

SMART FARMING SYSTEM BASED ON IOT TECHNOLOGY

D.HARI HARA SHREE¹, K.MOHANAPRIYA²

S.UMAMAHESWARI³, Dr.C.VENKATESH⁴

¹STUDENT MEMBER/ECE, SENGUNTHAR ENGINEERING COLLEGE, INDIA

²STUDENT MEMBER/ECE, SENGUNTHAR ENGINEERING COLLEGE, INDIA

³STUDENT MEMBER/ECE, SENGUNTHAR ENGINEERING COLLEGE, INDIA

⁴PROFESSOR/ECE, SENGUNTHAR ENGINEERING COLLEGE, INDIA

ABSTRACT:

Internet of Things (IoT) plays a decisive role in smart farming. Smart agriculture method is an emerging concept, because IoT can use a lot of sensors that are capable of providing information about their agriculture fields. This paper sights at making use of evolving technology i.e. IoT and smart agriculture using automation. Keeping track on environmental factors is the major aspect to improve the yield of the crops. From this proposed paper we have a novel methodology for smart farming system using various sensors through Internet of Things (IoT). Our system focuses on the measurement of physical parameters such as soil moisture content, climatic conditions, pH and water level of the soil, amount of fertilizer mixed with water and it also detects the any animal movement inside the field, if any abnormal activities occur the system gives an alert to those farmers. These sensors are connected to microcontroller which is programmed to maintain certain value of environmental conditions whenever changes occur the controller controls the condition automatically and also sends an SMS alert to concern Smart farming farmers through IoT interfacing with ESP8266 WIFI module and through BLYNK. By this system every farmer will get reliable agricultural information about their lands. This will improve the final outcome in qualitative manner.

Keywords: *ESP8266 WIFI module, Internet of Things, physical parameters, sensors, Smart farming, SMS alert.*

I. INTRODUCTION

Agriculture is the most important sector in India. It helps human beings grow the most ideal food crops and raise the right animals with accordance to environmental factors. It plays a significant role in India's economy. Over 58% of the rural households rest on agriculture as their principal channel of livelihood. Agricultural exports constitute 10% of the country's exports. So the farmer's and even Indian's economy will be ruined if there is no proper yields due to lack of knowledge of soil nature, timely available of

Second International Conference on Nexgen Technologies

Sengunthar Engineering College, Tiruchengode, Namakkal Dist. Tamilnadu (India)



8th - 9th March 2019

www.conferenceworld.in

ISBN : 978-93-87793-75-0

water, the ever changing weather conditions etc. Hence the farmer needs reliable agricultural information about their land. This paper will solve the problem that we are defined by the use of Internet of Things. The existing methods were only solving the problem on water irrigation by monitoring soil moisture and temperature of the agricultural land. So that we are going to propose a new methodology for monitoring the real time status of the land and also control the situations by both automatically and manually through smart phones. The main purpose of this paper is by implementing this method anyone can know the status of their land and the final outcome will be improved. This method will contribute a lot for many farmers and helps to improve the Indian economy on agriculture.

