CHAPTER 1

Introduction

Agriculture is the backbone of India. In India 70% of population depends upon farming and one third of the nations capital comes from farming. It is the science or practice of farming, including cultivation of the soil for the growing of crops. it consists of various phases that are depends on the environmental factors such as Temperature, Soil moisture and water level. Farmers need to keep the records of these environmental factors manually to cultivate crops properly. To avoid such burden from farmer, and to achieve such functionality farmers require a System which will be able to gather the information, from farm such as Temperature level, water level and soil moisture via various sensors.

The agricultural convergence technology is a technology to create a high value production quality increase of agricultural products in the whole process of agricultural production. In addition, implementing precision agriculture, which is an alternative to the future agriculture, through the convergence technology that allows prediction of supply and demand, real-time management and quality maintenance during the entire life cycle of agricultural products.Agriculture is one of the important sources of survival and one of the most important factors in the economic growth of the country.

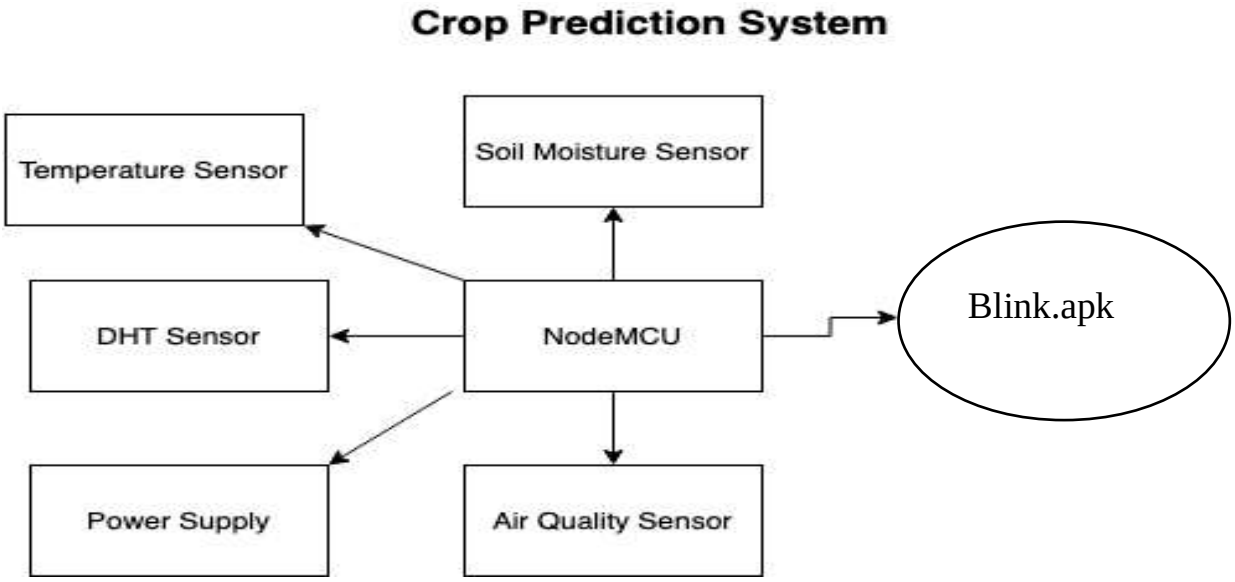
CHAPTER 2

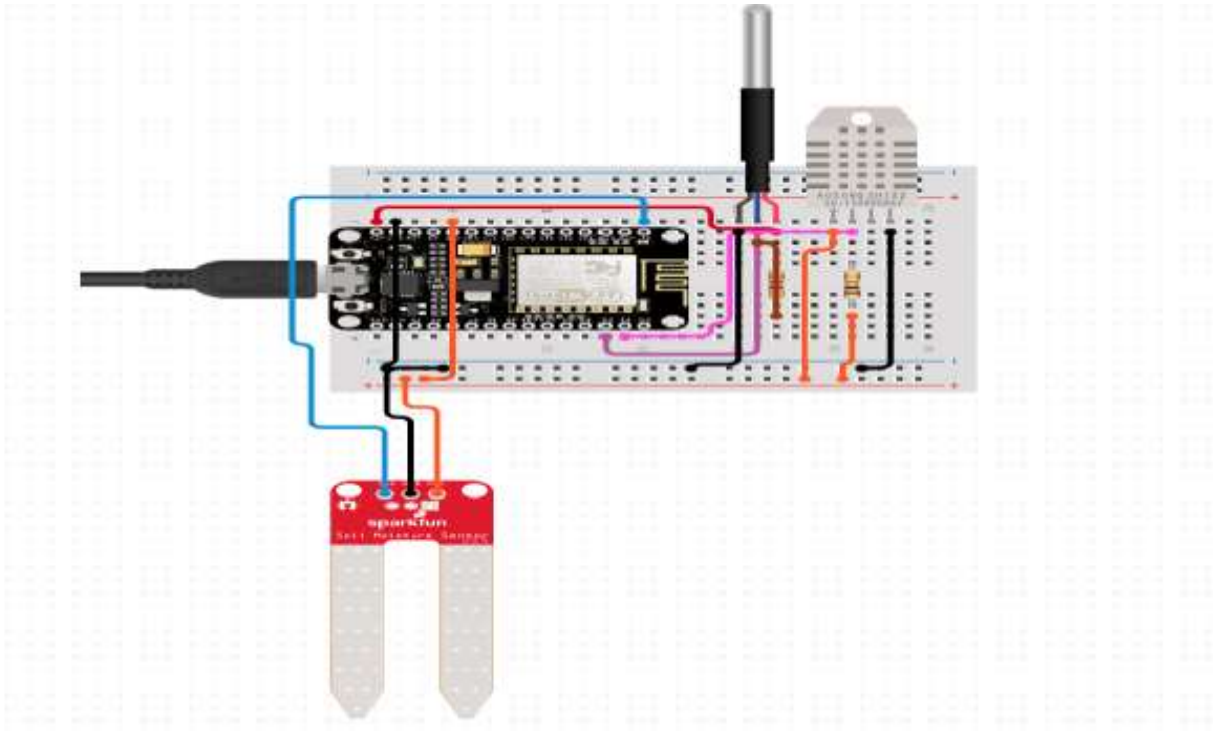
Literature Survey

Mostly the agriculture is ineffective in India because of the lack of knowledge about agriculture and usage of fertilizers. At present soil ingredients are being tested only at soil testing laboratory , where they use primitive method. In the existing system the soil can be tested just to check out the fertility and the moisture level. It has to be given to the lab for testing the soil. It will take some days to fetch result. Farmers are suffering much to get the farm lands survey reports quickly. Farmers get scared of rain every year for their demand yield. In primitive method, various soil nutrients can be suggested with the help of pH value. Asper the availability of nutrients, recommendation of cultivating particular crop will be given with the help of pH electrode.

