AUTOMATED AGRICULTURE ROBOT FOR EFFECTIVE FARMING

[1]Kausalya K, [2]Shibi Sangeeth J, [3]Yokesh Kumar A, [4]Vivek S
[1]Asst Professor, [2]Student, [3]Student, [4]Student
[1]Information Technology,
[1]Easwari Engineering College, Chennai, India.

Abstract : **Automation of farm activities can transform agricultural domain from being manual and static to intelligent and dynamic leading to higher production with lesser human supervision. This project proposes an automated irrigation system which monitors and maintains the desired soil moisture , humidity and temperature levels via automatic watering and pesticides spraying. Microcontroller on arduino uno platform is used to implement the control unit. Information from the sensors is regularly updated on a webpage using modem through which people can analyse the production and yield of crop using IOT. Also, the sensor readings are transmitted to a Thing speak channel to generate graphs for analysis.**

Index Terms **- Agriculture Robot, IOT, Sensors, Monitoring, watering, GSM.**

I. INTRODUCTION:

Agriculture plays vital role in Indian economy. Over 58% of the rural households depends on agriculture as thier principal means of livelihood. Currently Farmers are under growing pressure to intensify production to feed a growing population while managing environmental impact. The purpose of the project is to build a multipurpose agricultural robot which can perform various operations on field. One of the important profession in India is farming so it is essential to look out for automation in field work to reduce man power. Here this project focuses on farming work features like automatic irrigation system, monitoring of the field using parameters as temperature , soil moisture , humidity .All these parameters are monitored from field and transmitted to mobile unit using GSM module and also transmitted to web site for every 20 seconds by internet so that it is possible to make further analysis in future. The website can be accessed at any place by use of IOT.

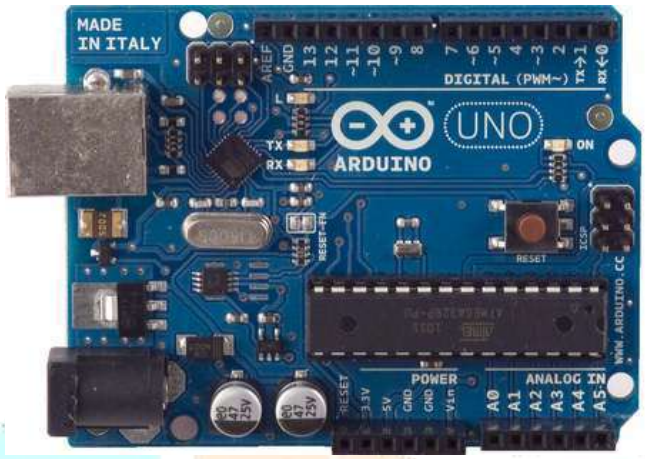
II. LITERATURE REVIEW:

In A Remote Measurement and Control System for Greenhouse Based on GSM-SMS [4] the proposed system introduced a GSM-SMS remote measurement and control system for greenhouse based on PC-based database system connected with base station. Base station is developed by using a microcontroller, GSM module, sensors and actuators. In practical operation, the central station receives and sends messages through GSM module. Criterion value of parameters to be measured in every base station is set by central station, and then in base stations parameters including the air temperature, the air humidity. Indu et al. (2013) [5] mainly focuses on reviews in the field of remote monitoring and control, the technology used and their potential advantages. The paper proposes an innovative GSM/Bluetooth based remote controlled embedded system for irrigation. The system sets the irrigation time depending on the temperature and humidity reading from sensors and type of crop and can automatically irrigate the field when unattended. Information is exchanged between far end and designed system via SMS on GSM network. A Bluetooth module is also interfaced with the main microcontroller chip which eliminates the SMS charges when the user is within the limited range of few meters to the designated system. The system informs users about many conditions like status of electricity, dry running motor, increased temperature, water content in soil and smoke via SMS on GSM network or by Bluetooth. In [6], R.Suresh et al. (2014) mentioned about using automatic microcontroller based rain gun irrigation system in which the irrigation will take place only when there will be intense requirement of water that save a large quantity of water. These systems bring a change to management of field resource where they developed a software stack called Android is used for devices that include an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. Mobile phones have almost become an integral part of us serving multiple needs of humans. This application makes use of the GPRS feature of mobile phone as a solution for irrigation control system. These system covered lower range of agriculture land and not economically affordable. In IOT SMS alarm system based on SIM900A [7], an IOT alarm system based on SIM900A module of SIMCOM Company was designed for greenhouse. The system can gather environmental parameters such as air temperature and air humidity. Meanwhile, with the use of AT command, this system can also realize SMS automatic sending and receiving, environmental parameters overrun alarm and insufficient balance alarm. Through the system setting,

the alarm message can be sent to the user-specified mobile phone automatically no matter what the users' location is. This system as a typical application of IOT in the agriculture has got some satisfactory results in the actual operation.