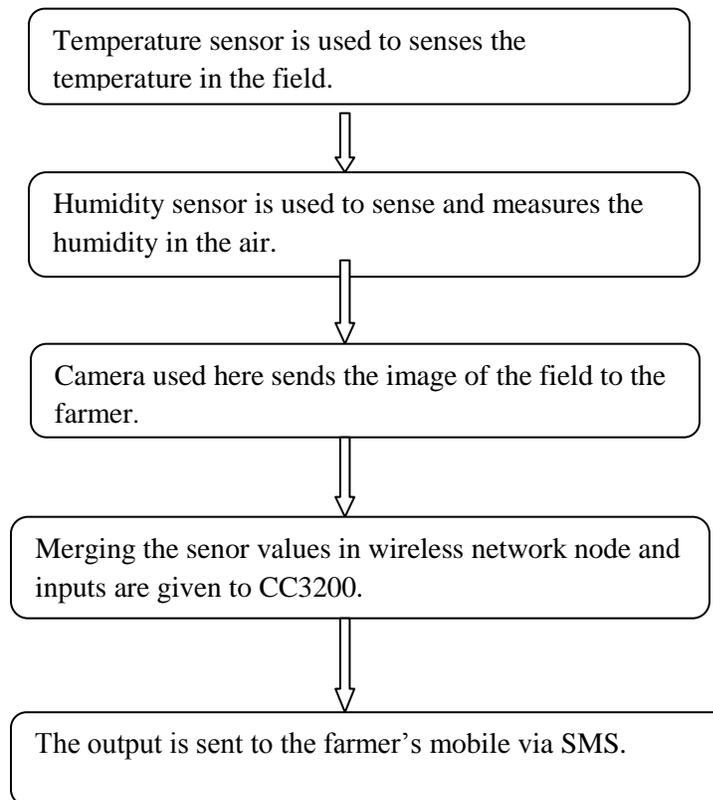
II.LITERATURE SURVEY

1.1 Sensor data collection and irrigation control on vegetable crop using smart phone and wireless sensor

The goal of this system is to provide suitable solutions for automating agriculture. The system that we have developed here has a soil moisture sensor, air humidity sensor and air temperature sensor. A wireless sensor network has been installed for collecting the environment data and controlling the irrigation system via smart phone. Through this system we can only control the irrigation system by monitoring few parameters and also the cost for the installation of the system is high.

1.2 IoT based monitoring system in smart agriculture

Smart farming is an emerging concept, as smart farming involves the use of sensors that are capable of providing information about the agriculture fields. This systems make use of evolving technology i.e. IoT and smart agriculture using automation. Keeping track of environmental factors is the major factor to improve the yield of coherent of the crops. This method includes monitoring temperature and humidity in agricultural field through sensors using CC3200 single chip. The conventional method of agricultural tracking includes the following steps that are illustrated in the flowchart below,



In this system cameras are used to monitor the field but we cannot sense the exact Moisture content in the soil. Therefore water level is not optimized.

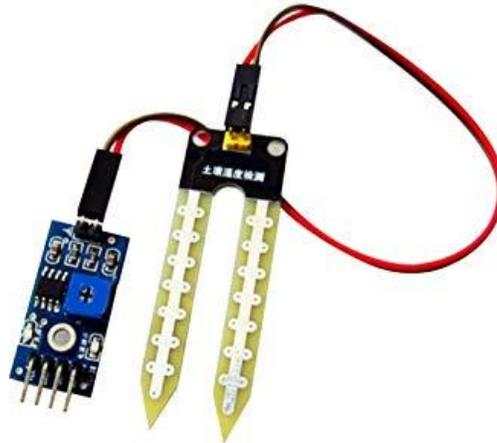
III. PROPOSAL METHOD:

For this smart farming system, we use IoT. Low cost IT solution preferably IoT sensor and IoT data integrating to existing application software. Arduino is computer hardware and has a IDE software, manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The aim is to provide a low-cost and easy way for novices and professionals to create devices that interact with environment using sensors and actuators. Sensors used here are as follows soil moisture, temperature, humidity, PIR, PH, a water flow sensor which gives the real time status of the agricultural land.

1. SOIL MOISTURE SENSOR:

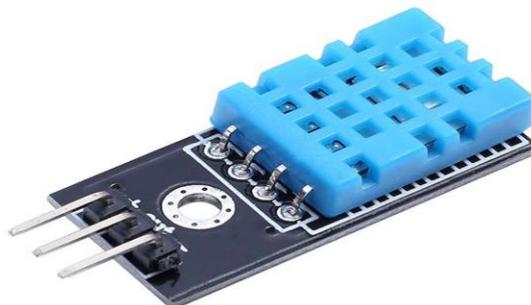
Soil moisture plays a vital role in the improvement of weather patterns and agricultural parameters. A soil moisture module measures the quantity of water present in a material, such as soil on a volumetric basis.

