

A REVIEW ON THREE IN ONE SMART AGRO DEVICE

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ABSTRACT

Agriculture is the backbone of Indian Economy. In today's world, as global population is growing at faster rate agriculture becomes more important to meet the needs of the human race. It plays vital role in the growth of country's economy. It also provides large ample employment opportunities to the people. Growth in agricultural sector is necessary for the development of economic condition of the country. According to statistics, agriculture uses 85% of available freshwater resources worldwide, and this percentage will continue to be dominant in water consumption because of population growth and increased food demand. The proposed system has been designed to overcome the unnecessary water flow into the agricultural lands, to control the unnecessary usage of fertilizer, to control pest and decaying of leaves using Internet of Things (IoT) and image processing. To combining all three setups such as Irrigation, Fertigation and pesticides spraying are controlled through a single device through a hand operated device.

Keywords: *Irrigation, Fertigation, Pesticides, IoT (Internet of Things), Image Processing, Embedded System, Image Processing.*

I. INTRODUCTION

Agriculture is the foundation of Indian Economy. In this day and age, as worldwide populace is developing at quicker rate agribusiness turns out to be more essential to address the issues of mankind. It assumes indispensable job in the development of nation's economy. It additionally gives vast abundant work chances to the general population. Development in agricultural division is essential for the improvement of financial state of the nation. Shockingly, numerous ranchers still utilize the customary techniques for cultivating which results in low yielding of products and natural products, wherever mechanization had been actualized and people had been supplanted via programmed hardware, the yield has been progressed. Subsequently there is have to actualize current science and innovation in the agriculture part to build the yield. As indicated by measurements, farming uses 85% of accessible freshwater assets around the world, and this rate will keep on being predominant in water utilization on account of populace development and expanded sustenance request.

Observing a natural variable isn't sufficient and finish answer for enhance the yield of the products. There are number of different variables that influence the profitability to awesome degree. These components incorporate assault of creepy crawlies and irritations which can be controlled by showering the product with appropriate bug spray and pesticides. The fertigation framework was promoted with arrangement and dosification of compost and choosing manure infusion strategy too in the upkeep and administration of the framework. Manures infused through sprinkler water system frameworks in a procedure called fertigation are one sort of small scale water system framework. Irrigators wishing to infuse synthetics have an assortment of infusion gear from which to pick, including differential weight or clump tanks, bladder tanks, venturi gadgets, and positive uprooting pumps. The arrangement's fixation is reliant upon the infusion techniques. Compost consistency could be significantly impacted by infusion strategy and administration amid the infusion procedure. It was likewise announced that infusion rate had a more huge impact on fertigation consistency than the impacts of injector compose. Among those techniques for infusion, venture injector and corresponding pump have great execution.

The pesticide influences the sensory system of people and furthermore prompts issue in body. This model is utilized to splash the pesticide substance to the territories that can't without much of a stretch available by people. The Universal Sprayer framework is utilized to splash the fluid and also strong substance which are finished by the general spout. Multispectral camera is utilized to catch the remote detecting pictures which are utilized to recognize the green

fields and in addition the edges of yield territory. The Internet of Things (IoT) is where in a cell phone can be utilized to screen the capacity of a gadget.

The Internet of Things (IoT) is worried about interconnecting imparting objects that are introduced at various areas that are perhaps inaccessible from one another. Internet of Things (IoT) is a sort of system innovation, which detects the data from various sensors and makes anything to join the Internet to trade data. The proposed framework has been intended to beat the superfluous water stream into the agricultural terrains, to control the pointless utilization of compost, to control vermin and rotting of leaves utilizing Internet of Things (IoT) and picture preparing.

II. MOTIVATION

There are such huge numbers of techniques and formulae can be found in the field of farming. Water system, Fertigation and dosification and so forth are the techniques. Since this techniques works with their very own recipes, joining all these and make one gadget is the primary undertaking in designing of the project. The pesticide influences the sensory system of people and furthermore prompts issue in body. Motivation behind this project is to design a model is utilized to splash the pesticide substance to the territories that can't without much of a stretch available by people. The Universal Sprayer framework is utilized to splash the fluid and also strong substance which are finished by the general spout. On other hand Sprinklers additionally assumes a vital job, controlling precise speed of sprinkler is a noteworthy assignment. It very well may be controlled through IoT. Providing and controlling the amount of manure and Pesticides is likewise a noteworthy undertaking.

