MINI- PROJECT REPORT ON

“ SMART AGRICULTURE SYSTEM USING IOT TECHNOLOGY.”

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CERTIFICATE

This is to certify that the Mini-Project report entitled "SMART AGRICULTURE SYSTEM "

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is a record of bonafide work carried out by them, under my guidance, in partial fulfillment of the requirement for the Second Year of Engineering(CSE) at MIT School of Engineering, Pune under MIT Art, Design & Technology University

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Abstract:

Technological significance has been an extraordinary help for settling on choices in different fields particularly in agriculture. The improvement of agriculture has been on a work in progress for as far back as couple of years because of absence of Agriculture information and ecological changes. Here, it principally concentrating on the enhancement of rustic and farming improvement through cutting edge data and correspondence forms. It stretches out the agriculture association's capacity to address the issues of its ranchers. By utilizing IoT, it upgrades the simple access monitoring framework to lessen the human worry in agriculture. The monitoring got, through Arduino Uno and send to the controller in case of crisis, he can ready to see the factual study report by independent of area and engine has been ON/OFF consequently if the water level is diminished. This examination gives the ideal data at any moment of time from any piece of world and review their concern quickly at any piece of the area.

Keywords : Internet of Things, Soil Moisture Sensor, Temperature Sensor

BODY OF REPORT

Introduction:

Agriculture has been the most imperative practice from soonest reference purpose of the human advancement. It has seen various cycles of enhancement in advancement with time. A not too bad cultivating practice is so far workmanship. Natural parameters, for instance, soil clamminess, temperature, stickiness, pH, sun put together radiation thus with respect to accept crucial part when all is said in the done enhancement of the plant. Temperature impacts countless activities, for instance, treatment, germination, etc. It is watched that, at the higher temperature, breath rate extends that result in reducing of sugar substance of nourishments developed starting from the earliest stage. At cut down temperatures photosynthesis activity is supported off .

As the world is trending into new technologies and implementations it is a necessary goal to trend up in agriculture also. Many researches are done in the field of agriculture. Most projects signify the use of wireless sensor network collect data from different sensors deployed at various nodes and send it through the wireless protocol. The collected data provide the information about the various environmental factors.

Problem Statement:

"To provide efficient decision support system using wireless sensor network which handle different activities of farm and gives useful information related to farm field to farmer."

The traditional agriculture and allied sector cannot meet the requirements of modern agriculture which requires high-yield, high quality and efficient output. Thus, it is very important to turn towards modernization of existing methods and using the information technology and data over a certain period to predict the best possible productivity and crop suitable on the very particular land. The adoptions of access to high-speed internet, mobile devices, and reliable, low-cost satellites (for imagery and positioning) are few key technologies characterizing the precision agriculture trend. Precision agriculture is one of the most famous applications of IoT in the agricultural sector and numerous organizations are leveraging this technique around the world. Some products and services in use are VRI optimization, soil moisture probes, virtual optimizer PRO, and so on. VRI (Variable Rate Irrigation) optimization maximizes profitability on irrigated crop fields with topography or soil variability, improve yields, and increases water use efficiency. IoT has been making deep inroads into sectors such as manufacturing, health-care and automotive. When it comes to food production, transport and storage, it offers a breadth of options that can improve India's per capita food availability. Sensors that offer information on soil nutrient status, pest infestation, moisture conditions etc. which can be used to improve crop yields over time. Some of the sample problem statements related to Agriculture & allied sectors where IoT application will be beneficial .

