion and wireless detectornodeswithwireless transceiver module supported zag beeprotocol square measure employed in the planning the system. info andweb application is employed to retrieve and store knowledge. In thisexperiment the detector node failure and energy potency square measuremanaged.

Liu Dan [2], Joseph Haule, Kisangiri archangel [3] and WangWeihong, Cao Shuntian [38] dispensed experiments onintelligent agriculture greenhouse observance system supported ZigBee technology.

The system performs knowledge acquisition,processing,transmission and receptionfunctions.Theaimoftheir experiments is to appreciate greenhouse atmosphere system,where the of system potency to manage the atmospherearea and cut back the money and farming price and conjointly saveenergy. IOT technology here relies

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on the B-S structure andcc2530 used like process chip to figure for wireless detectornode and organizer. The entryway has operational system} operatingsystem and cortex A8 processor act as core. Overall the planningrealizes remote intelligent observance and management ofgreenhouse and conjointly replaces the normal wired technologytowireless,conjointlyreduces hands price.Joseph haule [3],Dragoş Mihai Ofrim, Bogdan AlexandruOfrim Associate in Nursingd Dragoş Ioan Săcăleanu [18] have planned anexperiment that explains the employment of wsn employed in automatingirrigation. Irrigation management and rescheduling supported wsnare powerful solutions for optimum water management through automatic communication to understand the soil wetconditions of irrigation style.The method used here is to determine the right frequency and time of watering square measure important to make sure the economical use of water, prime quality of crop detection delay outturn and cargo. Simulation is completed for agriculture by OPNET. Another style of wsn is deployed for irrigation system exploitation zag bee protocol which can impact battery life. There square measure some drawbacks as wsn continues to be beneath development stage with unreliable communication times, fragile, power consumption and communication are often lost in agricultural field. therefore change irrigation system and Agricultural Crop observance using IOT- A Study Dr. D.K. Sreekanth, Kavya.A.M Professor, Department of engineering and Engineering, NMAM Institute of Technology, Nitte, Karnataka, India,uses low power and a coffee rate and thus energy economical technology. All the devices and machines controlled with the help of inputs received via sensors that area unit mixed with soil. Farmers will analyze whether or not the system performs in commonly or some actions area unit have to be compelled to be performed.

Vijay Kumar [4], Lin Zhang, Min yuan, Deyi Tai, Xia Oweixu, Xiang Zhan, Yuanyuan Zhang [13] studied the wok of rural farming community that replaces a number of the traditional techniques. The sensing element nodes have many external sensors specifically leaf condition, soil wet sensing element, soil pH, atmospheric pressure sensors hooked up thereto. supported the soil moisture sensing element the speck triggers the water sprinkling throughout the period of water scarceness and switches off when adequate water is besprent. This leads to conservation and soil pH is distributed to the bottom station and successively base station intimates the farmer regarding soil pH scale via SMS exploitation GSM model. This information helps the farmers to scale back amount of fertilizers used.

A development of rice crop watching exploitation WSN is proposed to produce a aid to farmers in real time monitoring and increasing the rice production. The machine-controlled control of water sprinkling and supreme provide of knowledge is enforced exploitation wireless sensing element network. G. Nisha [5], Chun-ling Fan, Yuan Guo [10] projected a wireless sensing element based mostly machine-controlled irrigation system to optimize water use for agricultural purpose. The system consists of distributed wireless sensing element network of soil wet, and temperature sensors mounted within the crop field. Zigbee protocol is used to handle the sensing element info and water amount programming exploitation algorithmic rule with threshold values of the sensors sent to a small controller for irrigation system. Data inspection is finished exploitation by exploitation electrical device and cellular internet interface. A wireless camera is fastened in crop field to monitor the sickness space exploitation image process technique. Meng Ji-hua [6] conducted a pursuit on growth of cereal crop seedlings, still because the standing and trend of their growth.

This paper introduced the look, strategies used and implementation of a world crop growth watching system, which satisfies the requirement of the world crop watching within the world. The system uses 2 strategies of watching, which are real-time crop growth watching and crop growing method monitoring. period crop growth watching might get the crop growing standing certainly amount by examination the remote perceived knowledge (NDVI, for example) of the amount with the data of the amount within the history (last year, mostly).

