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Low Cost Feature Agriculture System and Smart Irrigation Technology Using IOT

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ABSTRACT: Agriculture is known to be one of the most important economic activities. We need an increasing of decision support systems. This is the project from the motivation of the farmers working in the farm lands to design and develop an agricultural monitoring system using sensor network to increase the productivity and quality of farming without observing it for all the time manually. The productivity, growth, and quality of plants in agriculture it is depend on water level, humidity and tempter. We are using smart sensors like soil moisture, humidity and tempter sensors. These sensors are giving the values that values are stored in data servers. In this work we are using Aurdino IoT based system for collection and transfer the data sensors to Google drive.

I. INTRODUCTION

In terms of the production and consumption of goods agriculture play a key role in the life of our wealth. It is the foundation of our economic system. It provides food and raw material and also opportunities to the people in a large segment. The labour requirement and cost can be reduced by using the automation of data in regular period. The aim of our work is to propose solutions for the water saving and crop monitoring in real time with a using smart sensors like soil moisture, humidity and tempter sensors with the help of Aurdino 2560 IoT based system. It also helps in effective collection and transmits information, process all data, determine and control the equipment with advance technology for well organized and cost and crop production.

II. RELATED WORK

[1]The making of agriculture automation in hears they used GPS based remote controlled robot to tasks performing. [2] This paper proposes a novel methodology for a smart sensing system using wireless communication. [3] This paper mainly focused on the video monitoring system using wireless communications.[4] This paper mainly focuses on the measurement of PH of the soil, soil moisture content by using novel methodology. [5] The collection of the data of environment controlling the irrigation system via smart phone.

III. SYSTEM DESIGN

The design of the system is more important to this project. In this design we use Arduino 2560 Microcontroller to control all the sensors and components. The motor was not connecting directly so we use relay board between motor and microcontroller. We use wifi modem for data update. This all components connects are shown in below figure.

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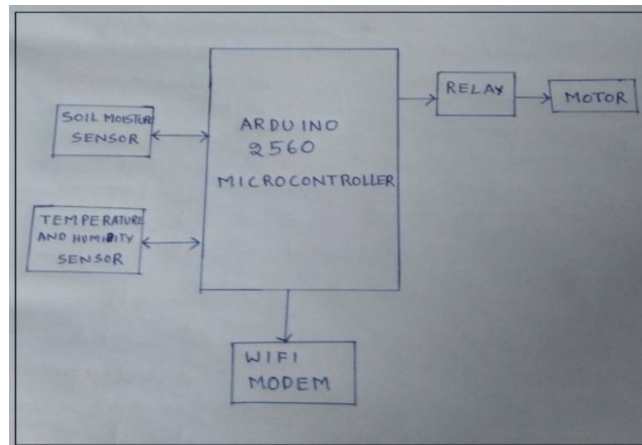


Fig: Block diagram of smart agriculture system

IV.SENSORS

In IoT projects sensors are act major role. We use sensors detect and take some type of inputs what we need. Sensors are used in agriculture to monitoring and collect the data of soil, water availability. In this project I am using mainly two sensors they are

1. Temperature and humidity sensor
2. Soil moisture sensor

Temperature and humidity sensor (DHT11)

we are using DHT11 sensor module for generates calibrated digital outputs of temperature and humidity values. This sensor is low cost and high reliability and long stability. It is interface with microcontroller like Arduino, raspberry pi etc.

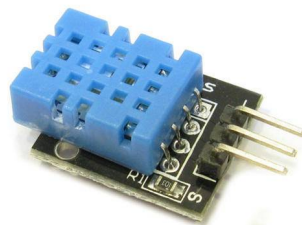


Fig: Temperature and humidity sensor (DHT11)

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Soil moisture sensor

This is soil water sensor. This can be used to detect soil moisture module output is high. This sensor has a fixed bolt hole for easy installation. This sensor has a potentiometer to set the desired moisture threshold.

