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Smart Agriculture Monitoring System

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Abstract: ***In this morden industry remote monitoring and controlling equipment at farm from a long distance is challenging now a days. At present we are able to control the equipment with the help of smartphones using IOT. This paper presents a novel of smart agriculture system using ATmega328P with global connection using Internet of Things (IOT). Internet of Thing (IOT) plays a important role in smart agriculture system. Smart agriculture helps to reduce the farmers work. It works automatically or farmer can operate it from anywhere. Smart agriculture monitoring system used wireless sensor network that collect all live information from different sensors and send that data through wireless protocol. Sensors that are used in system provides information about agriculture field. This project is developed to monitor crop-field using sensors (Soil Moisture Sensor, Rain Sensor, Temperature and Humidity Sensor).***

Keywords: Internet Of Things (IOT), Smart Agriculture using IOT, ATmega328P, Measuring Soil Moisture, Humidity And Temperature Of The Field Also Rain Detection System.

I. INTRODUCTION

Most of the peoples in India are depends on farming and farming is main source for those peoples. We saw from previous 10 years the food prices are constantly growing because quality of crop has dropped due to which crop is getting less and price is growing. Number of factors are affect on the crop that causes due to soil fertility most of the time, fertilizer misuse, climate changed or diseases and water little etc. This all overcome by using smart agriculture monitoring system it gives sufficient water time to time when field needs water this is done by using soil moisture sensor also in rainy season it used to alert farmer using rain sensor. Temperature and Humidity sensor is used to measure the climate changes. Float sensor is used to measure the water level in well and other water sources level float sensor indicate the water level and using that measure water level pump will start when soil needed water. If well has no water then using other IOT module this system shows alert to farmer mobile by calling to farmer or by SMS. In this system we are using ATmega328p microcontroller. All sensors are connected with ATmega328p and it take output values from sensors and it sends to farmer by using GSM module and our IOT server through WIFI module (ESP8266).by using IOT we send the collected data directly to central server in real time. Means we have automatic data collection data processing is done using computers.

II. BLOCK DIAGRAM

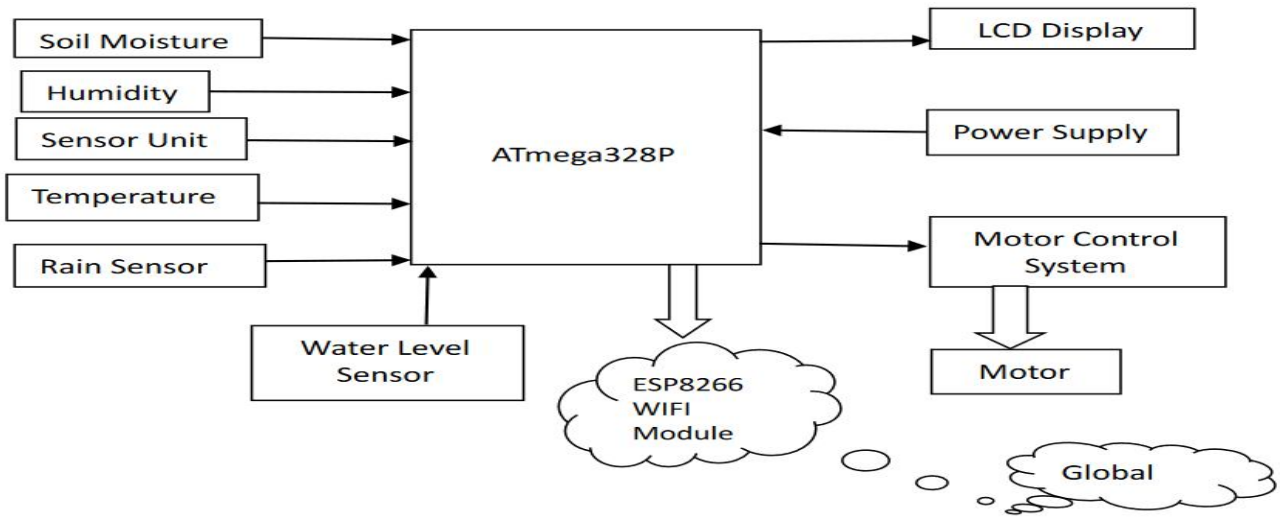

Fig. 1 Block Diagram

Block Diagram Description

1) *Collection of Sensory Data:* All data from sensors unit is collected and given to ATmega328P microcontroller.
2) *Wireless Data Transfer:* Data obtained from the sensors is transferred to a web using WIFI module.
3) *Decision Making:* The pump will automatically turn on when moisture level in soil falls below the threshold.
4) *Mobile Application:* The mobile app is used to controlled the system from anywhere

