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AUTOMATIC IRRIGATION SYSTEM BASED ON IOT MODULE

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ABSTRACT:

In India agriculture plays a very important role. The Indian economy is also greatly affected by agricultural, as about 50 percent of total population is directly or indirectly depend on the agricultural related activities. A farmer has to go to the farm to check the water level in the field and to turn on and turn off the water pump, sometimes even in the middle of the night. This problem can be overcome by improving old methods of farming. A new system can be developed or designed which transform the old traditional farming into the smart farming. This paper tries to design a simple water pump controller by using a soil moisture sensor and Esp8266 NodeMCU-12E. A Message Queue Telemetry Transport protocol is used for transmitting and receiving sensor information. Depending on a status of soil moisture content NodeMCU-12E controls a water pump action and displays the soil moisture sensor data and water pump status on a web page or mobile application (CAYENNE (my devices iot) android app). In this way, a secure, flexible, trust-able and economical system is developed to solve above mentioned agricultural irrigation problem.

Keywords: NodeMCU, IOT, Soil moisture sensor, IOT platform.

1. INTRODUCTION:

The agricultural development is accelerated with the increase in the productivity and up gradation of the plantation systems. The Internet of Things (IoT) has the capability to transform the world. However, the application of technology like IoT in agriculture could have the greatest impact. Every year the population is increased. So, to feed this much population, the farming industry must embrace IoT (Jim Chase, 2013). Against the challenges such as extreme weather conditions and rising climate change, and environmental impact resulting from intensive farming practices, the demand for more food has to be met. Advanced automated IoT technologies have to be used in agriculture to meet the demand. This paper described the agriculture sensor and its use in smart agriculture for increase the productivity with reduced human effort and cost. The IoT technology is more efficient due to following reasons such as Global Connectivity through any devices, Minimum human efforts, Faster Access, Time Efficiency and Efficient Communication. We read in the newspapers for many days about farmer's losses and

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farmers used to work out the soil maturity and suspicions for the production of yield. They won't worry about the temperature, water level and simply climate conditions that are terrible to farmers.. The Internet of Things (IOT) is reconstructing the agri-business which enables farmers to deal with challenges in the field, for example through the broad range of strategies, such as accuracy and practical farming. IOT assists in the assembling of information regarding conditions such as climate, humidity, temperature and soil fertility, a IOT-based examination enables the discovery of wild plants, water levels, exact location, field interruption, field development, horticulture. IOT helps in assembling information IOT uses farmers to connect from anywhere to anywhere to his house. Remote sensors are used to track household conditions and smaller controls are used to control and mechanize the house shapes.

2. LITERATURE SURVEY:

In Agriculture field, the farmers use manual method for checking the checking the soil parameters. The system mainly focuses to developing devices to manage and alert the farmers by the wireless sensor system (Lakshmisudha, 2011). It proposes a low cost and efficient wireless sensor network technique to acquire the soil moisture and temperature from various locations of farm and as per the need of crop controller to take the decision whether the irrigation is requirement (Nandurkar et al., 2014). The author (Chetan, 2015) proposes a novel technique for smart farming by linking a smart sensing system and smart irrigator system through wireless communication technology. The atmospheric conditions are monitored and controlled online (Vidya Devi & Meenakumari, 2013). The IoT technologies are used for smart agriculture (Gondchawar & Kawitkar, 2016). The highlighting features are smart GPS based remote controlled robot to perform tasks like weeding, spraying, moisture sensing, human detection and keeping vigilance. The cloud computing devices that can create a whole computing system from sensors to tools that observe data from agricultural field images and from human actors on the ground and accurately feed the data into the repositories along with the location as GPS coordinates (Gayatri et al., 2015). The author proposes (Joaquín Gutiérrez, 2013) an idea about how automated irrigation system was developed to optimize water use for agricultural crops. In addition, a gateway unit handles sensor information. The IoT based monitoring system (Meonghun Lee, 2013) to analyze crop environment and the method to improve the efficiency of decision making by analyzing harvest statistics. Image processing (Jhuria et al., 2013) is used as a tool to monitor the diseases on fruits during farming, right from plantation to harvesting. The variations are seen in color, texture and morphology. The soil parameters such as soil moisture content and surrounding temperature are crucial factors for the proper plant growth. The system provides a real time system which monitors soil temperature and soil moisture efficiently. The system valves are turn ON or OFF automatically depending upon the moisture content. The system provides a real time analysis to the

ISSN : 2057-5688

owner to monitor variation in the parameters. Using this system, one can save manpower, water to improve production and ultimately increase profit.