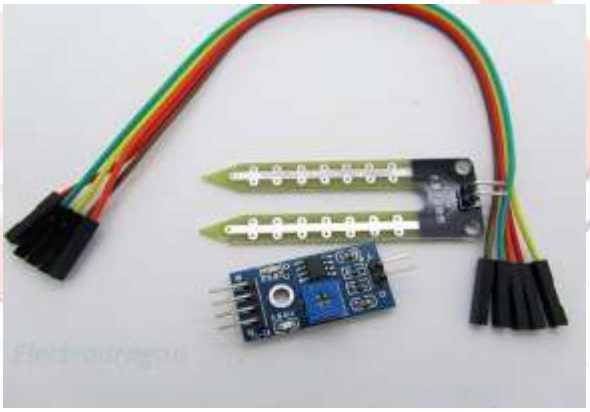
III. COMPONENTS USED:

1) ARDUINO UNO MICROCONTROLLER:



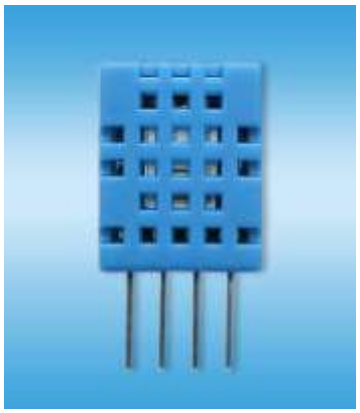
The Arduino microcontroller is an easy to use yet powerful single board computer that has gained considerable traction in the hobby and professional market. The Arduino is open-source, which means hardware is reasonably priced and development software is free. In this project arduino board is used and coding is done in such a way that the robot decides whether the plant needs water or pesticide or both. The inputs for the processing is got from the moisture and DHT sensors

2) SOIL MOISTURE SENSOR :



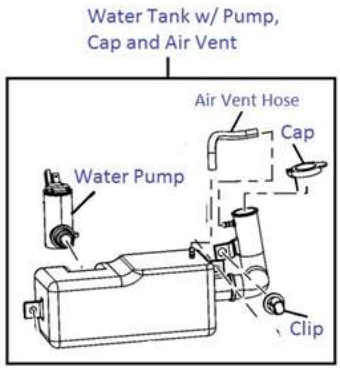
Soil moisture sensor is a sensor which senses the moisture content of the soil. The sensor has both the analog and the digital output. The digital output is fixed and the analog output threshold can be varied. It works on the principle of open and short circuit. The output is high or low indicated by the LED. When the soil is dry, the current will not pass through it and so it will act as open circuit. Hence the output is said to be maximum. When the soil is wet, the current will pass from one terminal to the other and the circuit is said to be short and the output will be zero. The sensor is platinum coated to make the efficiency high. The range of sensing is also high. It is anti-rust and so the sensor has long life which will afford the farmer at a minimum cost.

3) DHT 11:



DHT11 digital temperature and humidity sensor is a composite Sensor contains a calibrated digital signal output of the temperature and humidity. Application of a dedicated digital modules collection technology and the temperature and humidity sensing technology, to ensure that the product has high reliability and excellent long-term stability. This is used in field of agriculture for measuring the humidity and temperature which are the most essential things for crop growth.

4) FLUID TANK:

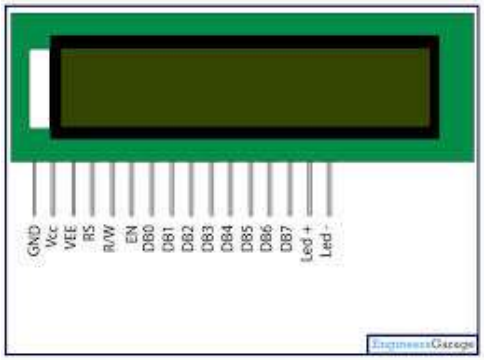


Fluid tank comes with a cap, clip and Air vent hose, It is connected with the water pump so as to supply water to the crops when the robot identifies that the specific plant needs water. It is not only used just for water but it is also used for pesticide spraying. All these watering and pesticide spraying operations are done by analyzing the crop, which is done by Arduino controller.

5) DC MOTOR:

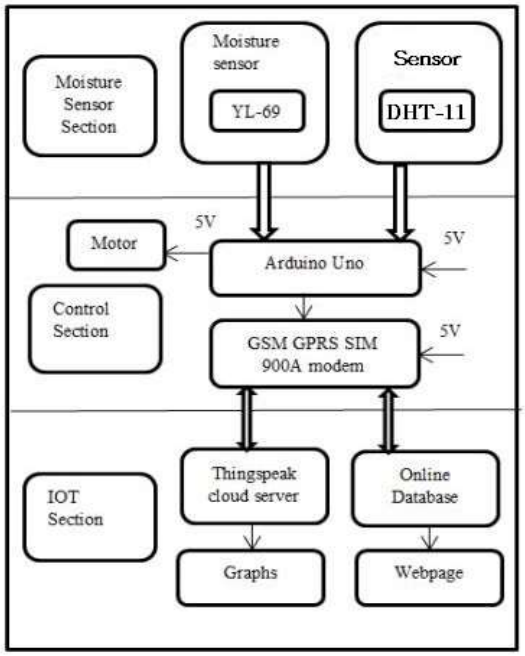
A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. In this DC motor is used to for watering the plants and for moving the robot.

