Providing Smart Agriculture Solution to Farmer by using IOT

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Abstract*:* Internet of Things (IOT) plays a crucial role in smart agriculture. Smart farming is an emerging concept, most of the people over all worlds depended on Agriculture. IOT is Revolutionary technology that represents the feature of computing and communication and IOT sensors capable of providing information about their agriculture fields. Monitoring Environment factors is the measure factor to improve the yield of the efficient crop. Precision Agriculture sensor monitoring network is used greatly to measure agrirelated information like temperature, humidity, Soil Moisture etc. And also shows motor ON or OFF Condition So, with IOT farmers can remotely monitor their crop and equipment by phones and computers. This survey is used to understand the different technology and to build sustainable smart agriculture.

Keywords:- Arduino Atmega 328/P,Wi-Fi module, Sensors, Motor Protection Circuit ,IOT.

I.INTRODUCTION

Agriculture is the basis for the human species, as it is main source of food and it place important role in the growth of countries economy. It also gives large ample employment opportunities to the people. Internet of thing (IOT) is widely used in connecting devices and collecting data information and analysing the sensed information and then transmitting it to the user. Why do we need IOT in Agriculture? From survey of United Nations- Food and Agriculture Originations, the world wide food production should increased by 70% in 2050 for evolving population.

The farmers still using traditional methods for agriculture, which results in low yielding of crops and fruits. The increase in production with low cost by monitoring the efficiency of the soil, temperature and humidity monitoring, rain fall monitoring, fertilizer efficiency, monitoring storage capacity of water tanks an also theft detection agriculture areas. Agri-IOT architecture which enclosed with low cost, low power consumption of devices, better decision making process, QoS services,optimal performance and it is easy to understand the farmer without knowledge.

Our main objectives of this project are building smart agriculture monitoring system using IOT. Constantly monitor and control environmental conditions in agriculture sector. It focuses on saving water, increasing efficiency and reducing the environmental impacts on plants production. The user can see the atmospheric conditions of the agriculture plants on website and control the Agriculture area from faraway places. It is to increase the production of food stuff. To save water, power etc. to increase the production of medicinal plants.

The objectives of the work are as

1) To develop a sensor module for measurement oftemperature, humidity**,** soilmoisture and Rain Detection.
2)To develop module for motor parameter measurement and control.
3) To develop module to establish communication link between farmer and monitoring station.

II. LITERATURE SURVEY

IOT Based Monitoring System in Smart Agriculture includes monitoring temperature and humidity in agriculture field through sensors using CC3200 single chip. Camera is interfaced with CC3200 to capture images and send that pictures through MMS to farmers mobile using Wi-Fi [1].

A smart system of green house management based on the internet of thing is proposed using sensor networks and web-based technologies.The system consists of sensor networks and a software control system. The sensor network consists of the master control centreand various sensors using Zigbee protocols. The hardware control centre communicates with a middleware system via serial network interface converters. The middleware communicates with a hardware network using an underlying interface and it also communicates with a web system using an upper interface. The top web system provides users with an interface to view and manage the hardware facilities; administrators can thus view the status of agriculture greenhouses and issue commands to the sensor through this system in order to remotely manage the temperature,humidity and irrigation in the green house [2].

Proposed work is making agriculture smart using automation and IOT technologies. Smart GPS based remote controlled robot will perform the operations like wedding, spraying, moisture sensing etc. It includes smart irrigation with smart control and intelligent decision making based on accurate real time field data and smart warehouse management. It monitors temperature maintenance, humidity maintenance and theft detection in the warehouse. All the operations will be controlled by smart device and it will performed by interfacing sensors, ZigBee modules, camera and actuators with microcontroller and raspberry pi. All the sensors and microcontrollers are successfully interfaced with three nodes using raspberry pi and wireless communication. Thispaper gives information about field activities, irrigation problems and storage problems using remote controlled robot for smart irrigation system and smart warehouse management system respectively [3].

This paper describes wireless sensor Network. The network performs three nodes i.e. acquisition, collection and analysis of data such as temperature and soil moisture. The benefits of irrigation process in agriculture are decreasing water consumption and environment aspects. Cloud Computing is an attractive solution for high storage and processing capabilities of large amount of data by the Wireless Sensor and Actuator Network.This work aims to agriculture, greenhouses,golf courses and landscapes. Architectureis divided in to three main components: a WSAN component, a cloud platform component and a user application component. It contains three different types of nodes such as sink node, a sensor node and an actuator node. SimplitiTI is a simple protocol for WSAN implementation in a cluster tree topology. The soil moisture monitors to assess the plants it need water for its proper development and optimization of natural resources [4].

