VSB ENGINEERING COLLEGE,KARUR-639111

IBM NALAYA THIRAN

PROJECT REPORT

Team ID	**PNT2022TMID33489**
Project Name	**Project – IOT ENABLED SMART FARMING APPLICATION**

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TEAM MEMBER 1: DEEPANA J

TEAM MEMBER 2: BRUNDHA C

TEAM MEMBER 3: DIVYA A

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1.INTRODUCTION

IOT- internet of things:-

Agriculture farming is the primary occupation of the most of the people and is the main back-bone of Indian economic system.Agriculture farming provides employment opportunities to most of the people on a large scale in underdeveloped and developing countries in addition to providing food.It is the process of producing different food, fiber and many other desired productsby the cultivation and risingof domestic animals. Agriculture is the primary source of livelihood for about more than 58% of India's population.

1.1 PROJECT OVERVIEW:-

This project is based on Iot enabed smart farming application which rates to

be retained and preferred to be conditional based full automation of the prospects and retained to reduce the work for the farmers who were considered as the backbone of our society. In order to achive this we use a trending technology named as Iot thus it is applying the concept of Iot and retesion ancient farming irrigation methods and using aurdino UNO and progressing the smart irrigation by making the smart automation this tends to be known as smart irrigation process.

1.2 PURPOSE :-

The main purpose of reducing the smart farming application using the aurdino UNO is to make an sealed cut down of human interference in the process of irrigation due to this irrigation process becomes simple and easy for farmers.

2.LITRATURE SURVEY:-

a. Existing problem

Using IOT enabled smart irrigation technique since the traditional irrigation.

PROBLEM STATEMENT :

To incorporate the process of working and also elevate the smart farming technique which is very complex one.

2.2 References:-

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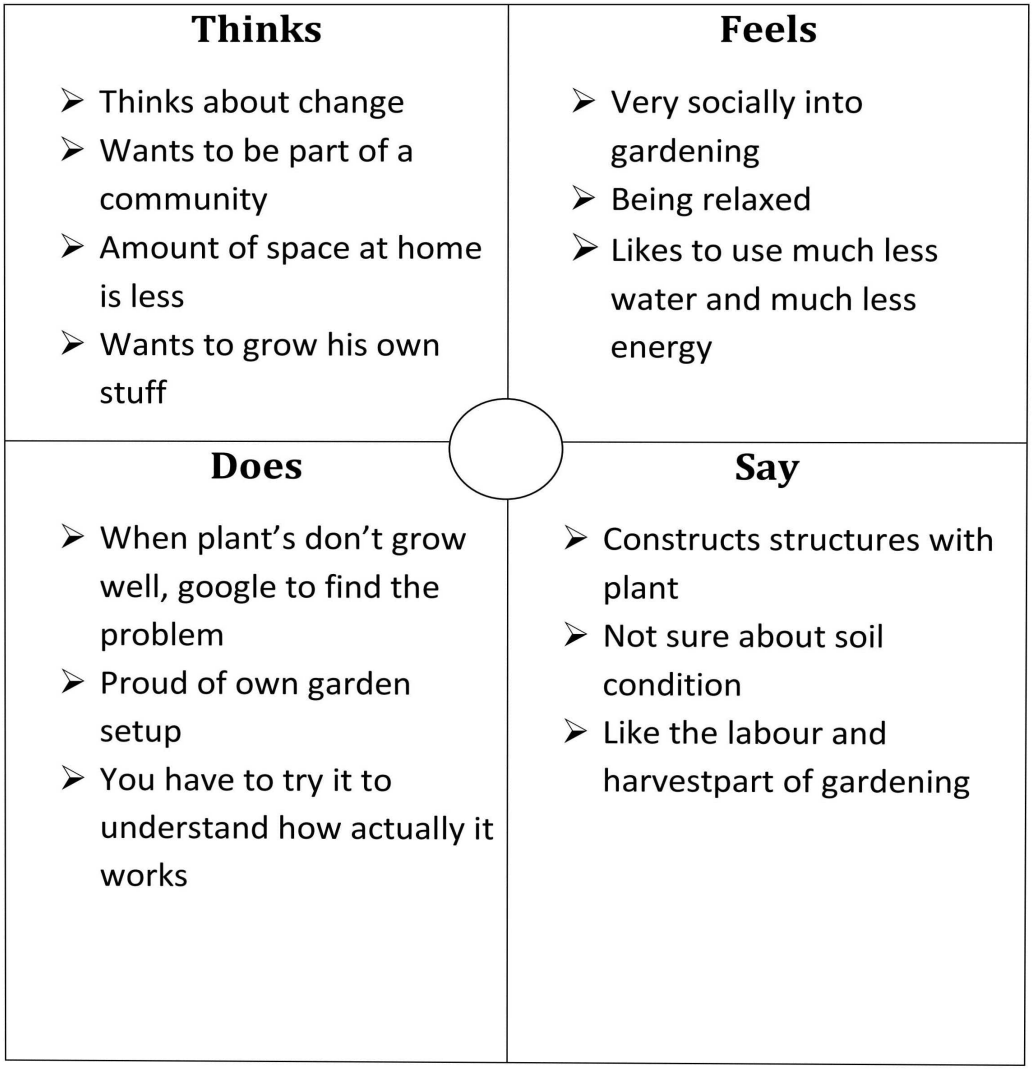
2.3 PROBLEM STATEMENT EXPLANATION:-