III. ISSUES OF PROJECT

Distinguishing proof of perishes in the plant and choosing the dose of pesticides to be splashed is testing errand in computerized farming framework. With the end goal to have a precise robotized framework cameras are utilized with every sprinkler in this proposed plan. Cameras catch the picture of leaves and picture preparing is done to check whether the plant is experiencing perish or not. In light of necessity, pesticide of appropriate measurements is made to shower on the perished plant. By this undertaking, necessity of work can be lessened. To check whether Fertigation is in a legitimate way or not is one of the key issue.

IV. OBJECTIVES

- ❖ To grow minimal effort agro gadget for savvy farming utilizing IoT.
- ❖ Cost compelling breeze power can be the response for all our vitality needs.
- ❖ Using weight sensor we can distinguish the dampness of soil.
- ❖ To shower the manure in appropriate path without wastage of it and without human dealing with.
- ❖ Proper medications are given to plants and which need it.
- ❖ Image preparing will give an unmistakable thought regarding morphological conduct of takes off.
- ❖ Controlling this assignment utilizing hand worked gadget (phone) which will decreases time.

V. LITERATURE SURVEY

Agriculture plays an important role in an Indian economy. It continues to be the stay of life for the majority of the Indian populations. Due to the improper maintenance, the crop becomes damaged which causes a huge loss for a farmer and hence the smart Agriculture concept was introduced. The factors include an attack of insects and pests and are to be controlled by sprinkling the proper insecticide and pesticides for the crop. Then the birds and other wild animals are stealing the crops at the harvesting stage. So, the farmers face several problems during the cultivation and harvesting stage. The solutions for all the problems are to take care of all factors and develop an integrated system which contains technologies as given below.

Automatic irrigation to the plants which helps to save money and water. Water shortage is one of the major problems in the world. Many different methods are incorporated for conservation of water. We need water in each and every field & is needed for every human beings, animals, plants, etc. Agriculture is one such field where water is required in high quantity. Wastage of water is a major problem in agriculture. Automatic irrigation system proves to be very helpful for those who travel. If designed and coded properly, automatic irrigation systems can be very cost effective and can do a lot of water conservation [1].

To save water and time we have proposed project titled Arduino based automatic irrigation system using IoT. In this proposed system, we are using various sensors like temperature, humidity, soil moisture sensors that sense the various parameters of the soil. In addition, based on soil moisture value land is automatically irrigated by ON/OFF of the motor. These sensed parameters and motor status will be displayed on user android application [2].

To design and implement a complete, reliable wireless irrigation system that has a great advantage in saving time, labor and cost. There are several attempts to use wireless the technology in building an efficient wireless irrigation system. But, these systems suffered from the lack of permanent power supply and the inability to deal with multiple sensing and related multiplexing techniques. The solar and automatic wireless technologies add a complete hand free work for all users. The system fulfills all the farmer needs to get cheaper and better quality products. The system is based on wireless digital technology that can be used for automatic irrigation of different areas [3].

Solar energy is the most abundant source of energy around the world. Solar energy is not just an answer to the current energy crisis, but also a form of energy that respects the environment. Photovoltaic generation is an efficient use of solar energy approach. Solar panels (a series of photovoltaic cells) are widely used today to work on street lights, to feed water heaters and cover domestic loads. The cost of solar panels is steadily declining, encouraging their use in various sectors. An application of this technology is used in irrigation systems for agriculture. The solar energy irrigation system can be a viable alternative for farmers in the current state of the energy crisis in India [4].

Smart agriculture by modernizing the current traditional methods of agriculture. Hence the project aims at making agriculture smart using automation and IoT technologies. The highlighting features of this project includes smart GPS based remote controlled robot to perform tasks like weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance, etc. Secondly it includes smart irrigation with smart control and intelligent decision making based on accurate real time field data. Thirdly, smart warehouse management which includes temperature maintenance, humidity maintenance and theft detection in the warehouse. Controlling of all these operations will be through any remote smart device or computer connected to Internet and the operations will be performed by interfacing sensors [5]. Optimize the water consumption, and to provide a remote control and monitoring for the irrigation system. Tests were realized to prove the validity of our proposed system by using Contiki-Cooja simulator [6]. A calculation created with edge estimations of temperature and soil dampness can be customized into a microcontroller-based entryway to control water amount. The framework can be controlled by photovoltaic boards and can have a duplex correspondence connect dependent on a cell Internet interface that permits information review and water system booking to be customized through a website page [7].

