



SURVEY ON WIRELESS SENSOR NETWORK IN AGRICULTURE

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ABSTRACT - Wireless Sensor Network (WSN) associates the physical and computational world by observing ecological phenomena through pervasive gadgets called sensor hubs or bits. India positions second in agriculture exercises. The agriculture creation procedure is influenced by various factors, for example, temperature, light, soil humidity, soil moisture. Accuracy agriculture is a field which gives reasonable situations to the sending of wireless sensor networks (WSNs). WSNs give precise data about natural attributes to ranchers. This paper studies that different sorts of uses, protocols and presented to current agriculture system depends on constrained sensor innovation which make it unusable continuously agriculture condition by utilizing our system wastefulness of existing system is diminished.

Keywords: [Agriculture, WSN, Frequency, Iot, Satellite, Environment.]

1. INTRODUCTION

Agriculture has expected a critical employment in the improvement of human progress. Due to the extended interest of nourishment, additional undertakings and unprecedented systems are being made to copy nourishment generation. Present day agriculture requires a greater generation of nourishment to address the issues of the exceptional overall people. To achieve this target, new advances and plans are being applied in agriculture to give a perfect choice rather than get-together and getting ready information to improve profitability. Similarly, the aggravating environmental change and water shortage request beyond anyone's imagination procedures for ebb and flow green abuses. The prerequisite for automation by then appears, and smart fundamental administration is wrapping up

progressively basic to achieve this target. In this sense, advancements, for instance, inescapable preparing, wireless sensor networks (WSN), radio frequency modules (RFID), appropriated registering, Internet of Things (IoT), satellite checking, remote distinguishing, etc are twisting up continuously pervasive. The rising of wireless sensor networks has enlivened another course in agriculture. Starting late, WSNs have been comprehensively applied in various cultivating applications. Wireless sensor network (WSN) accept a key activity in each rising field like agriculture, military, natural, mechanical and examine. It can amass sensory data, method and transmit to base station through other sensor hubs in a network. The sensor hub is a noteworthy and key segment of WSN and it is prepared for handling, gathering significant data and

talking with various hubs which are a bit of the network. Every hub which is a bit of wireless network can move the data and they accomplish this using a wireless association. The Global Positioning System present on the hub helps in finding the right area of the hubs present in the predefined region. The arrangement of the sensor hubs uses implanted software for sensor preparing, vitality the board, locationing, etc. The implanted software wears down the application layer and it decide various interfaces on a sensor hub. Wireless Sensor Networks (WSNs) comprise of various unassisted inserted devices which methodology and transmit data assembled from different on-board physical sensors (temperature, humidity, weight, etc.,).

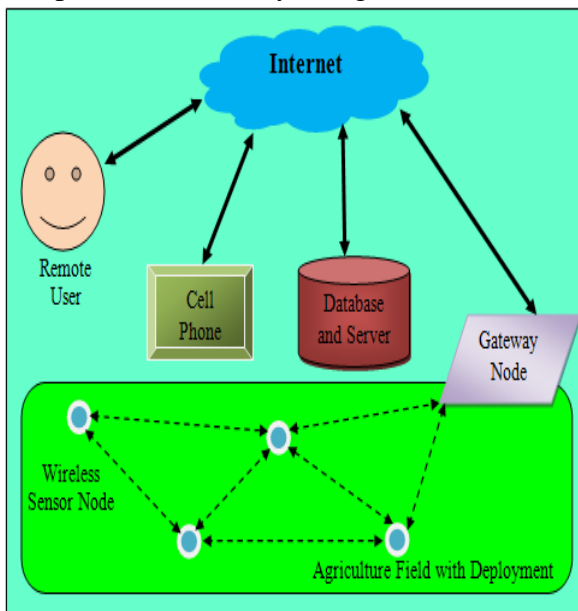


Figure 1: Agriculture in Wireless Sensor Network

For checking atmosphere variables including temperature humidity light air amount natural sensors are utilized. In this paper the advancement of system dependent on miniaturized scale controller. This system is lessening the wastefulness in the current system by creating multisensory shrewd information correspondence. This system utilizes various sensors to identify temperature water level, IR based

