Paper Type: Original Article

Smart Phone Based Monitoring of Agricultural Activities

Jiahua Fang*

Faculty of Science, Yibin University, 644000, China; Fang_J@gmail.com.

Abstract

This review also looks at the various environmental characteristics that can be used to achieve precision agriculture, such as irrigation, monitoring, soil qualities, and temp, Furthermore, a thorough investigation is carried out on various crops that are covered by WSN technology. The numerous communication technologies and sensors available for PA are also highlighted in this review. Several research questions were developed to examine the influence of WSNs in the agricultural area, and we attempted to discover answers to these research questions through this revised. Compared to the being IoT grounded husbandry and husbandry results, the propose result reduces network quiescence up to a certain extent. In this, a cross sub caste grounded channel access and routing answer for looking and actuating is proposed. We dissect the network structure grounded on content range, and quiescence. In the process of improving GDP of the country agriculture is the main part.

Keywords: Smart farming, Internet of things, IoT in agriculture, Sensors.

1 | Introduction

Most of the developing countries are trying to improve their economic wealth based on the agriculture. Now in these modern days' technologies plays a typical role on the agriculture sectors and improve the farming methods [1]. Now a days based on the advanced features cultivation phases like watering, fertilising, harvesting can be done more and firstly in various diffident processes [2]. Now days we introduce smart sensors in the fields to check the water level and photo sensors to check whether the sufficient sunlight is available or not [3]. A sensor checks the nitrogen content and warns the farmer to allow the methods for proper fertilization. The study of various standard Internet of Things (IoT) techniques use in agriculture sector based on hardware and software is developing. Smart agriculture is introduced in this domain to improve the agriculture industries [4]. Many of the technologies like IoT, cloud services, Big Data, GPS are mostly using in agriculture. IoT is quite different from ordinary people who are from before days [5]. But now days in between smart technology and smart system IoT becomes more popular. IoT is an emerging field, it's playing a major role in most of all the fields and disciplines including [6].

I. Agriculture
II. Health sector
III. Aviation and transport
IV. Home automation
V. Defence and military applications

The collection and exchanging of the data of these objects is done by network connectivity [7]. IoT can make persons to operate machine, objects things without moving physically from our place [8]. For example, remote sensing or remote controlling. IoT checks the things which having different characters and connected to the network [9]. They were in between a slew of farming experts who synthesised WSN research. Despite the fact that these research contribute to the area of WSN from various angles, a structured systematic review based on There is still a need for a quantitative method, such as bibliometrics [10]. As a result, guided by the. We want to fill this gap by reviewing the existing research on WSN in [11]. In the agricultural sector, there are a variety of applications. More specifically, the goal of this inquiry is to elicit responses to the following inquiries [12]. In existing WSN-based solutions, we introduce Wild networks and Fog computing to span longer ranges with less delay. A cross-layer MAC and routing solution is proposed that adapts to traffic nature and sets duty cycle correspondingly to increase latency and throughput over multi-hop IoT [13]. We outline the test bed assessment techniques and analyse the suggested architecture's performance.

Data and information are sent to a base station or a hub, either directly or indirectly. As a result, there is a significant amount of Improvements in the decision-making process [14]. WSN's tremendous benefits and capabilities (e.g., monitoring, automation, optimization, etc.) have motivated various companies to invest in the technology [15]. Different sensors are used to sense different parameters, and various communication protocols are used to transmit data. Authors have looked into the current situation [16].

Components

I. Connectivity: All devices which are using sensors, and equipment should be connected to one another through a safe and securable network [17].
II. Things: In the context of the IoT, things can include biochip transponders on pets and farm animals, heart monitoring implants, electric clams in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring, or field operation devices that aid fire-fighters in search and rescue operations. Things can be actuators or sensors that collect data and send it across the IoT [18].
III. Data: Data is the glue that holds the IoT together and drives action and insight [19].
IV. Communication: Every component or entity communicates with one another in order to convey data or initiate system monitoring and control. The most common way to start a conversation is to use [20].