IOT plays a major role in agricultural field This paper is mainly applied to agricultural field Smart irrigation and farming can help farmers to grow healthy plants. The existing system only checks the soil water stress and automates the process of watering. The paper is about IOT based smart farming and irrigation system. The ultimate agenda of this paper is to automate the process of watering to plants. This work helps us to know the values of various parameters such as

humidity, moisture and temperature of plants and water them accordingly. The system consists of three sensors which sense the values of humidity, moisture and temperature of plants.Even elderly people can easily do farming. The paper has been used to grow a tomato plant and it was successfully grown by automatic process. This methodology with the use of IOT technology had made us achieve a healthy farming. Increase in agriculture also helps us to increase the economical state of the country.

IDEATION AND PROPOSED SOLUTION:-

3.1 EMPATHY MAP:-



3.2 IDEATION AND BRAINSTROMING:-

Team Ideas:

DHARANI S:

1.End-to-end farm management systems.

2.Cattle monitoring and management.

DEEPANA J:-

1.Predictive analytics for smart farming.

2.We can make agricultural drones.

BRUNDHA C:-

1.Monitoring of climate conditions.

2.We can make harvesting automation.

DIVYA A:-

1.Get alert for any abnormal situation.

2.We can make green house automation.

Best Three Ideas:-

1.Cattle monitoring and management

2.Predictive analytics for smart farming

3.Monitoring of climate conditions.

3.3 PROPOSED SOLUTION:-

S.No	Parameter	Description
1.	Problem Statement (Problem to be solved)	Under- watering causes crop stress and yield reduction. Overwatering can also cause yield reduction and consumes more water and fuel than necessary and leads to soil erosion and fertilizer, herbicide and pesticide runoff.
2.	Idea / Solution description	Wireless sensor network collects the data from different types of sensors and then it sends to main server using wireless protocol.
3.	Novelty / Uniqueness	Wireless sensors gather data about local conditions and share findings with other powerful components or platforms for further processing. Networks should be easy to scale. Developers must be able to grow their wireless sensor networks efficiently without having to invest significant capital to expand
4.	Social Impact / Customer Satisfaction	Wireless Sensor Network (WSN)is used to collect, monitor and analyse the data from the field of agriculture. This interdisciplinary technology will boost the crop productivity and maintain quality for example, monitoring the pest and disease control, animal tracking and strength of the crop.Farmers are generally

		unaware of the IoT solutions available to them with less than 5% admitting to having knowledge of the subject;68% of farmers were hearing the term for the first time yet after making them understand about IOT operations,customers are satisfactory.
5.	Business Model (Revenue Model)	Innovative Business Model (IBM)
6.	Scalability of the Solution	IoT scalability refers to the ability to go from prototype to production in a seamless way.The solution given is scalable.

FUNCTIONAL REQUIREMENTS:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Log in to system	Check Credentials Check Roles of Access.
FR-4	Manage Modules	Manage System Admins Manage Roles of User Manage User permission
FR-5	Check whether details	Temperature details Humidity details
FR-6	Log out	Exit

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Usability includes easy learn ability, efficiency in use, remember ability, lack of errors in operation and subjective pleasure.
NFR-2	**Security**	Sensitive and private data must be protected from their production until the decision-making and storage stages.
NFR-3	**Reliability**	The shared protection achieves a better trade-off between costs and reliability. The model uses dedicated and shared protection schemes to avoid farm service outages.