Remote Monitoring in Agricultural Greenhouse Using Wireless Sensor and Short Message Service (SMS). In this paper they were sending information by means of SMS to send the qualities to portable application [8]. The innovative improvement in Wireless Sensor Networks made it conceivable to use in checking and control of nursery parameter in exactness agribusiness [9].

The venturi injector frameworks use a venturi confinement in the water line to suck the manure arrangement into the water stream and in this way they don't require electrical power. With venturi frameworks, the centralization of compost in the water stream stays consistent all through the water system cycle, yet requires weight misfortune in fundamental water system line or a sponsor pump and have quantitative part of fustigation is troublesome [10]. Irrigation planning impacts the rhizo sphere condition, including media water potential and salt aggregation, which thus influences plant development and photograph amalgamation [11].

The nuisance administration and vector control can be accomplished by the joining of the splash framework with the UAV results in a self-ruling shower framework. It has an incredible potential to upgrade bug administration for little and in addition the substantial harvest field to involve exceptionally exact site-determination application. It is likewise a decent strategy for the vector control in the regions where there is absence of effectively open by people or gear [12]. The created auto blending framework screens water system framework for trickle fertigation at the root zone ceaselessly and controls water system at per preset estimations of water pump stream rate and span of water system. The auto pumping unit guarantees the capacity of water in a tank for the supply of water system water to the dribble framework. This indigenously grew minimal effort auto blending and water system framework guarantees better comes back to Malaysian agriculturists through significant funds in labor and other homestead inputs [13].

The programmed water system framework for deciding the pH esteem and planned a framework which spares time and guarantees sensible utilization of water with the goal that agriculturists get learning about yields that can be developed in their field. This framework works in zones where there is no general supply of power. The framework is diminishing human intercession in this way less vitality of the agriculturist is required. They recommended that in future the modules like Artificial Intelligence can be added to consequently take in the example of watering the products [14]. The utilization of horticulture organizing innovation is need of the cutting edge rural improvement, yet in addition a critical image without bounds level of farming advancement; it will be the future course of rural advancement [15]. Bluetooth based system for watching cultivating parameter like temperature with the usage of microcontroller which works as a canny atmosphere station. The system gives ease remote course of action. This system is used for continuous watching agriculture recorded data. The drawback of the structure were its

correspondence run limited and accessibility course of action must be required Bluetooth with android convenient for the long haul watching [16].

To capturing the pictures of leaves getting ready in the field cleared up a couple of models of vision-based applications and besides have been represented and made to encourage the plant age. Their paper includes the future potential for picture getting ready for different cultivating industry settings [17]. The Data and Correspondence Innovation (ICT) and the association practices in e-association are basically driving e-farming in India. The paper is around an android application, utilizing ICT, moving e-association by giving unflinching data relating to developing like environment figure, adjust costs, news, government help lines, and a stock database supervisor [18]. To save water with stream water framework like blueprint of feathery spill water framework, customized water framework subject to sensor, precision water framework and so on. Also, moreover utilization of sensor-based water framework has a couple of central focuses, for instance, maintaining a strategic distance from soggy stress of trees, diminishing of over the best water utilize, ensuring of speedy creating weeds, evaluating readiness of soil [19]. To displaying the qualification among old and new procedure created in horticulture with picture taking care of and moreover edge condition [20]. How a broad (device) report with respect to the issue, going for being a starting stage for those driving examination on the issue [21]. The Picture dealing with nearby openness of correspondence framework can change the situation of getting the ace direction well inside time and at moderate cost since picture planning was the convincing gadget for examination of parameters [22].

VI. SUMMARY

The survey of existing works in the field of smart agro devices. The following major points are considered from the literature survey.