IOT in precision agriculture application using wireless moisture sensor network explained and proved the efficiency of feedback control method in greenhouse crop irrigation.A test was conducted to see the different these two methods. The methods are irrigation by schedule or feedback based irrigation.

Irrigation by schedule is to supply water to the plant at specific time periods. Feedbackbased irrigation is to irrigate plant when the moisture or level ofmedia wetness reached predefined value. The test shows that there is an average saving of 1,500 ml per day per trees [5].

Providing Smart Agricultural Solutions to Farmers for better yielding using IOT' M.K.Gayatriand J.Jayasakthi. 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 there positoriesa long with the location as GPS coordinate [6].

Sensor based Automated Irrigation System with IOT: A Technical Review 'India's Population is reached beyond 1.2 billion and the population rate is increasing day By day then after 25-30 years there will be serious problem of food, so the Development of agriculture is necessary. Today, the farmers are suffering from the lack of rains and scarcity of water. The main objective of this paper is to Provide an automatic irrigation system thereby saving time, money & power of the farmer. The traditional farm-land irrigation techniques require manual intervention. With the automated technology of irrigation the human intervention can be minimized. Whenever there is a change in temperature and humidity of the surroundings these sensors senses the change in temperature and humidity and gives an interrupt signal to the micro-controller [7].

III. PROPOSED WORK

Block diagram of proposed work:

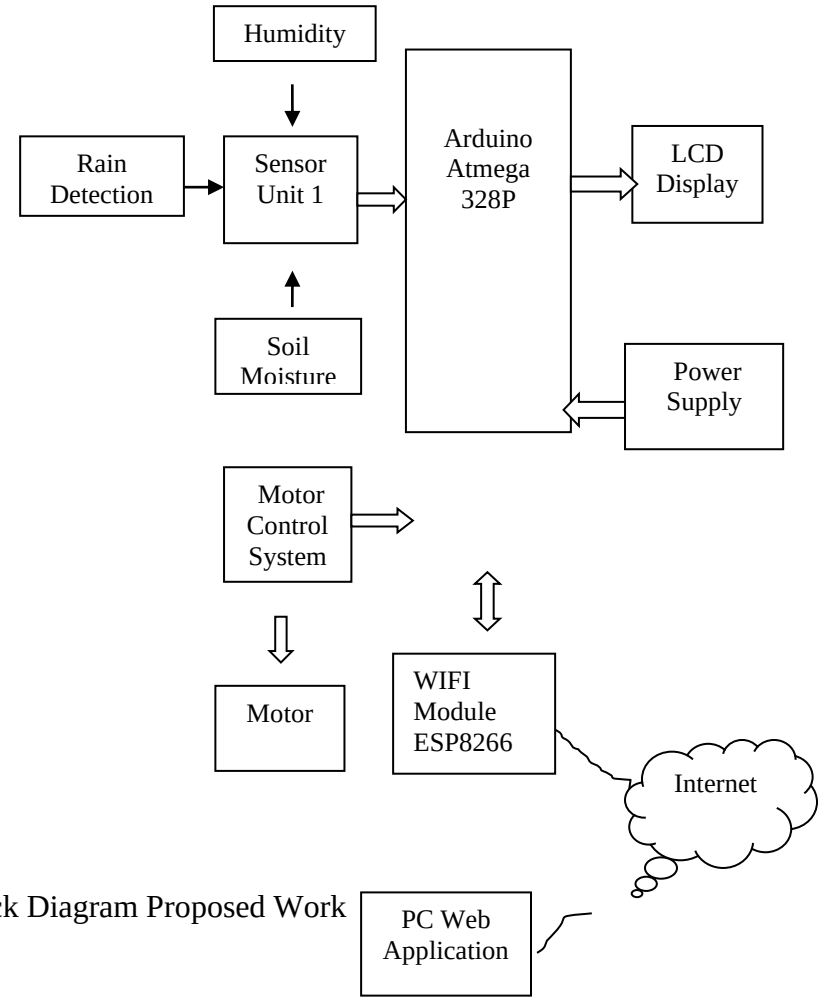


Fig1. Block Diagram Proposed Work

The basic architecture of wireless sensor node for environment monitoring is presented. The system is designed based on the following features: all nodes are similar in architecture and functionality, architecture can be improved in simple way; low power consumption, power effective, every node is capable of transmitting the data collected to the central system directly of working cooperatively with the rest one. We have developed the sensor nodes network using Arduino and IOT. Arduino acts as a main processor. A wireless sensor network consists of Arduino as a master as well as different types of sensors. A regulated power supply is provided to the overall system. The diagram of proposed work is depicted in figure1.

