# A Monitoring system using Smartphone for controlling various parameters in the agricultural field.

**Prof.S.S.Sambare[1] ,RitaliWarade[2] ,Shraddha Dumbre[3]and Pradnya Ghone[4]**

[1]*Assistant Professor ,Computer Department,Pimpri Chinchwad College of Engineering, Maharashtra, India.*
[2] *Student,Computer Department,Pimpri Chinchwad College of Engineering, Maharashtra, India.*
[3]*Student,Computer Department,Pimpri Chinchwad College of Engineering, Maharashtra, India.*
[4] *Student,Computer Department,Pimpri Chinchwad College of Engineering, Maharashtra, India.*

***Abstract***

*Agriculture plays an essential role in the economic prosperity and the development of India. Therefore a new and effective technology is required to improve the financial condition, productivity of farming system. The main aim is to propose an art of sensor technology in agriculture field, which will help to the rural farming community to replace some of the traditional techniques of farming and increase the production. The development in wireless sensor networks can be used to monitor various parameters such as soil moisture, humidity, temperature etc. In agriculture[5].In the proposed work, irrigation system is controlled on the basis of soil moisture sensor`s value[13]. Also, temperature and humidity of the field is monitored using temperature and humidity sensor. All this sensed data is collected in an Internet of Things (IoT) platform which is then send to an android app of farmer along with the user manual and translation facility in the app which increase the user friendliness of system.*

**Key words:** *Sensors, ESP8266,Ardiuno, Internet of Things ,Wireless Sensor Network.*

## 1.Introduction:-

The production quality as well as quality in agriculture is depending on the predictions of environmental conditions and the agricultural parameters such as soil moisture, temperature, etc. Accurate monitoring and controlling of these agricultural parameters is required to increase the crop production[3]. The current systems require more human intervention and they are also time consuming. So a modern technology is required to resolve the problem and should support for better irrigation management and field monitoring[1][7]. For this we can have a system called IoT based automatic irrigation system using Wireless Sensor Network (WSN). WSN has the ability of communication, computation and sensing. A bridge between the real physical world and virtual worlds can be provided with WSN. Hence using this system the field monitoring and controlling is done in this proposed system.

## 2. System Architecture:-

Sensors data is given to the controller for processing. Then that processed data is send an IoT platform and to user`s android app. In this system, values of sensors are used to control the operation of irrigation pump and monitor the parameters like temperature and humidity of the field. Also it includes an android application through which user get the information.

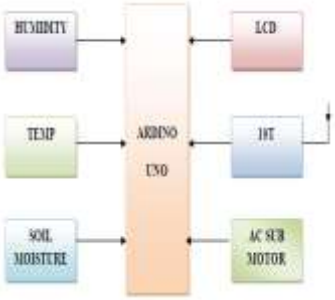

**Fig. 2.0** System Architecture

The hardware components used in system are as follows,

1) Ardiuno UNO:

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

2) ESP8266

The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network.

3) Sensors

Sensors are used to sensed the various parameters of the agriculture. In this system it is used to sense the soil moisture ,temperature and humidity present in the environment using soil moisture and DHT11 sensor.

4) Liquid Crystal Display (LCD)

LCD is the technology used for displays in notebook and other smaller computers LCD screen consists of two lines with 16 characters each. Each character consists of 5x7 dot matrix. Contrast on display depends on the power supply voltage and whether messages are displayed in one or two lines

.

5) AC Submersible Motor

A submersible pump (or sub pump, electric submersible pump (ESP)) is a device which has a hermetically sealed motor close-coupled to the pump body. The whole assembly is submerged in the fluid to be pumped[4].

## 3. Proposed System:-

The system is mainly divided into three modules as irrigation module, temperature and humidity monitoring module and user interface module. This system is designed to improve the crop production in terms of quality and quantity by controlling the working of irrigation system automatically and giving awareness about the field temperature and humidity to farmer which helps farmer to take right action for increasing the crop production[1][3].

In irrigation module based on the soil moisture sensor value the working of AC submersible motor get controlled. This module`s working is controlled automatically based on the moisture of soil through which only required amount of water will be given to crops and wastage of water can be reduced in the field.

In second module using DHT11 Humidity and Temperature sensor both the parameters are monitored. This module provide current temperature and humidity values of the field to farmer. This status of humidity, temperature of the field along with value of soil moisture sensor get stored on the IOT platform named as Thingspeak[7].

In the last module all the data is sent to an android app of farmer also the manual about crop details is provided in the android app with the language translation facility which increases the feasibility of system.