The differential result was classified into many classes toreflect the condition at distinction level of crop growing. In this system, each period crop growth watching and crop growing method watching area unit distributed at 3 scales, which area unit state (province) scale, country scale and continentscale. world crop growth watching system

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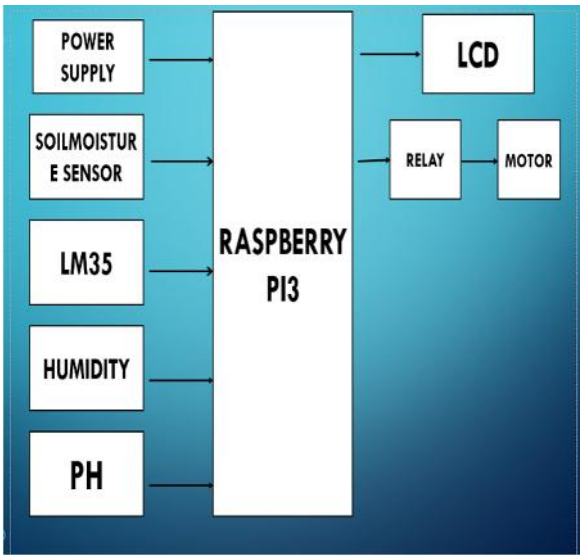
was found during thisdesign and engineered a system that may monitor the world cropgrowth with remote sensing knowledge. The system showed the characteristics of quick, effective, high credibleness andoperational in its run.



Data Flow diagram

Alan Main-waring [7], A.Sivasankari, S. Gandhimathi[36] have provided associate degree in-depth study of applying wirelesssensor networks to real-world surroundings observance. A set ofsystem style needs square measure developed that cowl thehardware style of the nodes, the look of the sensing element network,and the capabilities for remote knowledge access and management.To evaluate this implementation, have deployed associate degree initialprototype network at the James San Jacinto MountainsReserve (JMR) in Idyllwild, California. JMR could be a 29-acreecological preserve, representing only 1 of the University ofCalifornia System Natural Reserve System's thirty four land holdings.JMR climate is totally different from GD and weather changes willexists for durable. the information assortment will be created straightforwardfrom antecedently inaccessible employing a micro-measurement scale.Lei Xiao [8] Fiona Edwards potato, Emanuel Popovici, Yunseop Kim [14], R. Balamurali, K. Kathiravan [15]have planned the planning for wireless detector network (WSN)for a water irrigation management and observance that's composedof variety of detector nodes with a networking capability thatis deployed for Associate in Nursing ad-hoc for the aim of in progressmonitoring. The parameters employed in the water reservationcontrol are water levels and motor movement of the gatecontrolling the flow of water that is measured by the sensors,whichwillsense the condition and forward it to base station orcontrol area. This planned system offers an occasional powerconsumption with high responsibleness supported the result.

The useof high power WSN is appropriate for tasks in industriesinvolving large space observance like producing, miningconstructing, etc., The system mentioned here is incredibly simple toinstall and therefore the base station are often placed at the native residenceclose to the realm of observance wherever an individual needsminimal coaching at the start of the system installation.Giuseppe Anastasi [16] designed a WSN-based system tomonitor the productive cycle of high-quality wine in an exceedingly Sicilian winery. This project aimed to make sure overall smart quality ofthe production. the {planningthe look} incorporates correct planning infield, the hold on product preservation. Wireless detectorNetworks are deployed because the sensing infrastructure ofdistributed system to manage example productive chain,nodes are deployed each within the field and within the cellar,where wine aging is made. the information is collected at a mainunit so as to method inferences that counsel timelyinterventions that preserve the grapes quality.Rwan Mahmoud [17], Chen XianYi, Jin Zhi Gang, YangXiong [33] describes the safety problems with net of Thingswhich are directly associated with the wide application of the system.Beginning with the design and options of IOT, expandsmany security problems that exist in 3 stratified architectures,and came up with solutions to the problems. the protection measuresconcerned with it, those regarding perception layer are particularly viewed, together with algorithmic rule and keymanagement, security routing protocol and knowledge fusiontechnology, similarly as authentication and access management, etc.Dragoş Mihai Ofrim [18], Zulhani Rasin, Hizzi HamzahMohd, Shahrieel Mohd Aras [24] designed Associate in Nursing improvedsystem for environmental observance and dominant in termsof potency, flexibility and performance.