A. Sensor Use

1) Soil Moisture Sensor

The soil moisture sensor is used to measure water content in soil the sensor has both digital and analog outputs the electrodes of soil moisture sensor are inserted in soil. the moisture in the soil is indirectly by the conductivity of soil. The soil moisture sensor produce an output voltage according to resistance by measuring resistance we can determine soil moisture level. if the soil is more conductive means resistance is low then more water in the soil and it have better conductivity. If the soil is less conductive means resistance is high means it has low conductive. The operating temperature of sensor is in ranges from -40degree Celsius to +60 degree Celsius and operating current is 14mA.

Fig 2: Soil Moisture Sensor

2) DHT22 Sensor

The DHT11 sensor is a basic and low cost sensor the output of the sensor is in digital form. It uses a thermistor for temperature and a capacitive humidity to measure the surrounding air and split out a digital signal no analog pin is needed. It provide temperature and humidity readings it is most widely used sensor in DHTxx series. The operating voltage of sensor is ranges from 3 to 5V.

Fig 3: DHT11 Sensor

3) Rain Sensor

The rain sensor is used to rain detection. Its resistance inversely proportional to amount of water. If more water on the surface of rain sensor then it has lower resistance and when less water on surface of rain sensor its result into a higher resistance which means sensor produce output voltage according to resistance. A typical rain sensor has two component sensing pad and electronic module according to the resistance output voltage produce by module.

Fig 4: Rain Sensor

4) Water Level Sensor

Water level sensor used to measure the water level of tank. The sensor has ten exposed copper traces, five of which are power traces and the remaining five are sense traces.These traces are interlaced so that there is one sense trace between every two power traces.Normally, power and sense traces are not connected, but when immersed in water, they are bridged.The power and sense traces form a variable resistor whose resistance varies based on how much they are exposed to water.

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Fig 5: Water level Sensor

B. Blynk Platform

Blynk is an IoT platform for IOS or Android smartphones that is used to control Arduino, Raspberry Pi and NodeMCU via the Internet. This application is used to create a graphical interface or human machine interface (HMI) by compiling and providing the appropriate address on the available widgets.Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

Blynk App: – It allows you to create amazing interfaces for your projects using various widgets which are provided.

Blynk Server: – It is responsible for all the communications between the smartphone and hardware.

C. Wifi Module (ESP8266)

Wifi modules or wifi microcontrollers are used to send and recieve data over Wi-Fi. They can also accept commands over the Wi-Fi. Wi-Fi modules are used for communications bewtween devices. They are most commonly used in the field of Internet of Thnigs.

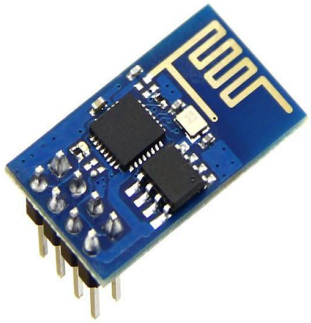
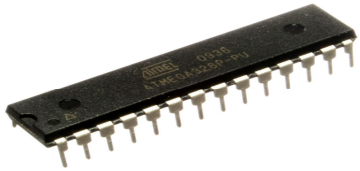


Fig 6: Wifi module(esp8266)

D. ATmega328P Microcontroller

The ATmega328 is a single-chip microcontroller created by Atmel in the megaAVR family (later Microchip Technology acquired Atmel in 2016). It has a modified Harvard architecture 8-bit RISC processor core.It can commonly be found as a processor in Arduino boards such as Arduino Uno.It is 28 pin microcontroller.