development, gas recognition and light force in agriculture condition and take a choice dependent on there qualities on went to trigger the water transfers for example water stream hand-off, ground transfer, water outlet hand-off. This is useful to choose the water system example of the system. This new innovation improves efficiency, Profitability, maintainability of our system and it give preferred reaction over existing system Along with these parameters we can build up the parameters like sunlight temperature soil consistency and ground level water. Sensor Networks have been conveyed for a wide assortment of utilizations and mindfulness has expanded concerning actualize innovation into a horticultural domain. Checking crops for recognizing natural conditions and sickness location is a significant job in effective development. Manual accumulation of information brings about varieties when contrasted with the off base estimation taken from the field. This can cause confusions in controlling any significant factor. The visual examination of specialists is the major viable methodology. So we need to search for quick, programmed and more affordable exact technique for ceaseless checking of farming field. Wireless sensor network can decrease this exertion and time required for checking a farming domain. Yield field checking utilizing WSN speaks to a lot of network applications with colossal potential advantages for the ranchers and society in general.

2. LITERATURE SURVEY

Brendan O’Flynn, Marco De Donno, Colm Barrett, Caoimhe Robinson, Alan O Riordan, (2017) Proposed to Design and implementation of WSN for precision agriculture in white cabbage crops. The point of moving learning and moderating the effects of the soil and environmental change on yields of white cabbage. One of the most significant highlights of the hub it's the conveyability, which is the reason it is

fundamental the hub nourishes, since it was picked to make the utilization of batteries and sustainable power source as it encourages handling in the field. The microcontroller used in the system is the ATmega328p, which is the principle component responsible for procuring, sending, and getting information. It is partitioned into three primary parts: Hardware hub, Wireless Sensor Network, and at long last the software part that incorporates a reading from the USB port program and a website/App android.

R.Balamurali, K. Kathiravan (2015): Proposed an Analysis of Various Routing Protocols for Precision Agriculture using Wireless Sensor Network. To separate distinctive routing protocols like AOMDV (Ad-hoc On demand Multipath Distance Vector Routing), AODV (Ad-hoc On demand Distance Vector Routing), DSR (Dynamic Source Routing) and Integrated MAC and Routing protocol (IMR) for precision cultivation using WSN. The Integrated MAC and Routing Algorithm is best suitable for multi-ricochet routing for precision cultivating using Wireless Sensor Network(WSN) to the extent Network life time. Here, network lifetime is considered as the time at which the principle center point in the WSN kicks the container. **Devi Kala Rathinam. D, Surendran. D, Shilpa. A, Santhiya Grace. A, Sherin. J (2019)** Proposed a Modern Agriculture Using Wireless Sensor Network (WSN). Instead of using traditional agriculture current agriculture should be conceivable by farmers in this bleeding edge word. Wireless sensor networks are used to screen the harvests. The farmer can measure the water level, humidity, soddenness content and besides the disorders impacted in the yields. The sensors accumulate the related information and store it on the web server. Expediently sends the related information to two people using adequately enrolled telephone numbers. One is farmer and another is near to agriculture authority. The

agriculture authority talks with the farmer truly and prescribes the pesticides. Both can screen the yields using their advanced mobile phones. The information is traversed their advanced mobile phones. **Kainat Affrin, Reshma P, Narendra Kumar G. (2017)** Proposed to Monitoring Effect of Air Pollution on Agriculture using WSNs. Air Pollution Sensors are the gadgets to recognize and screen the closeness of air poison in the enveloping zone for both indoor and outdoor conditions. Notwithstanding the way that there are various sorts of Air contamination sensors that are had commonsense involvement in certain aspects. The a lot of sensor bases on five fragments: Ozone, Particulate Matter, Carbon Monoxide, Sulfur Dioxide, and Nitrous Oxide. These sensors can help fill various needs and help call attention to normal issues past the degree of the human eye. **Anindita Mondal and Iti Saha Misra, Sagar Bose (2017)** Proposed to create a negligible exertion game plan using wireless sensor network for agriculture application. An epic approach is made to plan and fabricate a shut circle control structure for soil-moisture monitoring and controlling. To structure a negligible exertion WSN for agriculture application. New sensor hubs have been planned to restrict the cost of entire WSN rather than using existing wireless sensor bit open in the market at much more noteworthy cost which will hamper the principal point of view to restrain cost with required value. To structure new sensor hubs with the help of Arduino Platform and Raspberry Pi module to constrain the cost of entire thing. Determination of hardware part, firmware advancement, blend and field execution, testing and improvement are the techniques that have been sought after to develop the thing. **Shuraia Khan (2016)** Proposed a Wireless Sensor Network Based Water Well Management System for Precision Agriculture. A WSN based system using some accommodating instrument that ready