6) LCD DISPLAY:



LCD display is Liquid Crystal Display. It is attached along with the arduino board so as to display the readings taken from the crops. The readings may be sensor moisture, humidity or temperature sensor readings for a particular crop.

IV. BLOCK DIAGRAM:



The system consists of combination of hardware and software components. The hardware part consists of embedded system and software is the webpage designed using PHP. The webpage is hosted online and consists of a database in which readings from sensors are monitored, stored and analysed for every 20 seconds. An Application controlled Robot is designed with a sensor for analysing the humidity, temperature and moisture and an arduino uno microcontroller is used along with it for deciding whether to water or pesticide spraying the plants based on the readings taken from the sensor.

V. METHODOLOGY:

Water sprinkler control was achieved by setting a threshold value at which irrigation should begin. When the sensors detect moisture content before the threshold, the sprinklers are switched on till the soil is completely moist. The information from sensors is transmitted to an online database from where it is used to display on a website. The webpage displays the moisture content in soil which has been divided into two categories : Low and High. Pump is to beswitched on when the moisture content is low. The threshold values depend on the type of soil used. Readings from the two sensors were also transmitted to a THINGSPEAK channel to

obtain graphs. ThingSpeak is an open data platform and API for the Internet of Things that enables you to collect, store, analyze, visualize, and act on data from sensors or actuators, such as Arduino.

VI. INTERMEDIATE OUTPUT AND RESULT:

The temperature, humidity and moisture readings are stored in the form of graph for every 20 seconds in the thingspeak server. This is the one of the output that we get from the readings taken. These readings on taking as a whole can also furthur be used for future analysis for farmers, in the way of helping them to predict the growth of crop and in which season or time does the crop requires more water. It also helps in predicting the part of land that needs to be done a soil testing. The next set of output that we get from this robot is that it waters the plant and apply pesticides to the plant based on the moisture, humidity and temperature level.

VII. CONCLUSION:

This paper present Agricultural robot robotic system for agriculture which can be modelled by various purposes using algorithm for comfort to farmers and can be interfaced by using Arduino board and various types of sensors. Various aspects shows Agricultural robot serves better result than manual system. It is expected that recent trends in robots shall make it to be used in enhanced role in future. In agriculture, Agricultural robot can be experienced for several advancements. Implementation of Agricultural robot has significant saving in terms of time, efficiency and saving the wastage of resources and reduced utilization of manpower should pay the cost once the system is activated. The scope of the system, especially in metro cities, is located in places where people are unaware of farming. Agriculture is more valuable compared to others fields for occupation. The utility of technology with agriculture consider for automation. The Farming System is a suitable system.

VIII. REFERENCES

1. “sanjukumar , R.V.krishnaiah, “Advance technique for Soil Moisture Content Based Automatic Motor pumping for Agriculture Land
Purpose”,International Journal of VLSI and Embedded System,ISSN:2249-6556.
2. Trohandl C,Proske M & Elmeureich W, “Remote Target Monitoring in Embedded System Lab courses using a Sensor Network ”, Proc.32nd Annual Conference on IEEE Industrial Electronics IECON.
3. Rafael C. gonzalez, Richard E.Woods,” Digital Image Processing”,Second Edition, pearson Education.
4. Dr.K.Thangadurai, Asst. Prof., PG & Research Dept. Of Comp. Science, Government Arts College (Autonomous), K.Padmavathi,Ph.D
Research Scholar Research & Development Centre, Bharathiar University ,” Computer Visionimage Enhancement For Plant Leaves Disease Detection”, 2014 World Congress on Computing and Communication Technologies.
5. K.Anusha1, T.Suresh2, K.Niranjan Reddy, GSM Based Automation System for Agricultural Field, IJCSMC, Vol. 4, Issue. 1, January
2015, pg.236 – 241.
6. Prof C. H. Chavan, Mr.P. V.Karande, ” Wireless Monitoring of Soil Moisture, Temperature & Humidity Using Zigbee in Agriculture”,
International Journal of Engineering Trends and Technology (IJETT) – Volume 11 Number 10 - May 2014
7. Jeonghwan Hwang, Changsun Shin and Hyun Yoe, “Study on an Agricultural Environment Monitoring Server System using Wireless Sensor Networks” Sensors 2010, 10, 11189-11211; doi:10.3390/s101211189.