In this proposed research soil moisture sensor is used to know the exact soil moisture conditions on their fields. This helps farmers to generally use less water to grow a crop; they are able to increase yields and the quality of the crop by improved management of soil moisture during critical plant growth stages.



2. TEMPERATURE AND HUMIDITY SENSOR:

A temperature sensor is a device that are usually RTD (resistance temperature detector) or a thermocouple, which collects the data about temperature from a specific source and converts the data into convenient form for a device or an observer. There are various types of Temperature Sensor available and every kind has a different characteristics depending on their actual application In this method temperature and humidity sensor can be used to know the accurate value of the environmental conditions. Through this we can optimize the usage of water.



3. PIR SENSOR

In this study Passive Infrared (PIR) sensors are used for the purpose of human and animal detection in the field. This is a type most commonly encountered in motion sensing. They are commonly used in automatic door opening system, security alarm systems .PIR sensors are used as motion detectors in many applications such as Hospitals, grocery stores and libraries.



4. pH SENSOR

A pH sensor is used to value the hydrogen-ion activity in water-based mediums, pointing its acidity or alkalinity expressed as pH. The pH meter is used in ranging from laboratory experimentation to quality control. In this study pH sensors are used for soil, crop, and water testing in agriculture to achieve high quality produce from farming operation. The output can be digital or analog, and the device can be battery-powered or relay online power. With pH sensor we can measure the conditions and improve both the health and yield from our crops.



