A Survey on Agriculture Using Internet of Things

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Available online at: www.ijcseonline.org

Abstract— The internet of thing is a system of physical articles that can ready to gather and trade information utilizing installed sensors. The reason for this is to plan and build up a horticultural field checking framework utilizing Internet of things to expand the efficiency and nature of cultivating without watching it for all the time physically. IoT is quick developing innovation that helps in gathering data about conditions like humidity, temperature, moisture, and soil fertility, level of water, rain sensor, animal detection and agriculture. IoT innovation encourages agriculturists to get joined to his homestead from anyplace and whenever. The farm conditions are monitored by wireless sensors and micro controllers are used to control and automate the farm processes. IoT enables the farmers to view farm conditions remotely in the form of images. The ongoing condition of agricultural land is keep updated to farmers through smart phone using IoT at any time and any part of the world. It can also reduce the cost and enhance the productivity of traditional farming.

Keywords— Internet of Things (IoT), Large Scale Pilots (LSP), Agriculture monitoring, Sensors.

I.   INTRODUCTION

Internet of Things (IoT) is widely used in collecting data from sensors and connecting devices. Some examples of IoT are Smart Cities, Smart Metering, Security and Emergency, Industrial Control Smart Environment, Smart Water, Smart Agriculture, Home Automation, e-Health etc [3].The main challenges facing in agriculture sector are heterogeneity of the sector, business models and business confidentiality, farm sizes and capital investment costs, lack of connectivity, data processing power, lack of clear data governance, user and societal acceptance, Data security and privacy [2]. IoT based research is going and launching new products on everyday basis to make the actions smarter and better production in agriculture. The lot of activities are required in agricultural production such as like plant and soil monitoring, environmental monitoring like temperature and moisture, supply chain management , transportation, animal monitoring, control systems management, infrastructure management, pest control etc. IoT based agricultural meeting technology creates high significance in terms of quality and improved production and also reduces trouble on farmers in sufficient manner.

The objective of this research paper is to propose Agricultural Field Monitoring using Internet of things for improving Crop Productivity. This method collecting information about conditions like humidity, temperature, moisture, and soil fertility, level of water, rain sensor, animal detection and agriculture.

II.   RELATED WORK

Dr. D.K. Sreekantha et.al., have studied Agricultural Crop Monitoring using IoT. The Internet of things enables the farmers to face challenges in agriculture. IoT expertise helps in collecting information about conditions in the agriculture field. Farmers can easily get connected to his farm from anywhere and anytime with the use of IoT. The farm conditions are monitored by wireless sensor networks and micro controllers are used to organize and computerize the farm processes. The ongoing conditions of agricultural land are keeping updated to farmer through smart phone [1].

B. Balaji Bhanu et.al., proposed a system to monitor agricultural farm for improving the productivity and quality of farming using wireless sensor network without observing it for all the time manually. In agriculture the most important factors are temperature, humidity and carbon dioxide for quality, productivity and growth of plants. The agriculture experts can measures the system parameters periodically. Many environmental parameters are continuously monitored for analyzing growth and productivity to achieve incredible energy savings [5].

Ji-chun Zhao et.al., have studied IoT technology and mobile wireless communication technology to accomplish

greenhouse-site monitoring. The greenhouse monitor system based on IoT expertise has certain accuracy of monitor and control. The system has obtainable a good growth condition, it is simple to operate, the interface is responsive, contribution the real time environmental factors in the greenhouse [4].

Prathibha S R1 et.al., used IoT technology to form a smart agriculture .IoT sensors are used to monitor the field and provide information about the field. Agricultural farm can be monitored by various sensors such as temperature, humidity using CC3200 single chip. Camera is used to capture images and videos and transmit through MMS to farmers mobile using Wi-Fi [3].

Christopher Brewster et.al., used IoT technology to develop an application in domain of food and agriculture particularly in the field of environmental and social sectors. It reduces the food waste and contributing to food safety. The sector and technological challenges can be overcome using IoT based large scale pilots (LSP) in the full supply chain [2].