to screen and control water level in well using remote gadgets from separation territory. The essential idea of this designing is to make a stage and partner the require gadgets or sensors with this stage with constrained exertion. The reasons of picking WSN innovation are: a) a couple of regions have constrained access of link connection. b) Harsh environment could harm link connection. c) Not down to earth to collect correspondence foundation for each and every well that lead to a super costly system. Water Well Management System (WWMS) present a model based execution using ease Texas Instrument CC2530ZNP pack, Ultra-low control Microcontroller MSP430tm and Beagle Bone Board. **Asmita Singh, Abhishek Tyagi, Dr Sindhu Hak (2019)** Proposed an Energy Proficient WSN for Precision Agriculture – Using Modified Zonal Stable Election Protocol. changed Z-SEP for heterogeneous condition has been executed in the agricultural field. The field is part into zones: Zone 0, Head Zone 1 and Head Zone 2. In Zone 0 has recently normal hubs (which having the less imperativeness) are set up. Run of the mill hubs can transmit their respect information to the base station authentically and likewise use less imperativeness. Using the possibility of optimality, number of improvement hubs is picked. Both the Head Zones, i.e., Head Zone 1 and Head Zone 2 are likewise scattered pushed hubs. Probability is used to pick Cluster Head among all the improvement hubs. **George Eldho John, Renjith G, Neil K Thomas, Rohit Joseph Mammutil (2018)** Proposed the Application-explicit WSN for precision agriculture. The fundamental point is to help agriculturists not only to reduce the cost of creation of harvests yet in addition to add to condition preservation. The proposed WSN has two noteworthy sections. Ace controller and sensor hubs. Ace controller controls the sensor hubs' rest plan, guiding ways and so forward. In this manner the sensor hubs are completely constrained by the ace controller.

A sensor network calculation was defined to find the course using the area information. The calculation wears down the premise of neighborhood information acquired from the sensor hubs. A methodology for diminishing the parcel size is to send some middle of the road hubs or bundle head hubs with an improved battery reinforcement and computation proficiency, so they can facilitate the communication between the hubs in their gathering. **Nurul Fahmi, Samsul Huda, Udin Harun Al Rasyid, M. Choirur Roziqin (2017)** Proposed a model of monitoring precision agriculture system subject to wsn. The organizing and making the fundamental model of monitoring precision agriculture system using remote sensor modules. It is polished by enhancing the arranged communication using Zigbee communication module and other sensor modules. There are a couple of sensors for monitoring the precision agriculture, for instance, temperature, humidity, weight, and soil moisture. As the outcome from the sensor examining, the sensor information will be handled and sent using IEEE communication standard for putting away the sensor information to portal. Since the entryway has a limitation on the capacity media, at that point it requires synchronization for a perpetual putting away. By synchronizing the sensor information between the portal and the web server, at that point the sensor information can be gotten to at whenever and wherever through customer gadgets. **A Venkateshwar, Venkanagouda C Patil (2017)** Proposed a decentralized multi competitive clustering in wireless sensor networks for the precision cultivating. Another methodology of clustering for WSN by competitive technique among hubs. Decentralized Multi Competitive Cluster Approach restrains the utilization of energy among the sensor hubs. Through constraining the separation between two Cluster Heads to least, constructive results are cultivated and by picking high waiting

energy hubs, all the all the more neighboring hubs become closer to CHs. In the proposed system, to screen parameters like temperature of environment and soil clamminess substance of field of precision cultivating a network model called Decentralized Multi Competitive Clustering (DMCC) approach for WSNs. DMCC relies upon LEACH clustering convention which partitions WSN into clusters. All hubs are collected into various clusters and each cluster is with one Cluster Head. The hubs gather information and transmit information to their CHs. Cluster Heads all out the got information by then send information to Local Base Station. **Vijo T Varghese , Kalyan Sasidhar , Rekha P (2015)** Proposed a Status Quo Of WSN structures for agribusiness. The fact of the matter is to helping the farmers understand the need to improvise their methodologies for developing and besides use their property for a prevalent yield and pay. It involve remote monitoring sensors like the clamminess sensor, temperature sensor, deluge fall sensor, and so on to monitor the changing conduct of land in agreement to the common conditions. A setting engine checks the best conceivable gather, crop yield, proportion of water anticipated, how to adjust to changing parameters and so forward. The setting engine will moreover be related with a mobile phone application that will send noteworthy information to the farmers and get questions. There are some crucial variables that ought to be considered for reasonable water system. A portion of these are: Measure of precipitation, soddenness content in soil, Temperature and Humidity. At the point when the sensors measure these physical components to specific characteristics, these can be then used to make a system which could propose the conceivable yields that could be created by farmer for the season. **Ibrahim Mat, Mohamed Rawidean Mohd Kassim, Ahmad Nizar Harun (2015)** Proposed a precision agriculture applications utilizing