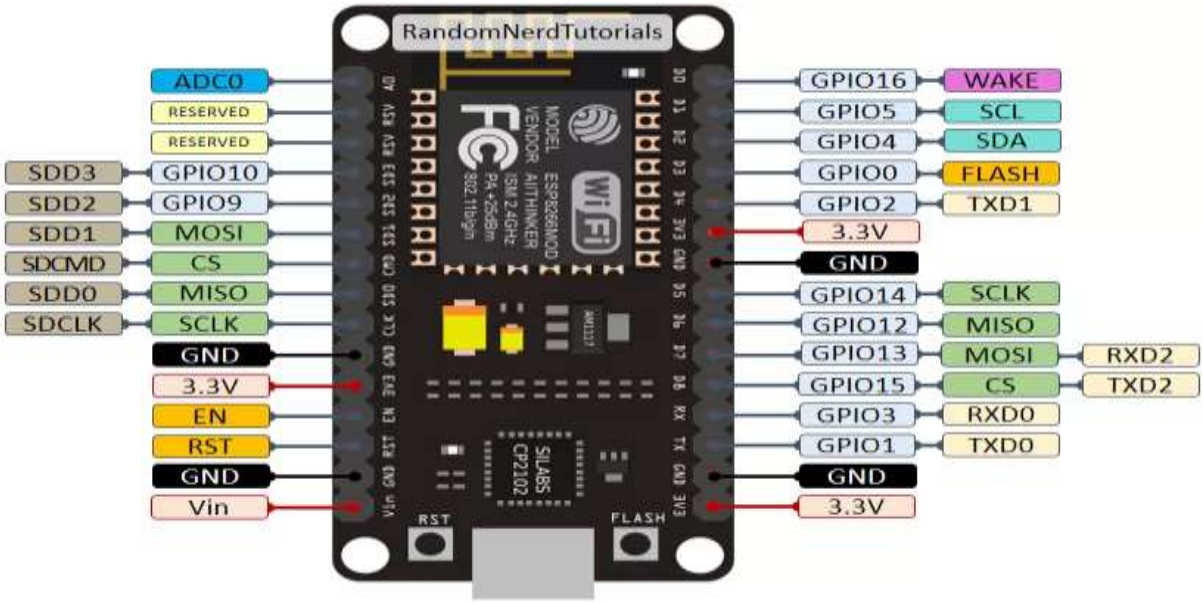
CHAPTER 3

Design

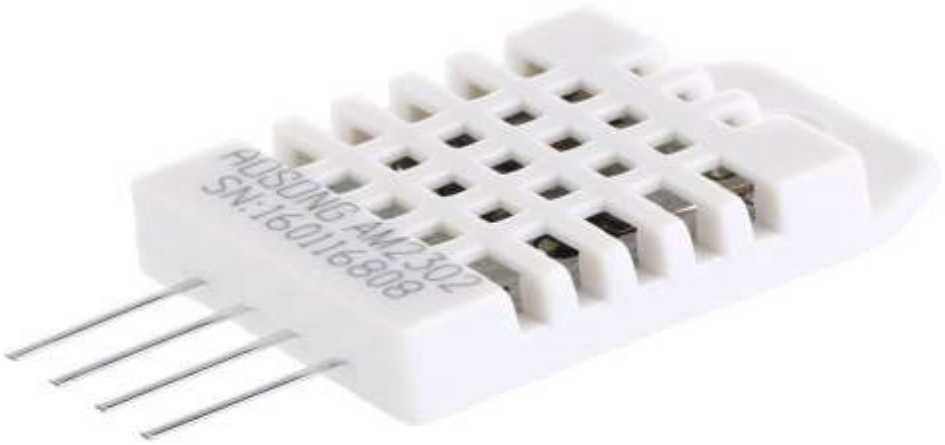




NodeMCU



DHT22 Sensor



DHT22 - AM2302

Soil Moisture Sensor

DS18B20 Temperature Sensor

MQ135 Air Quality Sensor

CHAPTER 4

Methodology

Our system will overcome the drawbacks of the primitive methods used till date. Here the soil parameters and nutrients present in the soil to determine the fertility level of that soil. Along with soil analysis our system will also predict the crops. It compares the present data and existing data collected from the Department of Horticulture and agriculture according to the different parameters like pH, moisture, temperature values. Farmers can test the soil multiple number of times during cultivation process and take necessary precaution to get good yield. The system takes the time period in which the farmer wants to start cultivating a crop as user input. Taking account the farmer's location, the system then decides on the crops that can be cultivated during that time period and provides a rank of crops that will be profitable based on the yield rate predictions obtained in that particular region at that given time. The application provides an easy sign up and sign in feature which facilitates in storing previously selected crop and the cost of cultivating that crop information for each user. Alongside that, the it provides scientific cultivation instructions for each of the crop through cultivation, fertilization and irrigation suggestion feature as well as the schedule for those activities as crop calendar. The cost calculator feature can help the farmer to keep track of his expenses and in making crop selection decisions by providing previous cultivation cost history. For efficient access to these information, the database was designed to be distributed between the local and cloud server.