- ❖ Automatic irrigation systems can be very cost effective and can do a lot of water conservation.
- ❖ Remote Monitoring in Agricultural Greenhouse is possible by using Wireless Sensor and Short Message Service (SMS).
- ❖ Smart irrigation systems are designed with smart control and intelligent decision making based on accurate real time field data.
- ❖ IoT is utilized in the agribusiness field to gather the information through the sensors and put away in the cloud database through the web. Therefore, in order to bridge these gaps in the literature for implementation of smart agro devices the following points have been taken into consideration.
- ❖ IoT is used to detect the data from various sensors and makes anything to join the Internet to trade data.
- ❖ Universal Sprayer framework with sprinkler system is utilized to splash the fluid and also pesticides automatically.
- ❖ Multispectral camera is utilized to catch the remote detecting pictures which are utilized to recognize the green fields and in addition the edges of yield territory.

VII. REFERENCES

- [1]. Bishnu Deo Kumar, Prachi Srivastava, Reetika Agrawal, Vanya Tiwari, "Microcontroller based automatic plant irrigation system", International Research Journal of Engineering and Technology, Volume: 04 Issue: 05 | May -2017.
- [2]. Pavankumar Naik, Arun Kumbi, Vishwanath Hiregoudar, Chaitra N K, Pavitra H K, Sushma B S, Sushmita J H, Praveen Kuntanahal, "Arduino Based Automatic Irrigation System Using IoT", International Journal of Scientific Research in Computer Science, Engineering and Information Technology © 2017 IJSRCSEIT Volume: 2 Issue : 3 | ISSN : 2456-3307.
- [3]. M. K. Al Enazi, A. A. Alomar, K. I. Alinzi, A. M. Alsaeed, "Arduino Based Automatic Irrigation System Using IoT", Advanced electrical and electronics engineering and scientific journal Volume 1-NO 1- January 2017.
- [4]. Saurabh Suman, Shanu Kumar, Ratnajeet Sarkar, Gautam Ghosh, "Solar Powered Automatic Irrigation System on Sensing Moisture Content Using Arduino and GSM" IJARECE Volume: 6 Issue : 6 June 2017.
- [5]. Nikesh Gondchawar, Prof. Dr. R. S. Kawitkar, "IoT based Smart Agriculture", International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 6, June 2016.

- [6]. Benahmed Khelifa and DouliAmel, Bouzekri Amel, Chabane Mohamed, BenahmedTarek,” Smart Irrigation Using Internet of Things”, The Fourth International Conference on Future Generation Communication Technologies (FGCT 2015).
- [7]. Joaquin Gutierrez, Juan Francisco Villa-Medina, Alejandra Nieto-Garibay, and Miguel ÁngelPorta-Gándara, “Automated Irrigation System Using a Wireless Sensor Network and GPRS Module”, IEEE transactions on instrumentation and measurement, 0018-9456, 2013.
- [8]. Izzatdin Abdul Aziz, Mohd Hilmi Hasan, Mohd Jimmy Ismail, Mazlina Mehat, Nazleeni SamihaHaron, - Remote Monitoring in Agricultural Greenhouse Using Wireless Sensor and Short Message Service (SMS) I, 2008.
- [9]. Mr. K. Kirubakaran, Selvi Ramalingam, S. Meerabai, V .Preethi, “Surveillance and Steering of Agricultural Field using Zigbee“, International Journal on Recent and Innovation Trends in Computing and Communication, vol 2, pp. 668 – 672, 2014.
- [10]. T. L. Robinson and W. C. Stiles, “Fertigation effects on apple tree growth, cropping, and dry matter partitioning,” New York Fruit Quarterly, Horticultural Society of N.Y, vol. 12, 2004.
- [11]. G.S. Campbell, Introduction to Environmental Biophysics. Springer, New York. 1986.
- [12]. S. Meivel M.E, Dr. R. Maguteeswaran Ph.D, N. Gandhiraj B.E,G. Srinivasan “Quad copter UAV Based Fertilizer and Pesticide Spraying System”, International Academic Research Journal of Engineering Sciences Vol. no.1 issue no 1, February 2016, Page No.8-12.
- [13]. Saiful Farhan M. Samsuri, Robiah Ahmad, Mohamed Hussein Department of Applied Mechanics, Faculty of Mechanical Engineering UniversitiTeknologi Malaysia. “Development of Nutrient Solution Mixing Process on Time-based Drip Fertigation System”, Fourth Asia International Conference on Mathematical/Analytical Modelling and Computer Simulation.2010.
- [14]. Sanjay Kumawat, Mayur Bhamare, Apurva Nagare , Ashwini Kapadnis “Sensor Based Automatic Irrigation System and Soil pH Detection using Image Processing”, International Research Journal of Engineering and Technology (IRJET), Volume: 04 Issue: 04 | Apr -2017.
- [15]. Pavankumar Naik, Arun Kumbi, Vishwanath Hiregoudar, Chaitra N K , Pavitra H K , Sushma B S, Sushmita J H , Praveen Kuntanahal “Arduino Based Automatic Irrigation System Using IoT”, International Journal of Scientific Research in Computer Science, Engineering and Information Technology, Volume 2, May-June-2017.
- [16]. Prosanjeet. J. Sarkar, Satyanarayana Changala “A survey on IOT based Digital Agriculture Monitoring System and their impact on optimal Utilization of Resources”, IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) e-ISSN: 2778-2834,p-ISSN:2278-8735.Volume 11,Issue 1, Ver.11(Jan-Feb.2016),PP 01-04.
- [17]. Lalit P. Saxena and Leisa J. Armstrong, “A survey of image processing techniques for agriculture”, Proceedings of AFITA 2014 - Copyright ASICTA Inc.
- [18]. Arpit Narechania, “AN ANDROID-ARDUINO SYSTEM TO ASSIST FARMERS IN AGRICULTURAL OPERATIONS”, Proceedings of IRF International Conference, 17th May-2015, New Delhi, India, ISBN: 978-93-85465-15-4.
- [19]. Gaurav Kumar, “Research paper on water irrigation by using wireless sensor network”, International Journal of Scientific Research Engineering & Technology (IJSRET) ISSN: 0278â•fi0882DEERET-2014 Conference Proceeding, 3-4 November, 2014.
- [20]. Mrs. Latha, “Image Processing in Agriculture”, international journal of innovative research in electrical, electronics, instrumentation and control engineering Vol. 2, Issue 6, June 2014.
- [21]. Dr K. Prakash, Dr P. Saravanamoorthi, Mr R. Sathishkumar, Dr M. Parimala, “A Study of Image Processing in Agriculture”, Int. J. Advanced Networking and Applications Volume: 09 Issue: 01 Pages: 3311-3315 (2017) ISSN: 0975-0290.