NFR-4	**Performance**	the idea of implementing integrated sensors with sensing soil and environmental or ambient parameters in farming will be more efficient for overall monitoring.
NFR-5	**Availability**	Automatic adjustment of farming equipment made possible by linking information like crops/weather and equipment to auto-adjust temperature, humidity, etc.
NFR-6	**Scalability**	Scalability is a major concern for IoT platforms. It has shown that different architectural choices of IoT platforms affect system scalability and thatautomatic real time decision-making is feasible in an environment composed of dozens of thousand.

5. PROJECT PLANNING & SCHEDULING:

5.1Sprint Planning & Estimation

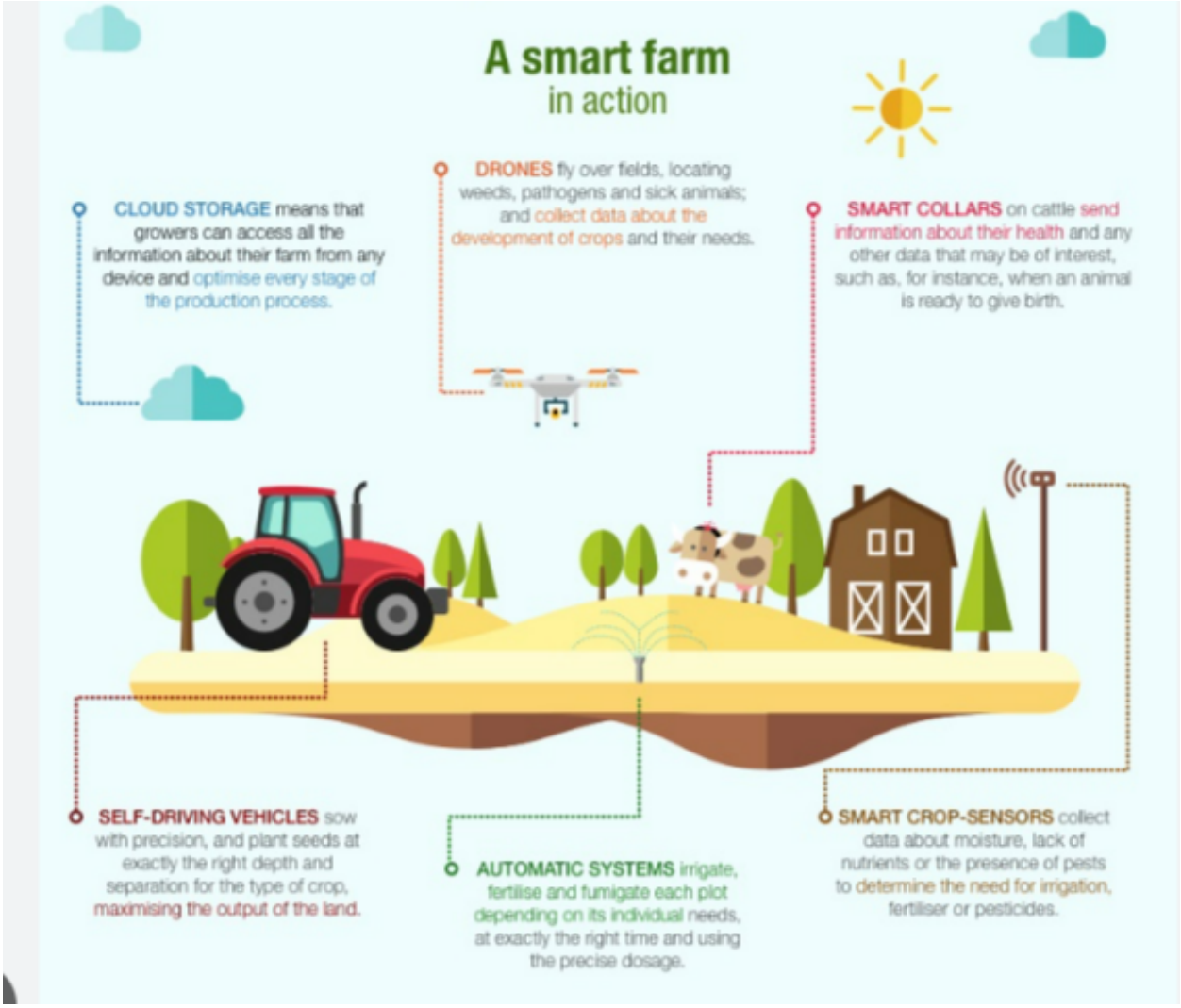
Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Hardware	USN-1	Sensors and wi-fi module with python code	2	High	Deepana J Dharani S Brundha C Divya A
Sprint-2	Software	USN-2	IBM Watson IoT platform, Workflows for IoT scenarios using Node-red	2	High	Deepana J Dharani S Brundha C Divya A
Sprint-3	MIT app	USN-3	To develop an mobile application using MIT	2	High	Deepana J Dharani S Brundha C Divya A
Sprint-4	Web UI	USN-4	To make the user to interact with software.	2	High	Deepana J Dharani S Brundha C Divya A