CHAPTER 5

Code

```
#include <ESP8266WiFi.h>
#include <WiFiClient.h>
#include <ESP8266WebServer.h>
#include <ESP8266HTTPClient.h>
#include "DHT.h"
#include <OneWire.h>
#include <DallasTemperature.h>
#include "MQ135.h"

const int oneWireBus = 4;     // soil temp sensor pin  connect to D2
int sensor =16;   //moisture sensor pin  connect to D0
#define ANALOGPIN A0    // Air Quality sensor pin connect to A0
#define RZERO 206.85    //  Define RZERO Calibration Value
MQ135 gasSensor = MQ135(ANALOGPIN);
// Setup a oneWire instance to communicate with any OneWire devices
OneWire oneWire(oneWireBus);
// Pass our oneWire reference to Dallas Temperature sensor
DallasTemperature sensors(&oneWire);
DHT dhtA(0, DHT22);  //  DHT22 sensor pin connect to D3

/* Set these to your desired credentials. */
const char *ssid = "divya";  //ENTER YOUR WIFI SETTINGS
const char *password = "12345678";
```

```
//Web/Server address to read/write from
const char *host = "http://trilocode.com/demo/temp/add_prod.php";

void setup()
{
   Serial.begin(115200);
   WiFi.mode(WIFI_OFF);
   delay(1000);
   WiFi.mode(WIFI_STA);

   WiFi.begin(ssid, password);     //Connect to your WiFi router
   Serial.println("");

   Serial.print("Connecting");
   // Wait for connection
   while (WiFi.status() != WL_CONNECTED)
   {
    delay(500);
    Serial.print(".");
   }
      Serial.println("");
   Serial.print("Connected to ");
   Serial.println(ssid);
   Serial.print("IP address: ");
   Serial.println(WiFi.localIP());  //IP address assigned to your
ESP(EXTRASENSORY PERCEPTION)

   sensors.begin(); // Soil moisture sensor
```

```
    float rzero = gasSensor.getRZero();
    delay(1000);
    Serial.print("MQ135 RZERO Calibration Value : ");
    Serial.println(rzero);

    dhtA.begin();

    //If connection successful show IP address in serial monitor

}

void loop()
{

  HTTPClient http;    //Declare object of class HTTPClient

  //-----------------------------------------------------Soil temp code ----------------------
-------------------------------------------------------------------
          sensors.requestTemperatures();
          float temperatureC = sensors.getTempCByIndex(0);
          Serial.print(temperatureC);
          Serial.println("ºC");
  //-----------------------------------------------------------------------------------------
-------------------------------------------------------
```

```
  //-------------------------------------------------Air quality (MQ135) code ---------
-------------------------------------------------------------------------------

        float ppm = gasSensor.getPPM();

        delay(1000);

        Serial.print("CO2 ppm value : ");

        Serial.println(ppm);

  //-------------------------------------------------------------------------------------
-----------------------------------------------------

  //-------------------------------------------------DHT22 Sensor code ----------------
-------------------------------------------------------------------

          float h1 = dhtA.readHumidity();           // f1 and h1 are celsius and
humidity readings

          Serial.println(h1);

          float t1 = dhtA.readTemperature();        // from DHT/A

          Serial.println(t1);

    //-------------------------------------------------------------------------------------
-----------------------------------------------------

 //-------------------------------------------------Soil Moisture Sensor code ---------
-------------------------------------------------------------------------------

          int data = digitalRead(sensor);

          Serial.print("Moisture sensor value : ");

          Serial.println(data);

    //-------------------------------------------------------------------------------------
-----------------------------------------------------

  //Post Data
```

```
  String postData = "temp=" + String(t1) + "&hum=" + String(h1) +
"&soil_moi=" + String(data) + "&soil_temp=" + String(temperatureC) +
"&gas=" + String(ppm) ;


   http.begin("http://trilocode.com/demo/temp/add_prod.php");
//Specify request destination
   http.addHeader("Content-Type", "application/x-www-form-urlencoded");
//Specify content-type header


   int httpCode = http.POST(postData);   //Send the request
   String payload = http.getString();    //Get the response payload


   Serial.println(httpCode);   //Print HTTP return code
   Serial.println(payload);    //Print request response payload


   http.end();  //Close connection


   delay(10000);  //Post Data at every 10 seconds
}
```

CHAPTER 6

Result

CHAPTER 7

Conclusion

Soil analysis and prediction of suitable crop provides the crop and fertilizer recommendation based on the processing of different parameters of soil.The farmers can get the soil testing services at the doorstep. This project replaces the primitive method of soil testing in a effective way and so, the farmers get to know about their soil quickly. The result provided by this project helps the farmer to take up decision and prevent them to use unbalanced fertilizers. This project is greatly useful to the second level farmers. Farmers get huge awareness on suitable crop cultivation and fertilizers to be suggested.

Refrences

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