The wireless sensor technology comprises of ESP8266 (Wi-Fi Module) and sensors. Realizations of data gathered by sensors are transmitted to the web server using wireless transmission Wi-Fi module is used for wireless transmission between the field and the web server. The system is developed using open source hardware which proves to be cost effective and having low power consumption. The sensors will gather the data of various environmental parameters and provide it to web server which act as a base station. Some sensors will directly process the data and provide it to the web server while some sensors will provide the data through Arduino Uno to web server using serial interface.

The sensors are deployed in the farm which senses the current climatic values of agriculture. The sensed data is in analog form so it is given to ADC.ADC will convert analog signal to digital form and transmit the data to Arduino. Different types of sensors are attached to the sensor nodes. There is serial communication between sensor unit and Wi-Fi Module (ESP8266). A GUI is used to display the data on the computer. Four types of sensors are attached to it such as temperature, humidity, soil moisture, rain detector.

The humidity sensor DHT 11 is used here. Humidity sensor will measure the water content in the atmosphere. The rated voltage is DC 5V and its operating temperature is 0-600C.The temperature sensor is modulated on DHT 11. It will measure both temperature as well as humidity.

The soil moisture sensor can be used to test the moisture of soil, when the soil is having water shortage, the module output is at high level, or else the output is at low level. By using this sensor one can automatically water the flower plant, or any other plants requiring automatic irrigation technique. It is having adjustable sensitivity and threshold level can be configured.

The rain sensor module is an easy tool for rain detection. It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity. The module features a rain board and the control board that is separate for more convenience, power indicator LED and an adjustable sensitivity though a potentiometer. The analog output is used in detection of drops in the amount of rainfall. Connected to 5V power supply, the LED will turn on when induction board has no rain drop, and DO output is high. When dropping a little amount water, DO output is low, the switch indicator will turn on. Brush off the water droplets, and when restored to the initial state, outputs high level.

Single phase protection circuit protect motor from single phasing. when 3 phase are available(RYB), then SPP circuit output is zero to base of transistor.Hence the transistor is off condition.An otherwise any one Phase is not available then SPP circuit will gives high signal to base of transistor and it acts as switch. Low signalgives to ATmega 328/p analogpin and both relays in off condition so Motor will stop running and protect it

IOT is used for transferring of data of devices via internet. By using IOT we can control the appliances anywhere and anytime by just using the SSH remote login.The cloud provides storage and computing resources to implement webs application. The data is stored on the web server.