3. PROPOSED SYSTEM:

An IOT based irrigation system is for efficient agricultural management system. The proposed system makes use of microprocessor ESP8266 on nodeMCU and IOT which enable farmers to remotely monitor the status of sprinklers arranged on the farm by knowing the sensor values thereby, making the farmers‟ work much easier as they can concentrate on other farm activities. This system uses valves to turn irrigation ON and OFF. The valves may be easily automated by using sensors. Smart irrigation management system allows farmers to apply the right amount of water at the right time.

In earlier days farmers used to calculate the readiness of soil and impacted doubts to create which to sort of yield. They didn't consider the stickiness, level of water and particularly atmosphere condition which was difficult to a Farmer, progressively The Internet of things (IOT) is renovating the agribusiness engaging the agriculturists through the broad scope of methodologies, for instance, exactness just as useful cultivating to manage difficulties in the field. IOT modernization helps in get together data on conditions like atmosphere, protection, temperature and productivity of soil, Harvest online assessment enables disclosure of wild plant, level of water, cultivation area, animal break in to the field, trim turn of events, agriculture. IOT use farmer’s interaction to get related with his living arrangement from any place and at whatever point. Distant sensor structures are used for watching the residence conditions and smaller scope controllers are used to control and motorize the field. To see distantly the conditions as picture and video, far off cameras have been utilized. IOT improvement can decrease the expense and update the efficiency of standard creating for farmers.

In order to increase the quality of our crop, we must use technologies that analyze the essence of the harvest and offer advice to benefit both farmers and government. The Internet of things (IOT) is revamping the agribusiness engaging the farmers by the broad assortment of techniques, for instance, accuracy and conservative cultivation to go up against challenges in the field. Use of Wireless sensor Networks In Precision Agriculture. The benefit in this report is to continuously evaluate various differentiated factors for yield and location. Precision Agriculture, as its name implies, is precise both in the area of its commodity territories and in the transport steps of soil, fertilizer etc. This invention will isolate a single plant in ten or many square meters for testing. Exactness Agriculture requires a novel programming model for each land territory, the characteristic soil write and the specific harvest or plants. For instance, every area will get its own particular ideal measure of water, compost and pesticide. In general, data collection is recommended on an hourly basis. Visitor information collection does not offer the product display extra helpful data and turns the wireless sensor network into a weight for power usage and data

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transmission. Fewer ongoing studies could be sufficient in respect of some moderate harvests and regions with highly stable and uniform conditions of atmosphere.

The working is as follows.

• The sensor network deployed in each section will keep updating the parameter readings in the cloud through a wifi communication module.

• Any changes with the data that can trigger to set the alarm will also be recorded and notified at the server room.

• The concerned authorities or the local can access the data and the warning notifications of the same.

• The data stored in the cloud called ThingSpeak server, where it can be used to make some analysis on fields.

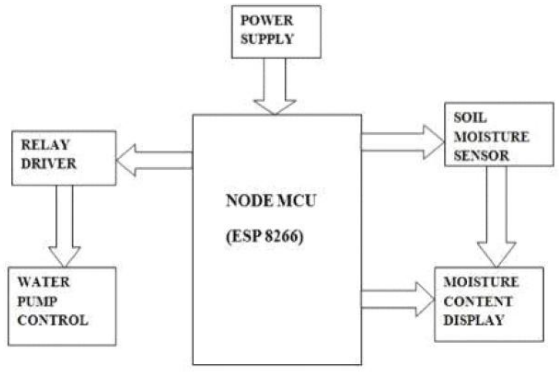

Fig.3.1. Proposed system block diagram.