Literature Survey:

The existing method and one of the oldest ways in agriculture is the manual method of checking the parameters. In this method the farmers they themselves verify all the parameters and calculate the readings. It focuses on developing devices and tools to manage, display and alert the users using the advantages of a wireless sensor network system. It aims at making agriculture smart using automation and IoT technologies. The highlighting features are smart GPS based remote controlled robot to perform tasks like weeding, spraying, moisture sensing, human detection and keeping vigilance. 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 the repositories along with the location as GPS coordinates.This idea proposes a novel methodology for smart farming by linking a smart sensing system and smart irrigator system through wireless communication technology.It proposes a low cost and efficient wireless sensor network technique to acquire the soil moisture and temperature from various location of farm and as per the need of crop controller to take the decision whether the irrigation is enabled or not.It proposes an idea about how automated irrigation system was developed to optimize water use for agricultural crops. In addition, a gateway unit handles sensor information.The atmospheric conditions are monitored and controlled online by using Ethernet IEEE 802.3.The partial root zone drying process can be implemented to a maximum extent.It is designed for IoT based monitoring system to analyze crop environment and the method to improve the efficiency of decision making by analyzing harvest statistics.In this paper image processing is used as a tool to monitor the diseases on fruits during farming, right from plantation to harvesting. The variations are seen in color, texture and morphology. In this paper, greenhouse is a building in which plants are grown in closed environment. It is used to maintain the optimal conditions of the environment, greenhouse management and data acquisition.

Features of the project:

In this technology two fingerprints of the user will be scanned by the optical fingerprint sensor.

Then the highest accuracy from the both of the fingerprints will be calculated.

The fingerprint which having higher accuracy will be used.

Technology Used:

Language Used –

Python:-It is an interpreted high-level general-purpose programming language. Its design philosophy emphasizes code readability with its use of significant indentation. Its language constructs as well as its object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python is dynamically-typed and garbage-collected. It supports multiple programming paradigms, including structured, object-oriented and functional programming.

TEMPERATURE SENSOR: The DHT sensor is highly used because its output voltage is linear with the Celsius scaling of temperature. It does not provide any external trimming. It has a wide operating range. The maximum output is 5V. The output will increase 10mV for every one degree rise in temperature. The range is from -55 degrees to +150 degrees. There are three terminals as Vcc, Ground and the analog sensor. It consumes minimum amount of electricity. Thus, it is energy efficient. It is very efficient in horticulture. It is user friendly to use.

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.