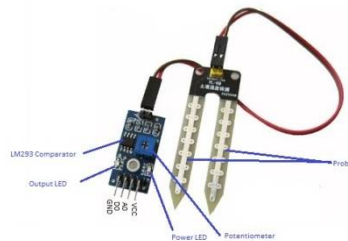


Fig: Soil moisture sensor

V. IoT(Internet of Things)

The IoT(Internet of Things) is a network of physical object devices, building and other items made with electronics, software, sensors and network connectivity which enables to exchange and collect data. The IoT allows gadget to be sensed and controlled casually across network infrastructure, for more direct integration of the physical world in to computer based system. When IoT is augmented with sensors and actuators, the technology becomes more instance general class of cyber physical systems which encompasses some technologies smart home, grids, cities etc. IoT is an architecture which comprises hardware board, software systems, and protocols which together creates an environment that allows smart embedded devices to be connected to internet while the sensory data can be accessed and can be triggered over internet. These devices must be uniquely discovered in most internets. IoT devices essentially have IPV6 addressing scheme. Unique IP addresses makes IoT devices to discover in internet as independent node.

VI. ARDUINO MEGA2560

The Arduino Mega 2560 is a microcontroller board based. This microcontroller have 54 digital input/output pins, 16 analog inputs, 4 UARTs (hardware serial ports), 16 MHz crystal oscillator, one USB connection, one power jack, an ICSP header, and one reset button. It encloses everything needed to support the microcontroller. It's simply connected to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

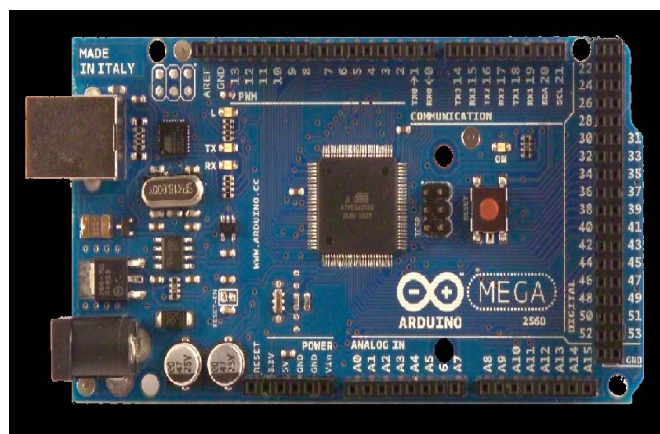


Fig: Arduino Mega2560

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The Arduino Mega2560 has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. This microcontroller provides 4 hardware UARTs for TTL (5V) serial communication. The board channels one of these over USB and provides a virtual com port to software on the computer.

VII. WORK CONTROLFLOW

In this proposed work we are gathering the data from sensors and we read that data. If the soil water level data in range then the motor was on otherwise we read the data again .we can see the below chat it shows work control flow.

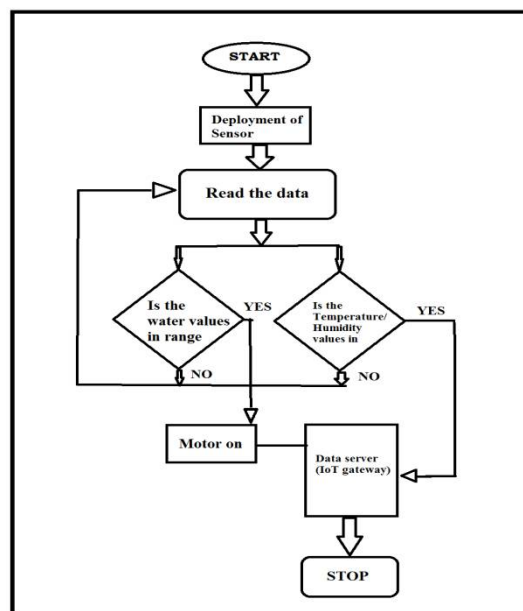


Fig: Flow chart

VIII. IMPLEMENTAION

This project deals a water save and crop monitoring system in farming. The implementation is provided by dividing project into two modules.

1. Hardware
2. Software

Hardware

The arduino mega 2560 processor was we are using in this project. This arduino mega 2560 processor is that is connects all the components. These processors have 54 pins digital input/output and 16 analog inputs. The sensor which gives threshold values is set in arduino mega 2560. The processor responsible for motor on and off control in farming land. The values are generated from sensors they are updated into server. In this project we are using Google spared sheet for store the data. This data was updated in every 1 minute using esp8266 wifi module.