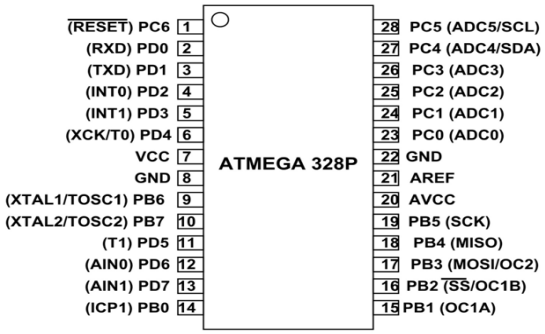


Fig 7: Atmega328p

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III. SCHEMATIC DIAGRAM

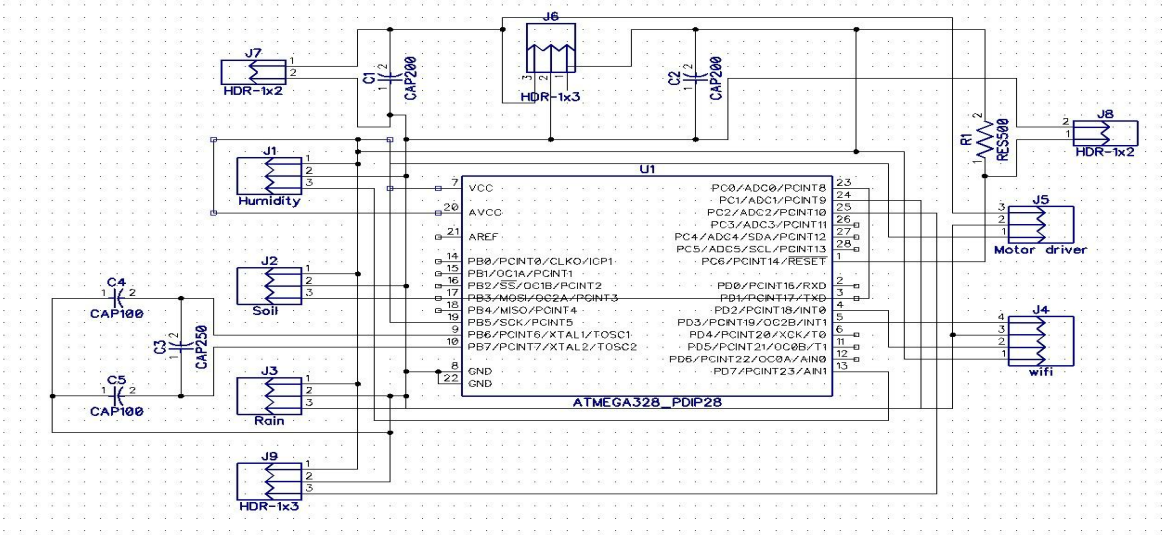


Fig. 8 Schematic Diagram

IV. FLOWCHART

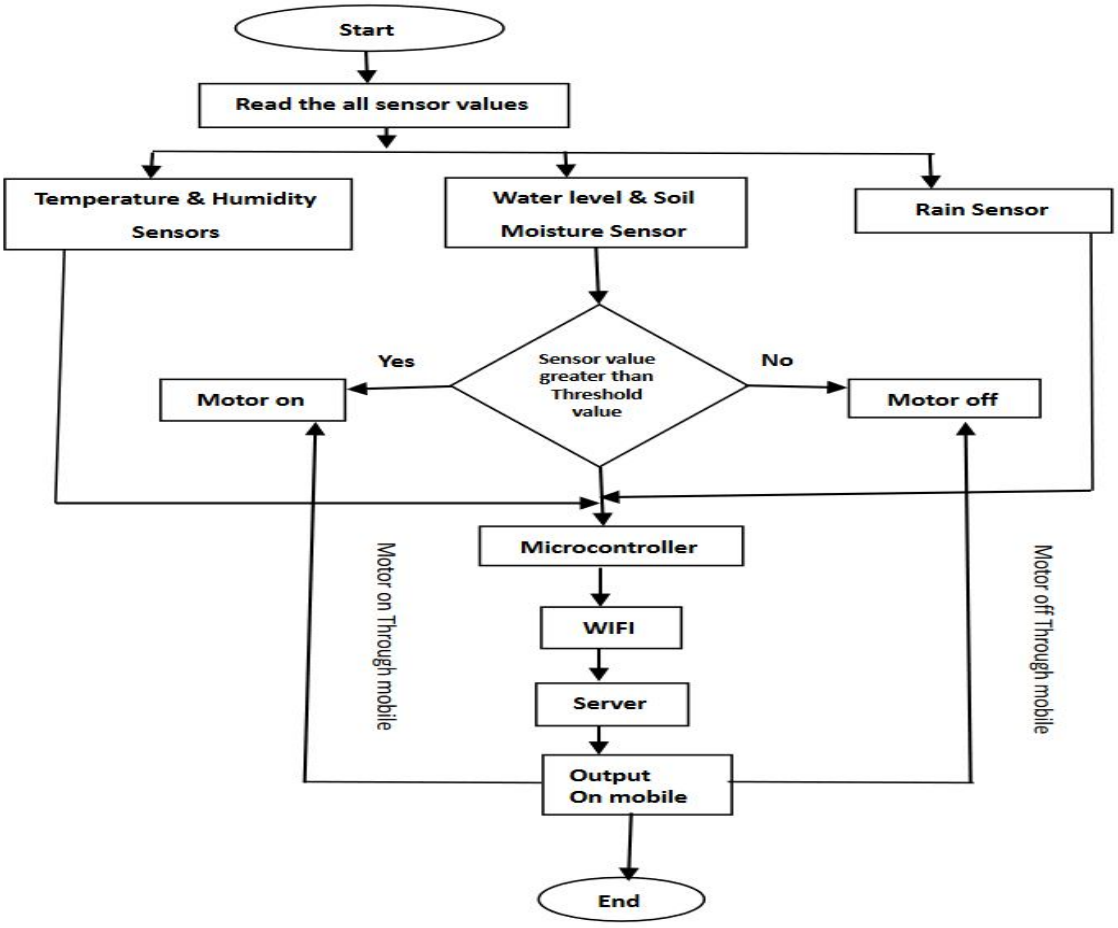
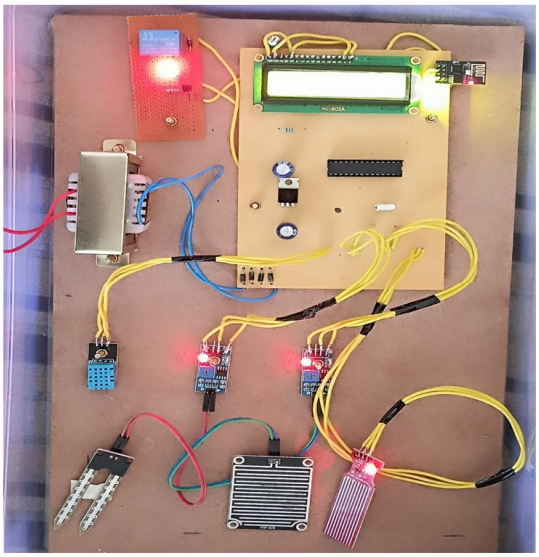
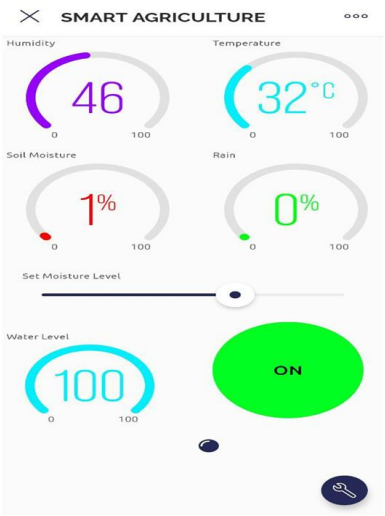


Fig. 9 Flow Chart

V. HARDWARE





VI. CONCLUSION

All This paper is used to brief the Smart Agriculture Monitoring System Using IOT. This technique will explain the used of IOT in the real world problem solving. It collect all data from sensors and send the data to the users via cloud. This system increase the productivity and also increase the quality. It reduce the farmer working time.