HARDWARE IMPLIMENTATION

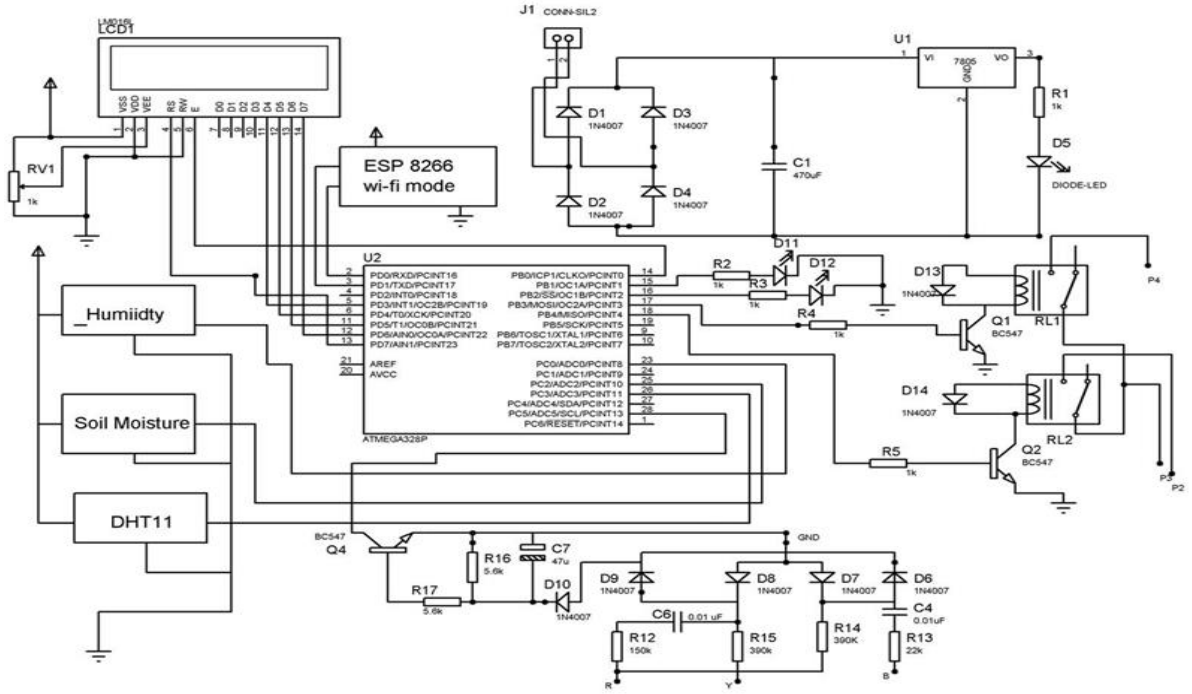


Fig.2 Cicuit diagram for Smart Agriculutre using IOT

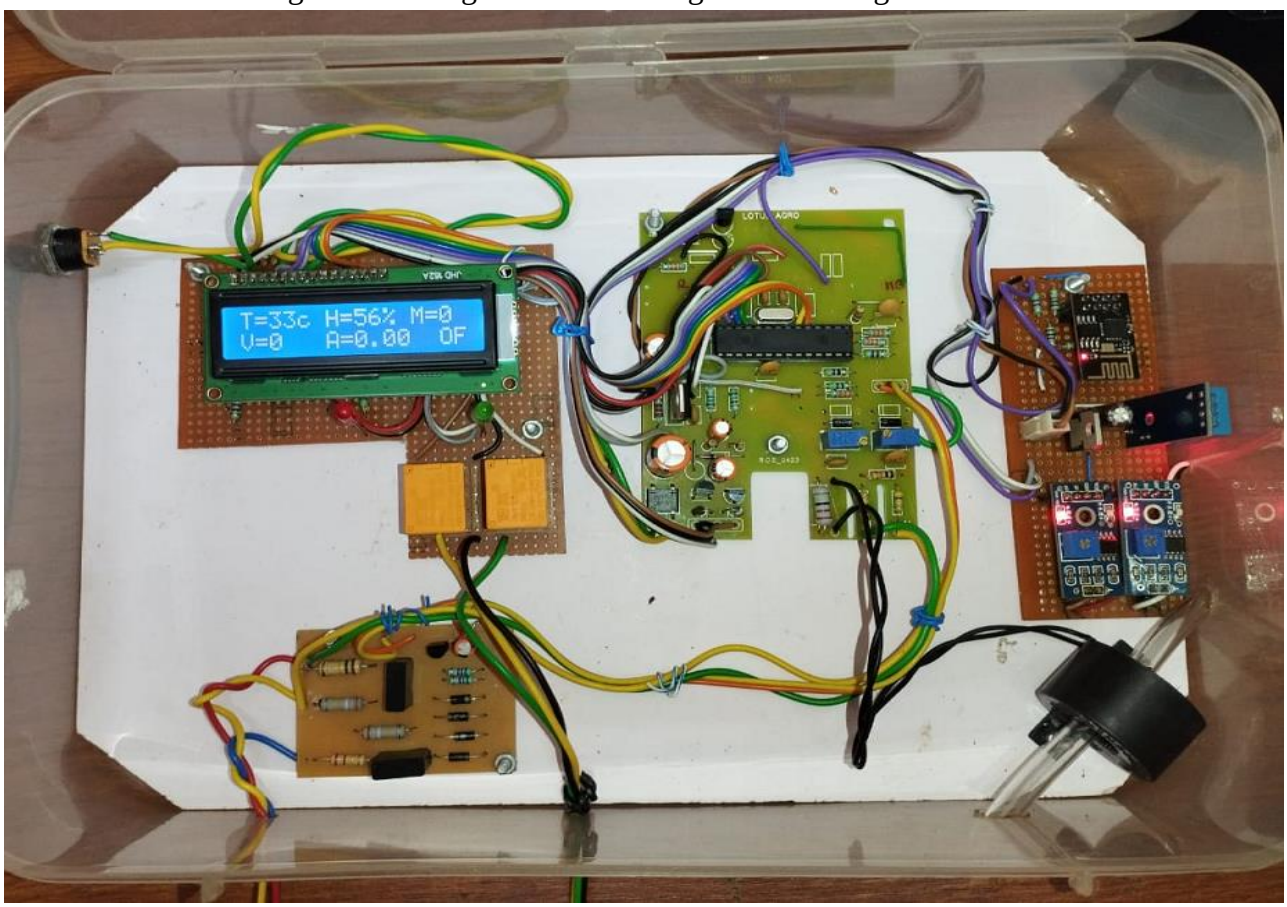
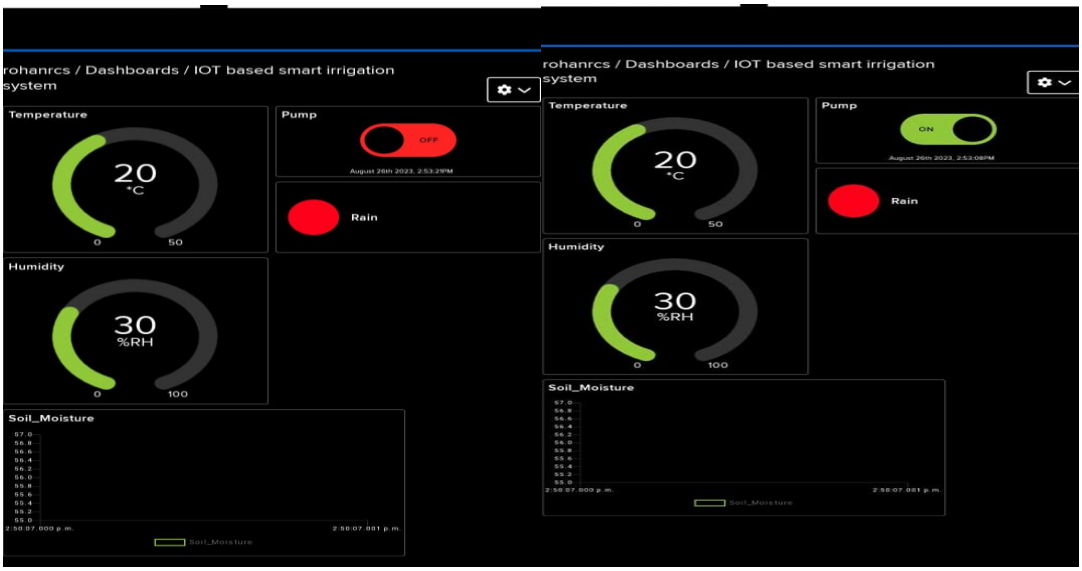


Fig.3 Hardware of the system

V. RESULT AND DISCUSSION

Web page result

This gives us the webpage result. We can observe the current climatic conditions in the agriculture sector on the webpage. One can watch it from anywhere because of internet of things. Smart agriculture monitoring system provides advanced system for farmers. Every time the sensors sense the climatic conditions it is displayed on this webpage. The refresh time is about 10 seconds. The changes in temperature, humidity, moisture and rain detection are displayed on this page. The changes in temperature and humidity are displayed in terms of digits. Soil moisture measures the water shortage and gives output either low or high. Rain detector detects rainfall, if there is no rain it outputs as Red dot rain otherwise it indicates as green dot as raining. For Motor Protection it shows that, either motor ON or OFF.



IV.CONCULSION

The developed system is Simple and cost effective than most other systems present in the market. It measures different environmental conditions. It includes measurement of atmospheric temperature, relative humidity,soil moisture and rain detection etc. and also shows that Motor ON or OFF. system uses wireless module for the data transfer communication purpose. So it can be use in open fields and reduces the human power and it also allows user to see accurate changes in crop yield.The developed system is more efficient and beneficial for farmers andconsumes less power.

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