Software

Arduino IDE is we are using for software support. In this software we write the program for hardware process like collect the data from hardware devices. In this program we declare that data collection and motor on and off when the threshold vales what we are given and total data was send to server through wifi module. We wrote another program in

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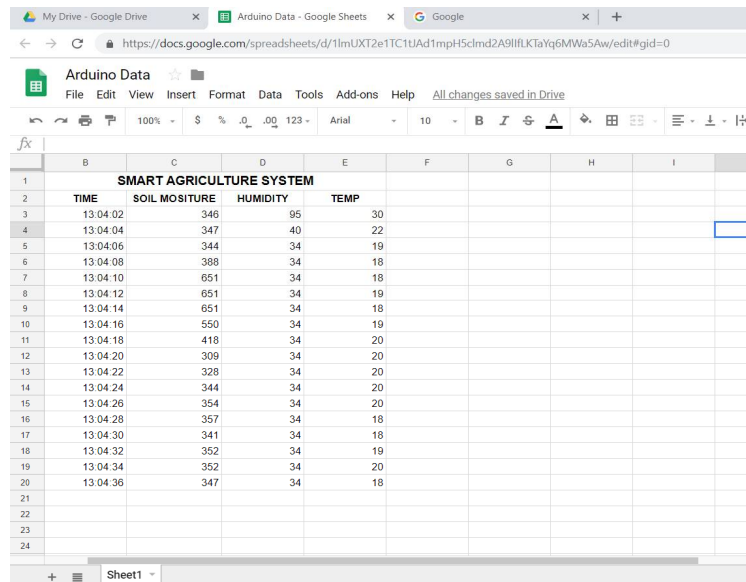
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server. In this program we declare that when wifi module was send the data the server was receive that data and save the data in to Google spread sheet. By using this program we can save the data in every 2 seconds.

IX. RESULTS

The hardware components are interfaced with Arduino microcontroller. The values form sensors are updated to cloud. The values are shown in below figure.



SMART AGRICULTURE SYSTEM				
TIME	SOIL MOSITURE	HUMIDITY	TEMP	
13:04:02	346	95	30	
13:04:04	347	40	22	
13:04:06	344	34	19	
13:04:08	388	34	18	
13:04:10	651	34	18	
13:04:12	651	34	19	
13:04:14	651	34	18	
13:04:16	550	34	19	
13:04:18	418	34	20	
13:04:20	309	34	20	
13:04:22	328	34	20	
13:04:24	344	34	20	
13:04:26	354	34	20	
13:04:28	357	34	18	
13:04:30	341	34	18	
13:04:32	352	34	19	
13:04:34	352	34	20	
13:04:36	347	34	18	

Fig: Updated values

In these values at first the soil moisture value is 346. This is the normal value so the motor was on automatically. When the value was reach threshold value the motor off. Hear the threshold value is 651. below figure shows the graph model of this process.

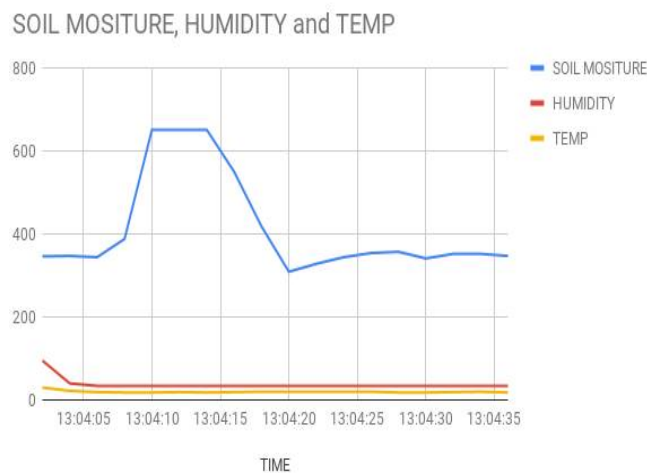


Fig: ANALYSIS

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X. CONCLUSION

This paper contains a monitoring system using IoT for a crop production. It has an importance consequence to develop Agricultural Information. Aurduino 2560 processor is integrating with temperature, humidity and water level to help the agriculture monitoring and production of the crop. The motor is controlled automatically depending upon the threshold value. The monitored details of the crop are transfer to the cloud through IoT. Therefore an agronomist can easily ingress and control the production of agriculture can the input materials, improve profitability, productivity and efficiency in production of farming system.

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