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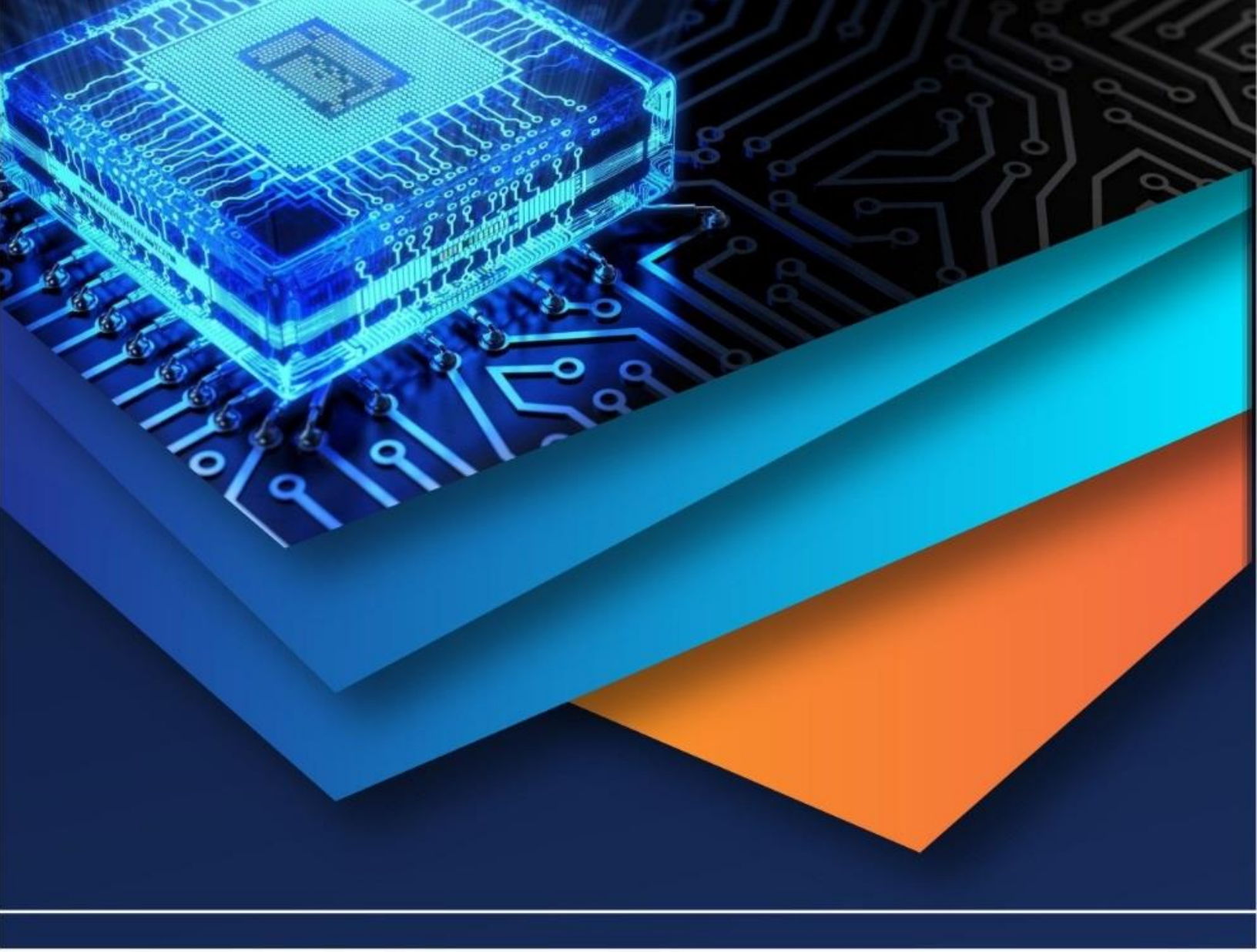

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