5.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022		05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022		12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022		12 Nov 2022

PROJECT IDEA:



6.CODING & SOLUTIONING (Explain the features added in the project along with code)

6.1Feature 1

```
//Arduino Code
// code starts here
int sensor_pin = A0; // Soil Sensor input at Analog PIN A0
int output_value ;
void setup()
{
  // put your setup code here, to run once:
  pinMode(4,OUTPUT);
  Serial.begin(9600);
  Serial.println("Reading From the Sensor ...");
  delay(2000);
}
  // put your main code here, to run repeatedly:
 void loop()
{
   output_value= analogRead(sensor_pin);
   output_value = map(output_value,550,10,0,100);
   Serial.print("Mositure : ");
   Serial.print(output_value);
   Serial.println("%");
   if(output_value<0){
   digitalWrite(4,HIGH);
```

```
        }
  else
      {
        digitalWrite(4,LOW)
      }
      delay(1000);
}
    //Code ends here
```

Feature 2:-

```
 /*
   Plant Watering Sytem

   The circuit:
    1. Water pump
    Power supply: 4.5~12V
    DCInterface: Brown +;
    2. Temperature/moisture
       sensorPower
       supply:3.3-5v
    3. Moisture
       sensor Power
       supply: 3.3-5v
 */
```

```
#define DHTPIN 2 //what digital pin we're connected
to
#define DHTTYPE DHT22 // DHT 22 (AM2302),
AM2321
DHT dht(DHTPIN, DHTTYPE);
const int SOIL_MOISTURE_SENSOR_PIN = A0;
const int WATER_PUMP_PIN = 4;
const int dry = 520;constint wet = 270;
const int moistureLevels = (dry - wet) / 3;
// TODO: Should we have a counter so if it waters for X times, then take abreak?
// OPTIMIZE: how dry to start wateringand for how long.const int
soilMoistureSartWatering = 400;
const int soilMoistureStopWatering = 300;// 60 seconds
const long waterDuration = 1000L * 60L;// 60 seconds
const long sensorReadIntervals = 1000L * 60L;// 2 hr
const long waterIntervals = 1000L * 60L * 60L * 2;
long lastWaterTime = -waterIntervals - 1;
boolean isWatering = false;

voidsetup()
  {
  Serial.begin(9600);
  pinMode(WATER_PUMP_PIN OUTPUT);
  waterPumpO
  f(dht.begin();

 }

voidmainLoop() {
```

```
  float temperature =
  getTemperature();float humidity =
  getHumidity();
  long soilMoisture = analogRead(SOIL_MOISTURE_SENSOR_PIN);
  Serial.println("Soil Moisture:" + readableSoilMoisture(soilMoisture) + ", "
+soilMoisture);
  Serial.println("Temperature:" + String(temperature) + " *F");Serial.println("Humidity:
  "+ String(humidity) + " %");

  if (millis()- lastWaterTime > waterIntervals)
    {waterPlants(soilMoisture
    );lastWaterTime =
    millis();
  }


  delay(sensorReadIntervals);
}


void waterPlants(int soilMoisture) {
    // Should this take a moving avg of the soilMoisture?
    // Can get outliers on the right after
  watering.if (soilMoisture >
  soilMoistureSartWatering)
```

7.TESTING

7.1Test Cases:-

INTERFACING OF SENSOR AND AURDINO AND INSTALLATION IN SOIL

According to our project we are improving an automated irrigation system which works in the soil in accordance to the humidity conditions in order to reduce human interference in the process of irrigation.This sprint three is the progression phase of the project in which we feed the code which has been developed for aurdino and we install moisture sensor to the aurino UNO by that we interface both in a successful manner then we install that into the real soil and test in the real time conditions.