In many countries agriculture is the first preference for income. Farming and crops play a major role in increasing the countries welfare and property. Because of unexpected climate changes and lack of man power farming related jobs and farming sector becomes very difficult [21]. Agriculture is one of the sectors where IOT can be very much useful. The challenges for IOT in agriculture sector are:

I. Improper watering to plants.
II. Deficiency of needed fertilizers.
III. Unexpected attack of pests and insects.
IV. Unexpected changes in climate.
V. Occurrence of natural calamities.

Existing IOT applications are useful for facing the following challenges. IOT also can perform a greater task by using sensors in the farms to monitor various contents like water level, temperature level,

humidity level, soil pH values, fertilizer content in soil etc. There are many persons who researches in the field and make farming much easy and smart.

2 | Literature Review

We've gone through nearly 30 journal papers which bandy some smart husbandry ways. But during the logical review, we came to identify that the underpinning armature or conception used in some papers are analogous. So we meliorated our literature with a representative work from each cluster of papers using an analogous armature [22]. It can minimize the use of fungicides, effectively control weeds and pests, and achieve effective green perfection husbandry. WSN can smell and collect real- time data of colourful information changes in the process of agrarian product and give timely feedback to the druggies. The data analysis and processing results are encouraged to druggies to realize the effective operation of perfection husbandry [23]. WSNs are employed for the dimension of temperature, covering the terrain, dimension of irrigation system, and dimension of water force in agrarian operations. WSNs support the growers to induce high volume crops. Still, they bear a battery power force to give energy to detector bumps. These networks increase the quality and product of the crops which directly affect the frugality. Recent studies have plant that numerous problems in the perpetration of perfection husbandry will be gradationally answered with the operation and development of these connecting networks.

The main functions of their system are to supply water when the field is dry and removing redundant water from the field. The system consists of a water position indicating detector which senses the water position in the field and sends it to a mobile device. Their bedded IoT tackle consists of a detector and two water pipes one for pumping water and one for stinking the water from the field. Mongrel solar panels are connected to the system, though solar power is considered as the primary source of power for the system. Soil hygrometer is used to smell the humidity position in the soil. They are claiming that their system reduces mortal trouble and increases the productivity.

3 | Proposed Work

Instead of using traditional agriculture modern agriculture can be done by farmers in this modern word. In this paper the wireless sensor networks are used to monitor the crops. The farmer can measure the water level, humidity, moisture content and also the diseases affected in the crops. The sensors collect the related information and store it on the webserver. Immediately sends the related data to two members using already registered phone numbers. One is farmer and another one is nearby agriculture specialist. The agriculture specialist communicates with the farmer directly and suggests the pesticides. Both can look on the crops by their smart phones. The information is received through their smart phones.