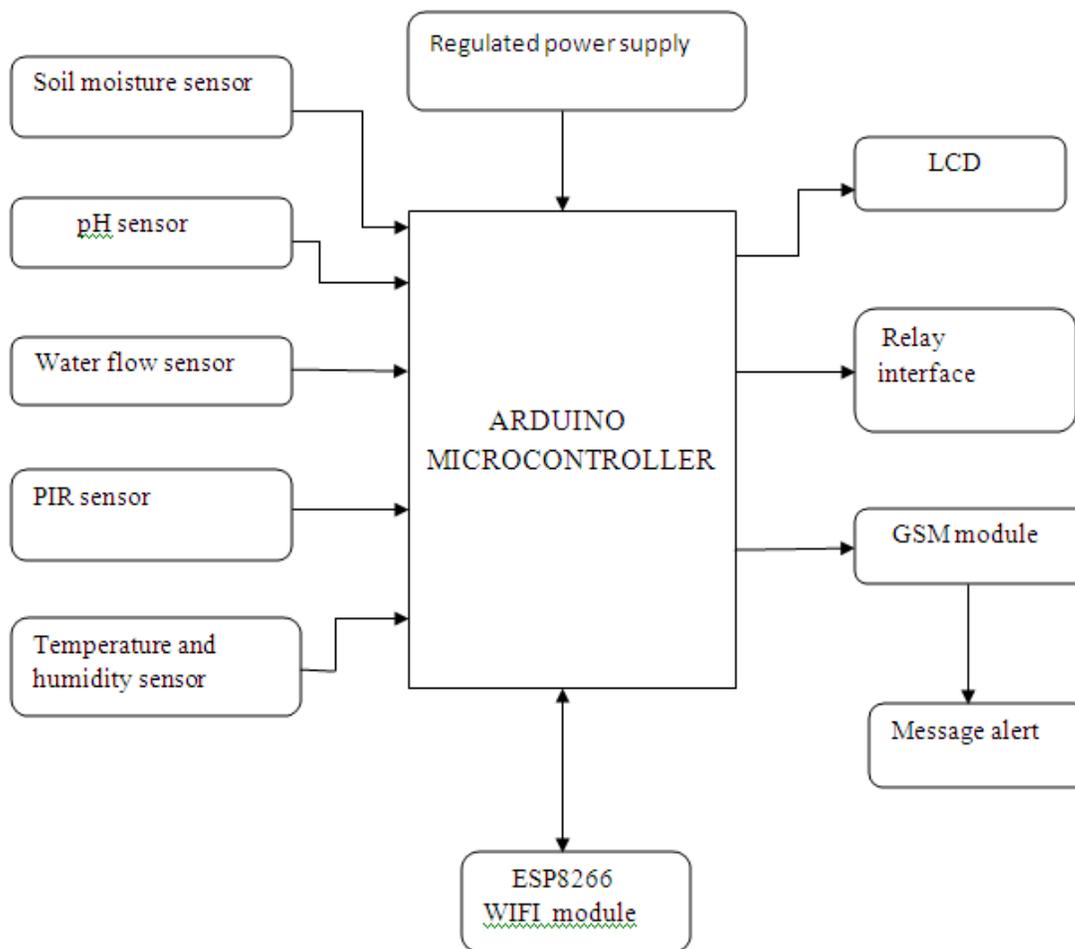
5. WATER FLOW SENSOR

A water flow sensor is usually made up of plastic valve body, a water rotor, and a hall-effect sensor. When water flows through the rotor, rotor rolls. The speed of the flow sensor changes with different rate of flow. The hall-effect sensor outputs the corresponding pulse signal. In the proposed system the water flow sensor is used to measure the amount of fertilizer mixed with water. Through this the farmers can get

the exact scenario of fertilizers mixed with water and the usage of fertilizers can be optimized. There are different types of applications such as gas meter, chemicals, process auto-control, medical, food and beverages.



IV. BLOCK DIAGRAM:



V. HARDWARE RESULT

The soil moisture sensor senses and values the moisture level in the soil. The PIR sensor detects the high frequency sound signal. The pH sensor and water flow sensor is used to improve the fertilizer usage. These data are processed and the optimum water level will be supplied to the field by automatically switching on the power supply to the water pump. These data will be transmitted to the user's mobile phone through IoT using a different IP address for the provided microcontroller which is programmed to transmit the data given by the sensor to the user through a web page showing the live condition of the field.

V. CONCLUSIONS & FUTURE ENHANCEMENTS

After the survey papers on intelligent farming such as Iot based monitoring system in smart agriculture, Smart Farming System using sensors for agricultural task automation, Sensor data collection and irrigation control on vegetable crop using smart phone and wireless sensor for smart farm and Remote agriculture automation using wireless link and IoT gateway infrastructure, a agricultural automation system using Internet of Things (IoT) is proposed.

This system provides real time information about the farmland and alerts the farmer in case of animal threats. The future enhancements are given below:

1. Irrigation system can be monitored.
2. Damage caused by predators is reduced.
3. Increased productivity.
4. Water conservation.

REFERENCES

- [1] Brown, Eric. " who needs the Internet of Things? "; Linux.com. Retrieved 23 October 2016 (13 September2016).
- [2] Brown, Eric. " 21 Open Source Projects for IoT"; Linux.com. Retrieved 23 October 2016 (20 September2016).
- [3] Kaewmard, Nattapol ; Saiyod, Saiyan —Sensor data collection and irrigation control on vegetable crop using Smartphone and wireless sensor networks for smart farm||, IEEE Conference on Wireless sensors (ICWiSE), DOI:10.1109/ICWISE.2014.7042670 , Page(s): 106 – 112,2014.

Second International Conference on Nexgen Technologies

Sengunthar Engineering College, Tiruchengode, Namakkal Dist. Tamilnadu (India)



8th - 9th March 2019

www.conferenceworld.in

ISBN : 978-93-87793-75-0

- [4] 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, ISSN (Online) 2278-1021 ISSN (Print) 23195940, June 2016.
- [5] Tanmay Baranwal, Nitika, Pushpendra Kumar Pateriya —Development of IoT based Smart Security and Monitoring Devices for Agriculture|| 6th International Conference - Cloud System and Big Data Engineering, 978-1-4673-8203-8/16, 2016 IEEE.
- [6] Zhenyu Liao; Sheng Dai; Chong Shen, "Precision agriculture monitoring system based on wireless sensor networks, "Wireless Communications and Applications (ICWCA 2012), IET International Conference on ,vol., no., pp.1,5, 8-10Oct. 2012.