7.2 User Acceptance Testing

INTERFACING AND TESTING AND DELIVERY:-

According to our project we are improving an automated irrigation system which works in the soil in accordance to the humidity conditions in order to reduce human interference in the process of irrigation

Finally we are yet to test our Iot enabled smart farming application and we are yet to test it in the real time environmental conditions in order to make it available for the real time use which could be to solve the problems in irrigation .

In this process we are yet to interface aurdino and configure it, then next to that we are tending to develop a code for the sensor and then we are interfacing it to make the sensing part next to that we are yet to stuff out the water tank and the motor for the irrigation purpose next to that we are going to progress into working conditions with the motor and fix it to the switch which is interfaced to the aurdino then finally the sensor senses the water moisture level in the land and then when the moisture level goes down the switch is switched on by that the motor starts running then the water is sucked out from the water reserve and irrigated to the land abide this when there is enough moisture in land the switch is automatically

switched off.By this we have limbed to our goal of automated irrigation.

8.Advantages and Disadvantages:-

Advantage:-

1. The user can be remote at any time
2. The user interference is not required
3. Reduces over irrigation
4. Reliability is high
5. Enhances the process of irrigation
6. Reduce wastage of resources
7. Improves lifestyle of farmers
8. Makes the progression to be easy
9. Improves ground water level in a periodical manner
10. Improved yield for farmers.
11. Attracts most of the people to involve in agriculture
12. Since the agriculture improves, human life also improves

Disadvantages:-

1. work for the people is reduced
2. sensors and the components should be maintained
3. there may be a threat of damaging sensors by animals present in the field

9.conclusion:-

—

To incorporate the process of working and also elevate the smart farming using IOT enabled smart irrigation technique since the traditional irrigation technique which is very complex one.

IOT plays a major role in agricultural field This paper is mainly applied to agricultural field Smart irrigation and farming can help farmers to grow healthy plants. The existing system only checks the soil water stress and automates the process of watering. The paper is about IOT based smart farming and irrigation system. The ultimate agenda of this paper is to automate the process of watering to plants. This work helps us to know the values of various parameters such as humidity, moisture and temperature of plants and water them accordingly. The system consists of three sensors

which sense the values of humidity, moisture and temperature of plants. If any of the values decreases the motor automatically turns on the water for plants. This is done using Arduino board, voltage regulator and relay which controls the motor. WIFI module is used to inform the user about the exact field condition. The various sensors send the values to the Arduino board which has been coded with if else conditions will further pass the commands to the relay which turns on or off the motor according to the conditions given. If the sensor values are decreased, it turns on the motor else it turns off the motor. The ultimate significance of this paper is that most of the manual work is reduced and watering process is automated with the help of devices as a result of which healthy plants can be grown, Water and electricity usage are saved by this paper. Even elderly people can easily do farming. The paper has been used to grow a tomato plant and it was successfully grown by automatic process. This methodology with the use of IOT technology had made us achieve a healthy farming. Increase in agriculture also helps us to increase the economical state of the country.
Thus, the above problem statement has been addressed and the perfect technology that could solve the above real world problem has been developed ,tested and presented on this esteem forum.

10.FUTURE SCOPE:

Future work would be focused more on increasing sensors on this stick to fetch more data especially with regard to Pest Control and by also integrating GPS modulein this IoT Stick to enhance this Agriculture IoT Technology to full-fledgedAgriculture Precision ready product.

1. Implementation of Foggers

2. Implementation of sliders.
3. Implementation of roof sheets.
4. Implementation of controllable water motor.

Detection of gases/minerals above/under the ground& detection of insects

11.APPENDIX:-

11.1 SOURCE CODE:-

```
//Arduino Code
// code starts here
Int sensor_pin = A0; // Soil Sensor input at Analog PIN A0
int output_value ;
void setup() {
  // put your setup code here, to run once:
  pinMode(4,OUTPUT);
     Serial.begin(9600);
   Serial.println("Reading From the Sensor ...");
   delay(2000);
}
  // put your main code here, to run repeatedly:

  void loop() {
   output_value= analogRead(sensor_pin);
 output_value = map(output_value,550,10,0,100);
   Serial.print("Mositure : ");
   Serial.print(output_value);
   Serial.println("%");
   if(output_value<0){
      digitalWrite(4,HIGH);
     }
     else{
            digitalWrite(4,LOW);
     }
   delay(1000);
}
     //Code ends here
```

GIT REPOSITORY LINK:-

https://github.com/IBM-EPBL/IBM-Project-41907-1660645970