- [22] Janwale Asaram Pandurng and Santosh S. Lomte, "Digital Image Processing Applications in Agriculture", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 5, Issue 3, March 2015.
- [23] A Fakhri, A Nasir, M Nordin, A Rahman and A Rasid Mamat, "A Study of Image Processing in Agriculture Application under High Performance Computing Environment", International Journal of Computer Science and Telecommunications [Volume 3, Issue 8, August 2012].
- [24]. Dr M Suchithra, Asuwini T, Charumathi M C, Ritu N Lal-"Sensor Data validation", International Journal of Pure and Applied Mathematics, Volume 119 No. 12 2018, 14327-14335.
- [25]. Keerthana B1, Nivetha P1, Boomika M1, Mathivatanni M1, Niranjanaa2," Literature Review on IOT Based Smart Security and Monitoring Devices for Agriculture", International Journal on Future Revolution in Computer Science & Communication Engineering ISSN: 2454-4248 Volume: 4 Issue: 2 342 – 345.
- [26]. R.Nandhini1, S.Poovizhi2, Priyanka Jose3, R.Ranjitha4, Dr.S.Anila5," ARDUINO BASED SMART IRRIGATION SYSTEM USING IOT",3rd National Conference on Intelligent Information and Computing Technologies, IICT '17.
- [27]. S. Rajeswari, K. Suthendran, K. Rajakumar, A Smart Agricultural Model by Integrating IoT, Mobile and Cloud-based Big Data Analytics", International Journal of Pure and Applied Mathematics Volume 118 No. 8 2018, 365-370 ISSN: 1311-8080 ISSN: 1314-3395.
- [28]. Ms Shwetha P.S, "Survey on Automated Irrigation Systems Using Wireless Sensor Networks", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 03 Issue: 04 | Apr-2016 p-ISSN: 2395-0072.
- [29]. K. Abhinayalalitha, P. Ramadoss, "Arduino based Agricultural Monitoring System in Mobile Application", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 04 Issue: 05 | May -2017 p-ISSN: 2395-0072.
- [30]. Agraj Aher1, Janhavi Kasar2, Palasha Ahuja3 , VarshaJadhav, Smart Agriculture using Clustering and IOT, International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 03 | Mar-2018 p-ISSN: 2395-0072.