Code:-

```
#include <Adafruit_I2CDevice.h>


#include <dht.h>


#include <LiquidCrystal_I2C.h>


#include <SoftwareSerial.h>

#include <Wire.h>

#include <LiquidCrystal_I2C.h>

#include <dht.h>

#include <Adafruit_BMP085.h>

Adafruit_BMP085 bmp;

dht DHT;

LiquidCrystal_I2C lcd(0x27, 16, 2);

SoftwareSerial gsm(10, 11); // RX, TX

#define DHT11_PIN A3

int chk;

int humi = 0;

int temp = 0;

int soil = 0;

int light = 0;
```

```
int BMP = 0;

int gas = 0;

boolean HT;


void setup()

{

  gsm.begin(9600);

  pinMode(A0, INPUT);

  pinMode(A1, INPUT);

  pinMode(A2, INPUT);

  pinMode(A3, INPUT);

  lcd.init();

  lcd.backlight();

  lcd.setCursor(0, 0);

  lcd.print("Please wait for");

  lcd.setCursor(0, 1);

  lcd.print("60 seconds.");

  delay(20000);

  delay(20000);

  delay(20000);

  modem_init();

  data_init();
```

```
  internet_init();
  lcd.clear();
}

void loop()
{
  chk = DHT.read11(DHT11_PIN);
  temp = DHT.temperature;
  humi = DHT.humidity;
  soil = analogRead(A0);
  light = analogRead(A1);
  gas = analogRead(A2);
  BMP = bmp.readPressure();
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Soil:");
  soil = map(soil, 0, 1023, 100, 0);
  lcd.print(soil);
  lcd.print("%");
  lcd.setCursor(0, 1);
  lcd.print("Light:");
  light = map(light, 0, 1023, 0, 100);
```

```
lcd.print(light);
lcd.print("%");
delay(3000);
lcd.clear();
lcd.setCursor(0, 0);
switch (chk)
{
  case DHTLIB_OK:
    HT = true;
    break;
  default:
    HT = false;
    break;
}
if (HT == true)
{
  lcd.print("Temp:");
  lcd.print(temp);
  lcd.print(" *C");
  lcd.setCursor(0, 1);
  lcd.print("Humidity:");
  lcd.print(humi);
```

```
  lcd.print("%");
}
else
{
  temp = 0;
  humi = 0;
  lcd.print("Temp:");
  lcd.print("No Data");
  lcd.setCursor(0, 1);
  lcd.print("Humidity:");
  lcd.print("No Data");
}
delay(3000);
lcd.clear();
lcd.setCursor(0, 0);
lcd.print("Air Qlt: ");
gas = map(gas, 0, 1023, 0, 100);
lcd.print(gas);
lcd.print("%");
lcd.setCursor(0, 1);
lcd.print("Pressure:");
```

```
}

void modem_init()
{
  Serial.println("Please wait.....");
  gsm.println("AT");
  delay(1000);
  gsm.println("AT+CMGF=1");
  delay(1000);
  gsm.println("AT+CNMI=2,2,0,0,0");
  delay(1000);
}

void data_init()
{
  Serial.println("Please wait.....");
  gsm.println("AT");
  delay(1000); delay(1000);
  gsm.println("AT+CPIN?");
  delay(1000);
  delay(1000);
  gsm.print("AT+SAPBR=3,1");
```

```
gsm.write(',');

gsm.write('"');

gsm.print("contype");

gsm.write('"');

gsm.write(',');

gsm.write('"');

gsm.print("GPRS");

gsm.write('"');

gsm.write(0x0d);

gsm.write(0x0a);

delay(1000); ;

gsm.print("AT+SAPBR=3,1");

gsm.write(',');

gsm.write('"');

gsm.print("APN");

gsm.write('"');

gsm.write(',');

gsm.write('"');

//------------APN------------//

gsm.print("bsnlnet"); //APN Here

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

gsm.write('"');
```

```
gsm.write(0x0d);
gsm.write(0x0a);
delay(1000);
gsm.print("AT+SAPBR=3,1");
gsm.write(',');
gsm.write("");
gsm.print("USER");
gsm.write("");
gsm.write(',');
gsm.write("");
gsm.print("  ");
gsm.write("");
gsm.write(0x0d);
gsm.write(0x0a);
delay(1000);
gsm.print("AT+SAPBR=3,1");
gsm.write(',');
gsm.write("");
gsm.print("PWD");
gsm.write("");
gsm.write(',');
gsm.write("");
```

```
  gsm.print("  ");
  gsm.write("");
  gsm.write(0x0d);
  gsm.write(0x0a);
  delay(2000);
  gsm.print("AT+SAPBR=1,1");
  gsm.write(0x0d);
  gsm.write(0x0a);
  delay(3000);
}

void internet_init()
{
  Serial.println("Please wait.....");
  delay(1000);
  gsm.println("AT+HTTPINIT");
  delay(1000); delay(1000);
  gsm.print("AT+HTTPPARA=");
  gsm.print("");
  gsm.print("CID");
  gsm.print("");
  gsm.print(',');
```

```
  gsm.println('1');

  delay(1000);

}
```

Conclusion and Future Enhancements:

For future developments it can be enhanced by developing this system for large acres of land. Also the system can be integrated to check the quality of the soil and the growth of crop in each soil. The sensors and microcontroller are successfully interfaced and wireless communication is achieved between various nodes. All observations and experimental tests prove that this project is a complete solution to field activities and irrigation problems. Implementation of such a system in the field can definitely help to improve the yield of the crops and overall production.

Thus the smart agriculture using IoT will revolutionized the world of farming and it will increase the productivity as well as improve the quality and can save lives of farmer. There is an urgent need for a system that makes the agricultural process easier and burden free from the farmer's side. With the recent advancement of technology it has become necessary to increase the annual crop production output of our country India, an entirely agro centric economy. The ability to conserve the natural resources as well as giving a splendid boost to the production of the crops is one of the main aims of incorporating such technology into the agricultural domain of the country. To save farmer's effort, water and time has been the most important consideration.

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