The smart farm helps the farmer to yield high profit by growing the crop without infection and at exact soil moisture content. Due to automatic process it reduces the human effort and view the growth of crop through smart phone. The wireless communication reduces the cost of implementation. In future this is implemented for large area of land. The internet connectivity is required at all the time to communicate the data to farmer. The predefined prediction of weather condition helps the farmer to cultivate the crop based on weather condition. The smart mobile is used by all kind of people. The smart phone corresponds of multiple operations (apps). For ultramodern husbandry the special kind of app is designed to cover the husbandry land. These Operations can be penetrated through internet, which is connected to webserver. The planter can cover the land from anywhere. The husbandry specialist can also cover the land from anywhere and shoot the result to the planter through the operation itself. Numerous growers are connected to the Operation, they can also give their result to the infections on the crop.
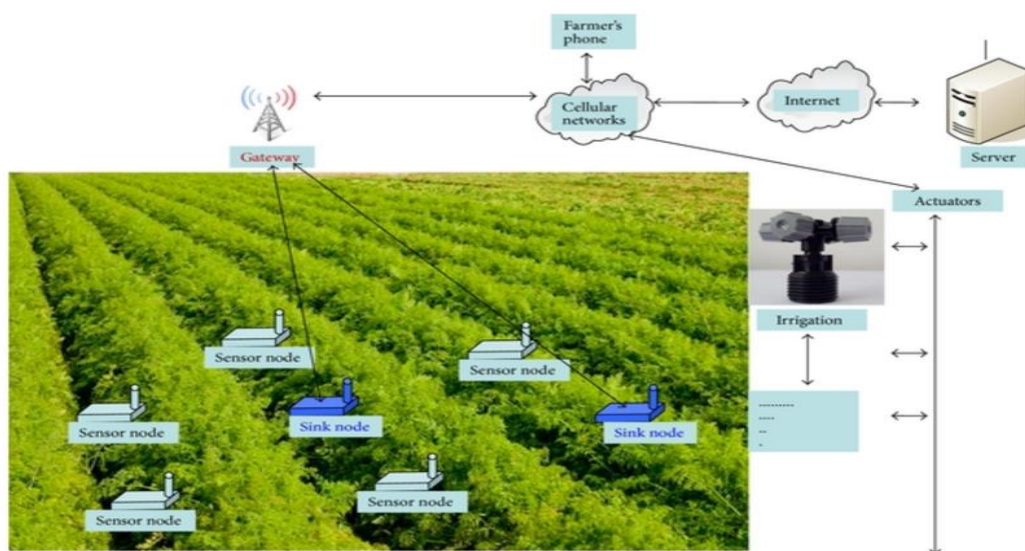
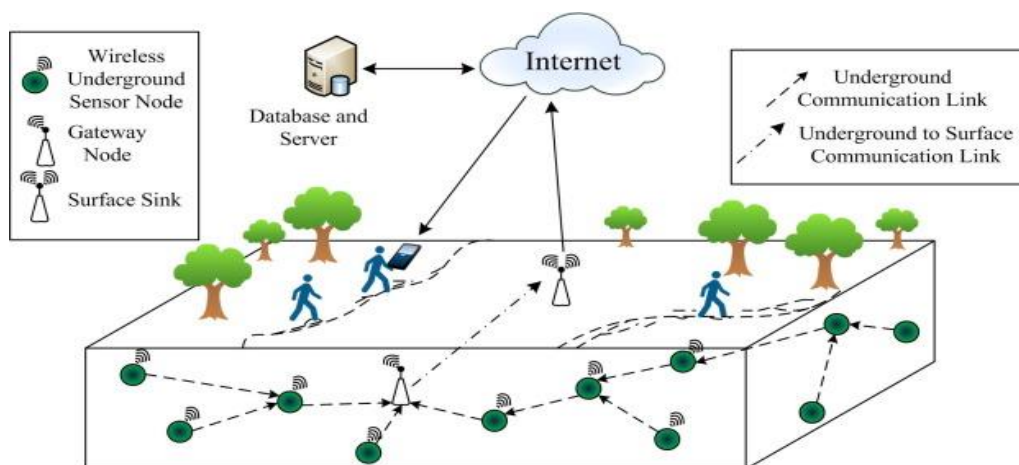**Fig. 1. Deployment of sensor node in agricultural field.**

Fig. 2. Working model.

4 | Conclusion

Agriculture can be done in this ultramodern world using numerous rearmost technologies. Then WSN are used for producing crop with high production and with less cost. Currently mortal beings aren't involved in Civilization. To reduce the trouble of mortal wireless detectors networks are used. Then detector bumps collect the data and shoot to growers as well as husbandry specialist. Using some fresh tackle and software information is transmitted to smart phones. The planter can operate mobile phones from anywhere at any time. This operation can group numerous growers into it and also the specialist. This is more suitable for husbandry dependent countries like India.

References

[1] Mohapatra, H., & Rath, A. K. (2020). Fault-tolerant mechanism for wireless sensor network. *IET wireless sensor systems*, *10*(1), 23-30.

[2] Mohapatra, H., & Rath, A. K. (2019). Fault tolerance in WSN through PE-LEACH protocol. *IET wireless sensor systems*, *9*(6), 358-365.

[3] Mohapatra, H., & Rath, A. K. (2019). Detection and avoidance of water loss through municipality taps in India by using smart taps and ICT. *IET wireless sensor systems*, *9*(6), 447-457.