III. PROPOSED WORK

There is a need to design a wireless agricultural environmental monitoring system based on IoT technology. ATmega328/P is the main block of this proposed system consists of microcontroller and serial monitoring is done by LCD. The agricultural farm is monitored by various sensors such as temperature sensor, moisture sensor, water level sensor, technical specifications, digital temperature and humidity sensor, animal detection sensor and soil moisture sensor. To observe remotely the state of interaction in the form of image and video, wireless sensors have been used. The ongoing condition of agricultural land is keep updated to farmers through smart phone using IOT at any time and any part of the world. IOT expertise can reduce the cost and improve the productivity of traditional farming.
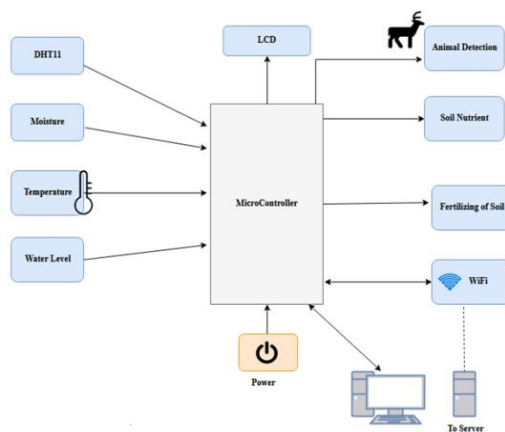

Fig1: Block diagram of proposed system

a) ATmega328P
The ATmega328/P gives the accompanying highlights: High Performance, Low Power AVR 8-Bit Microcontroller, Advanced RISC Architecture, High Endurance Non-unstable Memory Segments, and Peripheral gadgets, Special Microcontroller, I/O and Packages. The ATmega328P AVR is upheld with a full arrangement of program and framework advancement apparatuses including: Macro Assemblers, Program Debugger/Simulators, and C Compilers, In-Circuit Emulators, and Evaluation units. Small scale controllers are utilized to control and computerize the ranch conditions in farming. Sensors are accustomed to Monitoring the state of product field is especially vital.

b) LM35 Temperature Sensor
The LM35 is coordinated circuit temperature sensors. It tends to be caught or built up to a surface and the scope of surface temperature will be inside of $0.01°C$ .The air temperature is same as the surface temperature. The real temperature of LM35 kick the bucket would be at a transitional temperature between the air temperature and the surface temperature.

c) Soil Moisture Sensor
The dielectric permittivity of the sensor utilizes capacitance to gauge the dirt dampness. The sensor makes vitality relative to the dielectric permittivity, and furthermore the water substance of the dirt. Dampness is fundamental for plant development, so dirt dampness pointers not just guide in keeping vegetables and ornamentals sound amid times of starvation .It additionally encourages plant specialists choose when to water for the most part in dry atmospheres. At the point when the simple voltage water level is low, the water level will be low in the dirt and these simple voltages continue expanding as the conductivity flanked by the cathodes in the dirt changes.

d) Water Level Sensor
Water level sensor is utilized to screen the control of engine, which ensures a consistent protect of water in a capacity tank. These normal water level controllers are utilized to routinely fill the over-head tank when it begin or has transform into unfilled and additionally watch the water level in it.

e) Technical Specifications
Measures Temperature from - 55oC TO +125OC, Unique 1-Wire Interface, , Coverts temperature to 12-bit computerized word in 750ms.

f) DHT11 Digital Temperature and Humidity Sensor
DHT11 computerized temperature and moistness sensor is a melded Sensor contains an adjusted advanced flag yield of the stickiness and temperature. Utilization of a gave advanced modules accumulation mastery and the temperature

and mugginess detecting ability, to ensure that the item has high consistency and amazing long haul consistent quality.

g) Animal Detection Sensor

A PIR sensor is utilized to detect movement roughly whether a human has moved in or out of the sensors run. They are reasonable, little, low-control, simple to utilize and don't wear out.

IV. CONCLUSION

Web of Things (IoT) has conveyed defiance to every single field of human life by building the entire thing shrewd and smart. This framework gives dependable and proficient checking of agrarian homestead. The proposed framework can gather data about conditions like stickiness, temperature, dampness, and soil richness, dimension of water, rain sensor, creature discovery and farming. This work can abuse effective surroundings checking which will empower them to build to a great extent yield and nature of product. In future the live information can be feed into on the web and access date utilizing cloud.

REFERENCES

[1]. Dr. D.K. Sreekantha, Kavya.A.M Nitte,"Agricultural Crop Monitoring using IOT- A Study", Professor, Department of Computer Science and Engineering, NMAM Institute of Technology,Nitte, Karnataka, India, sreekantha@nitte.edu.in 2017 11th International Conference on Intelligent Systems and Control (ISCO).