Some parametersthat are taken into thought are resolution,accuracy, acquisition rate, energy consumption, flexibility etc.,The designed system permits multi-point observance at anylocation, with none would like of wired affiliation and haveintelligent sensors. The measure purpose density offers highaccurate knowledge even from the remote locations. A split is made,in terms of physical affiliation, between the measure,monitoring and management elements, creating the system veryflexible. The disadvantage of this technique is concerning powerconsumption, that could be a key issue of wireless detectornetworks. Therefore, the detector nodes need an honest resourcemanagement in network. This paper uses zag bee protocol Improvements and more developments of this techniquepredicts: energy resources, algorithms for energysaving, magnified property and reduced traffic. To monitorthe parameters from a bigger distance, this technique might besupplied with GSM or Wi-Fi transmitters, to be able totransfer the knowledgethroughexistingtelecommunicationnetworks.Rachel Cardell-Oliver [19] delineated the look andimplementation of a reactive event driven network forenvironmental watching of soil wetness and evaluates theeffectiveness of this answer. a unique feature is to form asolution is its reactivity to the environment: once rain fallsand soil wetness is dynamic speedily, measurements square measurecollected oft, whereas throughout dry periods betweenrainfall event measurements square measure collected abundant less usually.Reactivity permits to target dynamic responses and limit theamount of useless knowledge gathered, further as uprobustness and network period of time. the most aim of thisexperiment is to demonstrate a reactive device network thatcan deliver helpful knowledge on soil wetness responses to precipitation.The Pin-jar network meets the goal of providing helpful knowledge ondynamic responses of soil wetness to precipitation. Future workwill target addressing the constraints of the presentprototype in lustiness of packet delivery and network longevity, and in guaranteeing network response to events ofinterest. Authors commit to generalize event-condition-actionframework for programming reactive device networks.Duan Yan-e [20] explained the agricultural datatechnology (AIT) wide applied to each a part of agricultureand goes to become the foremost economical suggests that and tools for enhancing agricultural production and for creating use ofcomplete agricultural resources. Agriculture dataManagement affects the vary of agricultural data andefficiency of agricultural production. during this experiment, onthe count of introducing the construct of agriculturalinformation management and analyzing a number of the optionsof agricultural knowledge, the look technique and design ofIntelligent Agriculture MIS was designed thoroughly, finally, theproposal provides AN implementation illustration of system inagricultural production.Fiona Edwards Irish potato [21] projected system usesWireless device Network (WSN) technology to watch ahoneybee colony and collect data concerning activity at intervalsa beehive further as its close space. The project uses lowpower WSN technologies, as well as novel sensing techniques,energy neutral operation, and multi radio communicationsincluding cloud computing to watch the conditions at intervalsthe colony. WSN is fashionable new technology, it's a necessaryconcept of the net of Things. an entire answer ispresented as well as a wise hive communication with knowledgeaggregation and image tools. Future work can targetimproving the energy performance of the system, introducinga additional specialised set of sensors, implementing a machinelearning algorithmic rule to extract that means from the info while not human supervision; and securing further deployments ofthe system.P. Tirelli, N.A. Borghese [22] found that observation gadflyinsect population is presently a issue in crop protection. Thesystem here is presently supported a distributed imaging device operated via a wireless sensing element network that's ready toautomatically capture and transmit pictures of unfree areas toa remote host station. The station validates the density ofinsect evolution at totally different farm locations associate degreed produces analarm once insect density goes over threshold. The clientnodes area unit unfold within the fields, that act as observation stations.The master node coordinates the network and retrievescaptured pictures from the consumer nodes. throughout a observationperiod of 4 weeks the network in operation often, predictsa gadfly insects' population curve correlative to daily analysisobtained by visual observations of the lure and therefore thefeasibility is set.Nguyen Tang Kha Duy [24], K.Sathish Kannan andG.Thilagavathi [35] found a flexible

answer in a shot ofimproving the accuracy in observation the environmentalconditions and reducing human power for industrialhousehold's shrimp farming.

The element is capable ofcollecting, analyzing and presenting information on a Graphical UserInterface (GUI), programmed with science laboratory read. The projectedsystem saves the price of hiring labor in addition because the electricityusage. The system style proposes a flexible, low-cost, andcommercial version which is able to perform best for tiny medium size farming operations because it doesn't need anyrenovation or reconstruction of the lake. This methodology isupdating the sensing element data and reflective the $64000 factorsof environmental shrimp fanning. at this time this technique conjointlyprovides several choices that area unit user friendly permitting theupdates to farmer with all the mandatory farming factorsresulting in sensible production.