[4] Mohapatra, H., & Rath, A. K. (2020). Survey on fault tolerance-based clustering evolution in WSN. *IET networks*, *9*(4), 145-155.

[5] Mohapatra, H., & Rath, A. K. (2021). Fault tolerance in WSN through uniform load distribution function. *International journal of sensors wireless communications and control*, *11*(4), 385-394.

[6] Mohapatra, H., & Rath, A. K. (2020, October). Nub less sensor based smart water tap for preventing water loss at public stand posts. *2020 IEEE microwave theory and techniques in wireless communications (MTTW)* (Vol. 1, pp. 145-150). IEEE.

[7] Mohapatra, H., & Rath, A. K. (2022). IoE based framework for smart agriculture. *Journal of ambient intelligence and humanized computing*, *13*(1), 407-424.

[8] Mohapatra, H., & Rath, A. K. (2021). A fault tolerant routing scheme for advanced metering infrastructure: an approach towards smart grid. *Cluster computing*, *24*(3), 2193-2211.

[9] Mohapatra, H., & Rath, A. K. (2021). An IoT based efficient multi-objective real-time smart parking system. *International journal of sensor networks*, *37*(4), 219-232.

[10] Mohapatra, H., & Rath, A. K. (2019). Fault tolerance through energy balanced cluster formation (EBCF) in WSN. In *Smart innovations in communication and computational sciences* (pp. 313-321). Springer, Singapore.

[11] Panda, H., Mohapatra, H., & Rath, A. K. (2020). WSN-based water channelization: an approach of smart water. In *Smart cities—opportunities and challenges* (pp. 157-166). Springer, Singapore.

[12] Mohapatra, Hitesh; Rath, Amiya Kumar: 'IoT-based smart water' [Control, Robotics & Sensors, 2020], 'IoT Technologies in Smart Cities: From sensors to big data, security and trust', Chap. 3, pp. 63-82, DOI: 0.1049/PBCE128E_ch3, IET Digital Library.

[13] Mohapatra, H. (2021, September). Socio-technical challenges in the implementation of smart city. *2021 international conference on innovation and intelligence for informatics, computing, and technologies (3ICT)* (pp. 57-62). IEEE.

[14] Mohapatra, H. (2020). Offline drone instrumentalized ambulance for emergency situations. *IAES international journal of robotics and automation*, *9*(4), 251-255.

[15] Mohapatra, H., & Rath, A. K. (2020). *Fundamentals of software engineering: designed to provide an insight into the software engineering concepts*. BPB Publications.

[16] Mohapatra, H. (2021). *Designing of fault tolerant models for wireless sensor network* (Doctoral dissertation, Ph. D Dissertation, Veer Surendra Sai University of Technology). Retrieved from http://hdl.handle.net/10603/333160

[17] Mohapatra, H., & Rath, A. K. (2020). Social distancing alarming through proximity sensors for COVID-19. *Easy chair*, *18*. https://wvvw.easychair.org/publications/preprint_download/dMGk

[18] Mohapatra. H. (2021). Smart city with wireless sensor network, ISBN-13: 979-8791261380, KDP, 2021.

[19] Mohapatra, H. (2018). *C Programming: practice.cpp*. Independently Publisher.

[20] Mohapatra, Hitesh; Rath, Amiya Kumar, 'Smart Bike Wheel Lock for Public Parking', Application Number: 336834-001.

[21] Mohapatra, H., & Rath, A. K. (2020). Advancing generation Z employability through new forms of learning: quality assurance and recognition of alternative credentials. DOI: 10.13140/RG.2.2.33463.06560

[22] Mohapatra, H. (2009). *HCR using neural network* (PhD's Desertion, Biju Patnaik University of Technology). Retrieved from https://www.academia.edu/29846341/HCR_English_using_Neural_Network

[23] Mohapatra, H. (2019). *Ground level survey on sambalpur in the perspective of smart water* (No. 1918). Retrieved from https://easychair.org/publications/preprint/CWpb