4. RESULTS EXPLANATION

The hardware is interfaced with all the sensors in the board. The hardware components include the microcontroller, a water pump, relay,12 V battery, Wi-fi sensor and the soil moisture sensor is interfaced and power supply has provided. The system has been tested for watering a plant in a garden. In the field section, sensors are deployed in the field like soil moisture. The data collected from these sensors are sent to the Database via the android application. In control section, the system is turned on using the application, this is done using the on or off buttons in the application. Also, this system is turned on automatically when the moisture of the soil is low, the pump is turned on and depending on the moisture content. The application has a future feature of taking the time from the user and irrigates the field when the time comes. In manual mode, there is a manual switch in the field to make sure that if the system fails, one can turn off the water supply manually.

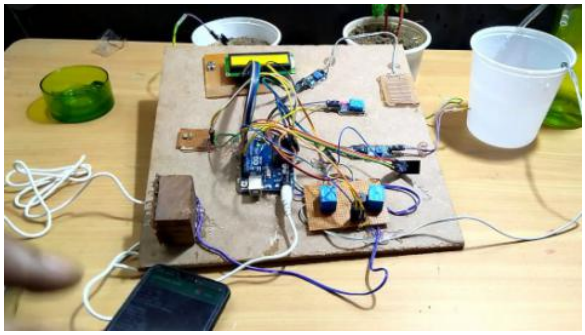

Fig.4.1. Hardware kit image.

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Fig.4.2. Output results

5. CONCLUSION:

Internet of Things will help to enhance smart farming. Using IoT we can predict the soil moisture level and humidity. Irrigation system can be monitored and controlled by IoT technology. The crop damage using predators is reduced. IoT works in different domains of farming to improve time efficiency, water management, crop monitoring, soil management, control of insecticides and pesticides. It also minimizes human efforts, simplifies techniques of farming and helps to gain smart farming. Along with these features smart farming can help to grow the market for farmer with single touch and minimum efforts.

REFERENCES:

[1] Yick, Jennifer, Biswanath Mukherjee, and Dipak Ghosal. "Wireless sensor network survey." Computer networks 52.12 (2008): 2292- 2330.

[2] Tubaishat, M., & Madria, S. (2003). Sensor networks: an overview. IEEE potentials, 22(2), 20-23.

[3] Yang, L. D. (2011). Implementation of a wireless sensor network with EZ430-RF2500 development tools and MSP430FG4618/F2013 experimenter boards from Texas instruments.

[4] Lozano, C., & Rodriguez, O. (2011). Design of forest fire early detection system using wireless sensor networks. Electronics and Electrical Engineering, 3(2), 402-405.

[5] Nakamura, F. G., Quintão, F. P., Menezes, G. C., & Mateus, G. R. (2005, April). An optimal node scheduling for flat wireless sensor networks. In International Conference on Networking (pp. 475-482). Springer, Berlin, Heidelberg.

[6] Kovács, Z. G., Marosy, G. E., & Horváth, G. (2010, October). Case study of a simple, low power WSN implementation for forest monitoring. In 2010 12th Biennial Baltic Electronics Conference (pp. 161-164). IEEE.

[7] Galgalikar, M. M. (2010, February). Real-time automization of agricultural environment for social modernization of Indian agricultural system. In 2010 The 2nd International Conference on Computer and Automation Engineering (ICCAE) (Vol. 1, pp. 286- 288). IEEE.

[8] Sepaskhah, A. R., & Ahmadi, S. H. (2012). A review on partial rootzone drying irrigation. International Journal of Plant Production, 4(4), 241-258.

[9] Nikolidakis, S. A., Kandris, D., Vergados, D. D., & Douligeris, C. (2015). Energy efficient automated control of irrigation in agriculture by using wireless

ISSN : 2057-5688

sensor networks. Computers and Electronics in Agriculture, 113, 154-163.
[10] Awang, A., & Suhaimi, M. H. (2007, November). RIMBAMON©: A forest monitoring system using wireless sensor networks. In 2007 International Conference on Intelligent and Advanced Systems (pp. 1101-1106). IEEE.