The system has high quantifiabilityfor households or farming businesses on an oversized scale. Authorsproceeds to check the reliableness of the system in real worldapplications.Zulhani Rasin [25], Wang advisement and Cao Shuntian[39] bestowed an overseas intelligent observation system(RIMS)based on ZIGBEE Wireless sensing element Network (WSN). In RIMSdata is transmitted to the dominant center through ZIGBEEMesh Network and also the remote are going to be offered. Theredundancy router nodes area unit designed to boost thetransmitting reliableness. This paper uses the wireless meshnetwork rather than inserting the cables within the field, to avoidcable issues and preparation. Except the wireless centralreceiver, the system can continue operating as was common just in case offailure of any node.R. Balamurali [26], Narut Soontranon, PanwadeeTangpattanakul,Panu Srestasathiern, Preesan Rakwatin [32],Chen XianYi, Jin Zhi Gang, principle Xiong [33] have mentionedprecision agriculture for time period observation ofenvironmental conditions of a farm like temperature, humidity, PH etc.

The values of monitored parameters are communicated to the remote server in order to takeappropriate action, instead an actuator or an automated systemcan also be used to take appropriate action based on themeasured parameters over a period of time. This paperanalyzes the various routing protocols like AOMDV, AODVDSR and Integrated MAC and Routing protocol (IMR) forprecision agriculture using WSN. This analysis drawsconclusions that Integrated MAC and Routing Algorithm isbest suitable for multi-hop routing for precision agriculture using Wireless Sensor Network (WSN) in-terms of Networklife time. The network lifetime is considered as thetime at which the first node in the WSN dies. The work may beenhanced to analyze other network parameters like throughputand end-end delay.Sonal Verma [27], Chen XianYi, Jin Zhi Gang, YangXiong [33], A. Sivasankari and S. Gandhimathi [36] haveexperimented the potential utility of an inexpensive cameraobservation system called crop phonology recording systemwhich is as an alternative approach for the observation of cropgrowth condition.

The design explored the availability of day time exposure values recorded in the header region of EXIFformatteJPEG files by RGB and NIR-cameras and proposedusing vegetation indices, ev-NDVI, ev-SR, and CIgreen,which were calculated from the combination of daytime exposure values and cDN. The study found that ev-VARIworked the best for maize and ev-CIgreen for soybeans whenestimating green LAI. ev-VARI was also the best in estimatinggreen leaf biomass in maize and NRBINIR in soybean. Thiscamera-based vegetation index has possibility to estimate awide variety bio-physical parameters, a choice for highfrequencyobservations at many locations of vegetation.

Elias Yaacoub [28], K.Sathish Kannan, G.Thilagavathi[34] proposed the deployment of a wireless sensor network to monitor and analyze air quality in Doha. Data stored on theserver is subjected to intelligent processing and analysis in

order to present it in different formats for different categoriesof end users. This experiment brings out a user-friendlycomputation of an air quality index to disseminate the data tothe general public and also the data presentation for environmental experts using dedicated software tools, for example- the R software system and its Open-air package.Depending on the target end-user the stored data can beaccessed and displayed in different formats.

Jinhu Liao [30], Chen XianYi, Jin Zhi Gang, Yang Xiong[37], Weimin Qiu, Linxi Dong, Haixia Yan,

Fei Wang [38]have proposed a remote monitoring system, which can monitor agricultural land in real time and makes gooddecisions. The system collects data from a farm by using ZigBee modules, which makes data fused by using highperformance controller ARM micro controller and transfersthe data to a remote computer by using GPRS modules to takean informed management decisions by using computer.This

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not only a solution to improve the level of agriculturalproduction, but also to reduce human the costs very effectively.Nelson Sales [31] experimented with interconnection ofsmart objects embedded with sensors that enabled them tointeract with the environment and among themselves, forminga Wireless Sensor Network (WSN). These network nodesperform acquisition, collection and analysis of data, such astemperature and soil moisture. This type of data can be appliedto automate the irrigation process in agriculture for decreasingthe water consumption, which would result in monetary andenvironmental benefits. Authors proposed to use cloudcomputing which has the high storage and processingcapabilities, the rapid elasticity and pay-per-use characteristicsmakes an attractive solution to the provided might help researchers to highlight issues in the agriculture domain.

III. CONCLUSIONS

Internet of Things has enables the agriculture crop monitoringeasy and efficient to enhance the productivity of the crop andhence profits for the farmer. Wireless sensor network andsensors of different types are used to collect the information ofcrop conditions and environmental changes and theseinformation is transmitted through network to thefarmer/devices that initiates corrective actions. Farmers areconnected and aware of the conditions of the agricultural field at anytime and anywhere in the world. Some disadvantages incommunication must be overcome by advancing thetechnology to consume less energy and also by making user interface ease of use.

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