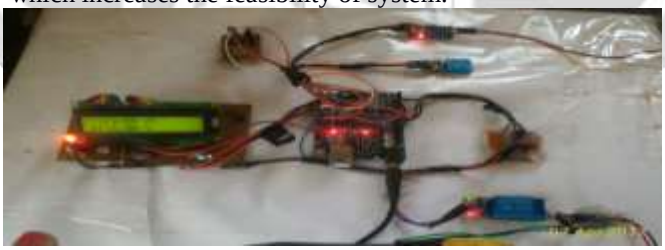

**Fig.3.1** Temprature and humidity monitoring

**Fig.3.2** Irrigation system working


**Fig.3.3** Temperature Graph


**Fig.3.4** Humidity Graph


**Fig.3.5** Moisture sensor`s reading graph

## 4. Conclusion:-

After implementing this monitoring and controlling system for agricultural field we conclude that this system provides several benefits and can be operated with less manpower. Over-watering and under-watering affects the crop so proper amount of water should be supplied. The awareness of current temperature and humidity of field will help the farmer to take proactive measures for crop yielding. By analysing the soil parameters system waters the farm. So by this wastage of water can be reduced.

## 5. Future Scope:-

As we developed a system which gives atomization to water supply to crops that is irrigation, In addition to that we can add timer for the particular time period. Due to this motor will be start only for the given time period which will help to reduce power consumption and to reduce wastage of water. In between if the power failure is there then timer will be extended after power on.For sensor protection in the field from cattle less we can deploy cattle sensor also.

## References:-

[1]*G. V. Satyanarayana and SD.Mazaruddin,*Wireless Sensor Based **"Remote Monitoring System for Agriculture Using ZigBee and GPS",** *Conference on Advances in Communication andControl Systems 2013 (CAC2S 2013).*

[2] *Hui Liu, ZhijunMeng, Shuanghu Cui*, A Wireless SensorNetwork Prototype for Environmental Monitoring in Greenhouses

[3] *N. Sakthipriya*, **"An Effective Method for Crop Monitoring Using Wireless Sensor Network",** Middle-East Journal of Scientific Research 20 (9): 1127-1132, 2014 ISSN 1990-9233 © IDOSI Publications, 2014 DOI: 10.5829/idosi.mejsr.2014.20.09.114152

[4] IEEE Std 802.15.4-2006. Part 15.4: wireless medium access control (MAC) and physical layer (PHY)specifications for low-rate wireless personal area networks (LRWPANs). IEEE Std802.15.4-2006, 2006.The IEEE std. 802.15.5-2009: Part 15.5: Mesh Topology CapabilityinWirelessPersonalArea Networks (WPANs) IEEE Std802.15.5-2009.

[5]*AnjumAwasthi and S.R.N Reddy*, Monitoring for PrecisionAgriculture using WirelessSensor Network, Volume 13 Issue 7Version 1.0 Year 2013, Type: Double Blind Peer Reviewed International Research Journal, Publisher: Global Journals Inc. (USA), Online

ISSN: 0975-4172 & Print ISSN: 0975-4350.
[6] *Herman Sahota, Ratnesh Kumar, Ahmed Kamal and Jing Huang*,AnEnergy-efficientWireless Sensor Network for PrecisionAgriculture,2010 IEEE.
[7]*Liu Yang, LinyingJiang , Kun Yue ,Heming Pang,*"Design and Implementation of Lab RemoteMonitoring System based onEmbedded Web Technology,2010.
[8]*N.K.choudhari,shantung pathak and debajyotimukhopathwayMilindpande*, H2E2: AHybrid, Hexagonal & Energy Efficient WSN Green Platform for Precision Agriculture ,2012 IEEE.
[9] *Wen Hu, Tuan Dinh Le, Peter Corke*, Outdoor Sensornet Design and Deployment:Experiences from a Sugar Farm2012 IEEE.
[10]*Xihai Zhang, Yachun Wu, Xiaoli Wei*, Localization algorithms in wireless sensornetworks using Non metric Multidimensional scaling with RSSI for precision agriculture2010 IEEE.
[11]*Tao Liu, Feng Li*, Power-efficient Clustering Routing Protocol Based on Applications in Wireless Sensor Network, 2009 IEEE.
[12]*Ying Zhang*, Design of the node system of wireless sensornetwork and its application in digital agriculture, 2011IEEE.
[13]*Yunseop (James) Kim, Member, IEEE, Robert G. Evans, and William M. Iversen*, Remote Sensing and Control of an Irrigation System Using a Distributed Wireless Sensor Network, Ieee Transactions On Instrumentation And Measurement, Vol. 57, No. 7, July 200