[2]. Christopher Brewster, Ioanna Roussaki, Nikos Kalatzis, Kevin Doolin, and Keith Ellis "IoT in Agriculture: Designing a Europe-Wide Large-Scale Pilot", IEEE Communications Magazine ,September 2017.

[3]. Prathibha S R1, Anupama Hongal 2, Jyothi M P3 ,"IOT BASED MONITORING SYSTEM IN SMART AGRICULTURE", 2017 International Conference on Recent Advances in Electronics and Communication Technology.

[4]. Ji-chun Zhao ,Jun-feng Zhang, Yu Feng ,Jian-xin Guo "The Study and Application of the lOT Technology in Agriculture", 2010 IEEE.

[5]. B. Balaji Bhanu, K. Raghava Rao, J.V.N. Ramesh, Mohammed Ali hussain,"Agriculture Field Monitoring and Analysis using Wireless Sensor Networks for improving Crop Production", 2014 IEEE.

[6]. LIU Dan, Cao Xin, Huang Chongwei, JI Liang Liang, "Intelligent agent greenhouse environment monitoring system based on IOT technology", 2015 International Conference on Intelligent Transportation, Big Data & Smart City

[7]. Joseph Haule, Kisangiri Michael, "Deployment of wireless sensor networks (WSN) in automated irrigation management and scheduling systems: a review", Science, Computing and Telecommunications (PACT), 2014, Pan African Conference

[8]. S. Vijayakumar, J. Nelson Rosario, "Preliminary Design for Crop Monitoring Involving Water and Fertilizer Conservation Using Wireless Sensor Networks", Communication Software and Networks (ICCSN), 2011 IEEE 3rd International Conference.

[9]. G. Nisha, J.Megala, "Wireless Sensor Network Based Automated Irrigation and Crop Field Monitoring System", 2014 Sixth International Conference on Advanced Computing (IcoAC), International Conference.

[10]. Meng Ji-hua, Wu Bing-fang, Li Qiang-zi, "A Global Crop Growth Monitoring System Based on Remote Sensing", 2006 IEEE International Symposium on Geoscience and Remote Sensing, International Conference.

[11]. Alan Mainwaring, Joseph Polastre, Robert Szewczyk, David Culler, John Anderson, "Wireless Sensor Networks for Habitat Monitoring", International Conference.

[12]. 12. Lei Xiao, Lejiang Guo, "The Realization of Precision Agriculture Monitoring System Based on Wireless Sensor Network", 2010 International Conference on Computer and Communication Technologies in Agriculture Engineering.

[13]. Ling-ling LI, Shi-feng YANG, Li-yan WANG, Xiang-ming GAO, "TheGreenhouse Environment Monitoring System Based on Wireless Sensor Network Technology", Proceedings of the 2011 IEEE International Conference on Cyber Technology in Automation, Control, and Intelligent Systems, March 20-23, 2011, Kunming, China.

[14]. Chun-ling Fan, Yuan Guo, "The Application of a ZigBee Based Wireless Sensor Network in the LED Street Lamp Control System", 2013, College of Automation & Electronic Engineering, Qingdao University of Scientific & Technology, Qingdao, China embedded technology, Consumer Electronics - China, 2014 IEEE International Conference.

[15]. FuBing, "Research on the Agriculture Intelligent System Based on IOT", 2012 International Conference on Image Analysis and Signal Processing.

[16]. Wen-Yao Zhuang, Miguel Costa Junior, Pedro Cheong, Kam-Weng Tam, "Flood Monitoring of Distribution Substation in Low-Lying Areas Using Wireless Sensor Network", Proceedings of 2011 International Conference on System Science and Engineering, Macau, China – June 2011 (NESEA), 2012 IEEE 3rd International Conference.

[17]. Lin Zhang, Min yuan, Deyi Tai, Xia Oweixu, Xiang Zhan, Yuanyuan Zhang, "Design and implementation of granary monitoring system based on wireless sensor network node", 2010 International Conference on Measuring Technology and Mechatronics Automation.

[18]. Yunseop Kim, Member, IEEE, Robert G. Evans, and William M. Iversen, "Remote Sensing and Control of an Irrigation System Using a Distributed Wireless Sensor Network", Ieee transactions on instrumentation and measurement, vol. 57, no. 7, July 2008.