remote moisture sensor arrange. A functional, insignificant exertion and environmental-accommodating Greenhouse Management System (GHMS) is presented reliant on WSN innovation. In this particular application, GHMS is used to manage the greenhouse condition. GHMS will examine the wetness of the earth media in the greenhouse by utilizing moisture sensor. GHMS will examine wetness of the air in the greenhouse by utilizing humidity sensor. GHMS read the glow of the air in the greenhouse by utilizing temperature sensor. In perspective on the sensors reading GHMS will naturally decide to ON or OFF gadgets, for instance, water siphon for irrigation, fan for air course and mist for adding water noticeable all around and to expand the humidity. GHMS has been used expressly to achieve perfect irrigation. **Jorge Granda-Cantuna, Carlos Molina-Colcha, Sergio-Enrique Hidalgo-Lupera, Christian-David Valarezo-Varela (2018)** Proposed to plan and utilization of a remote sensor sort out for precision cultivating working in API Mode. The WSN system was realized to enable the end client to perform authentic examination on the got estimations and surmise accommodating information about environmental conditions. It was confirmed that the GPS NEO - 6M module has a dormancy of 12 minutes to pick up information related to the territory of the hubs in an indoor course of action; this notwithstanding the manner in which that the creator demonstrates that the sensor takes around 27 seconds before it shows the primary estimations. In spite of the way that the sensor is careful, it encounters issues to connect with satellites when it is plan inside, being unquestionably progressively convincing in outdoors conditions. To certify that precision of the information acquired by the hub 1 and hub 2 sensors, it was critical to contrast the results and exactness equipment available. The WSN game plan joined the use of API mode, which permits an awesome correspondence

to be developed between hubs, unfeasible in clear mode. In API mode, the correspondence relies upon sending groups with a given size and in a portrayed solicitation. **Emilian Vlasceanu, Dan Popescu, Loretta Ichim (2019)** Proposed an aerial automated group for complex monitoring in precision agriculture. Proposed an aerial computerized bunch for complex checking in exactness agribusiness. An unmanned aerial system (UAS), in light of multi-UAV (unmanned aerial vehicle) design, facilitated in Internet, ready to accumulate information from ground remote sensor systems (WSNs), conveyed on gigantic regions for anticipation agribusiness. The multi-UAV system is a joined one, where the ground sub-system (GCS and GDT) accumulates information and speaks with the UAVs (adjusting the mission or the assignments). proposes a complex UAS design with two UAVs and one GDT following both in the identical time. To concentrated in travel of mission arranging and information gathering: navigation calculation, move of flight direction in UAS, taking care of directions to UAS ground part, and information move among WSN and UAV. **Gourab Panda, Tufan Saha (2018)** Proposed to work of ease strong wireless sensor network for keen indoor cultivating things. intends to develop a WSN consist of a passage, router and sensor hubs alongside a back up way. By making more than one router makes the structure progressively strong. To configuration minimal effort reliable WSN with performing different undertakings suggests the end gadget for instance sensor hub identifies four novel parameters like soil moisture, temperature, relative humidity and light power. It is additionally smart on the grounds that as opposed to four sensor hubs it simply use single sensor hub which diminishes the cost by 1/ fourth. Distinguishing four particular parameters and getting ready comparable information simultaneously with incitation makes it a

power savvy answer for indoor agriculture. The entire arranging, determination of gadgets and use are ongoing procedures. In the proposed WSN model for indoor cultivating application A set estimation of soil moisture, temperature, humidity and light power.

CONCLUSION

Some current advancements of WSN in agriculture are talked about in this paper. The new innovation includes distinguishing some environmental conditions and harvest sicknesses successfully. The new WSN engineering is useful for ranchers in upgrading the profitability and expanding the net edge. There are different advances to complete Wireless Sensor Network in Agriculture. These different advancements for Precision Agriculture Based on ZigBee Technology, Precision Agriculture Based on GPS Technology and Precision Agriculture Based on GPRS Technology are inspected and some are considered reliant on their presentation.

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