Project Report Format

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1. INTRODUCTION

Agriculture is the basic source of livelihood of people in India. In the past decade, it is observed that there is not much crop development in agriculture sector. Food prices are continuously increasing because crop rate is declined. Some of the factors which are responsible for this may be wastage of water, low soil fertility, fertilizer abuse, climate change, diseases, etc. There are number of factors which are responsible for this, it may be due to water waste, low soil fertility, fertilizer abuse, climate change or diseases, *etc*. It is very essential to make effective intervention in agriculture and the solution is better management and regular maintenance and checking of the crops which include the technologies-IOT in integration with Wireless sensor networks, sensing the parameters with sensors and notifying the concerned people by SMS features. . It has potential to change the way of development in agriculture and gives great contribution to make it smart agriculture. Monitoring systems are used in the field to collect information on farming conditions (e.g., light intensity, humidity, and temperature) with the aim of enhancing crop productivity. Internet of things (IoT) technology is a recent trend in numerous fields, including monitoring systems for agriculture. In conventional farming, farmers need manual labor to handle crops and livestock, often leading to inefficient resource use. This downside can be addressed through the concept of smart farming, whereby farmers receive training in the use of IoT, access to the global positioning system (GPS), and data management capabilities to increase the quantity and quality of their products. Latest technologies such as Internet of Things and Cloud in combinationwith Wireless Sensor Networks can lead to agricultural modernization. IoT is an ecosystem of connected physical devices that is accessible through the Internet. It consists of objects, sensor devices, communication infrastructure,computational and processing units. The sensors communicate the information over the Internet to the cloud server which is a computational and processing unit. In this project, we developed a new farming monitoring system that has a robust design, high accessibility, and wireless communication. The system was integrated by using the input from sensors, interfaced with Arduino Uno, and using GSM as the interface with the end-user (Farmer mobile). Since our aim is to help the farmers, we tried to design the system to be moreunderstandable to them without the need for complex theoretical background. Thus, the effectiveness of the process is improved compared to the traditional and manual appliances from the farmers.

1.1 Project Overview

Listing the components to be used in the circuit .Drawing a block diagram ofthe circuit diagram to be used .Stating the methodology and processes to be done .Writing the detailed processes and working on it .Obtaining the results and try to make more improvisations .Taking note of the improvements in the subject and scope for future work.

1.2 Purpose

- To do smart farming with the help of IOT.
- Usage of water effectively in farming.
- To modernize the farming by IOT.
- Detection of animal intrusion in the agricultural field.

1. LITERATURE SURVEY

Zuraida Muhammad, Muhammad Azri Asyraf Mohd Hafez, Nor Adni MatLeh, Zakiah Mohd Yusoff , Shabinar Abd Hamid

https://ieeexplore.ieee.org/abstract/document/9204927/authors#authors

[1] The term "Internet of Things" refers to the connection of objects, equipment, vehicles, and other electronic devices to a network for the purpose of data exchange (IoT). The Internet of Things (IoT) is increasingly being utilised to connect objects and collect data. As a result, the Internet of Things' use in agriculture is crucial. The idea behind the project is to create a smart agriculture system that is connected to the internet of things. The technology is combined with an irrigation system to deal with Malaysia's variable weather. This system's microcontroller is a Raspberry Pi 4 Model B. The temperature and humidity in the surrounding region, as well as the moisture level of the soil, are monitored using the DHT22 and soil moisture sensor. The data will be available on both a smartphone and a computer. As a result, Internet of Things (IoT) and Raspberry Pi-based Smart Agriculture Systems have a significant impact on how farmers work. It will have a good impact on agricultural productivity as well. In Malaysia, employing IoT-based irrigation systems saves roughly 24.44 percent per year when compared to traditional irrigation systems. This would save money on labour expenditures while also preventing water waste in daily needs.

Divya J., Divya M.,Janani V.

https://ieeexplore.ieee.org/document/8273717

[2] Agriculture is essential to India's economy and people's survival. The purpose of this project is to create an embedded-based soil monitoring and irrigation system that will reduce manual field monitoring and provide information via a mobile app. The method is intended to help farmers increase their agricultural output. A pH sensor, a temperature sensor, and a humidity sensor are among the tools used to examine the soil. Based on the findings, farmers may plant the best crop for the land. The sensor data is sent to the field manager through Wi-Fi, and the crop advice is created with the help of the mobile app. When the soil temperature is high, an automatic watering system is used. The crop image is gathered and forwarded to the field manager for pesticide advice.

H.G.C.R. Laksiri, H.A.C. Dharmagunawardhana, J.V. Wijayakulasooriya

https://ieeexplore.ieee.org/document/9063272

[3] Development of an effective loT-based smart irrigation system is also a crucial demand for farmers in the field of agriculture. This research develops a low-cost, weather-based smart watering system. To begin, an effective drip irrigation system must be devised that can automatically regulate water flow to plants based on soil moisture levels. Then, to make this water-saving irrigation system even more efficient, an IoT-based communication feature is added, allowing a remote user to monitor soil moisture conditions and manually adjust water flow. The system also includes temperature, humidity, and rain drop sensors, which have been updated to allow remote monitoring of these parameters through the internet. In real time, these field weather variables are stored in a remote database. Finally, based on the present weather conditions, a weather prediction algorithm is employed to manage water distribution. Farmers would be able to irrigate their crops more efficiently with the proposed smart irrigation system.

Anushree Math, Layak Ali, Pruthviraj U

https://www.ijraset.com/research-paper/smart-agriculture-monitoring-and-control-system-using-iot

[4] India is a country where agriculture plays a vital role. As a result, it's critical to water the plants wisely in order to maximise yield per unit space and so achieve good output. Irrigation is the process of providing a certain amount of water to plants at a specific time. The purpose of this project is to water the plants on the National Institute of Technology Karnataka campus with a smart drip irrigation system. To do this, the open source platform is used as the system's fundamental controller. Various sensors have been employed to supply the current parameters of components that impact plant healthiness on a continual basis. By controlling a solenoid valve, water is provided to the plants at regular intervals depending on the information acquired from the RTC module. The webpage may be used to monitor and manage the complete irrigation system. This website contains a function that allows you to manually or automatically control plant watering. The health of the plants is monitored using a Raspberry Pi camera that gives live streaming to the webpage. The controller receives water

flow data from the water flow sensor through a wireless network. The controller analyses this data to see if there are any leaks in the pipe. Forecasting the weather is also done to restrict the quantity of water given, making it more predictable and efficient.

Dweepayan Mishra, Arzeena Khan, Rajeev Tiwari, Shuchi Upadhaye

https://www.ijraset.com/research-paper/smart-agriculture-monitoring-and-control-system-using-iot

[5] Agriculture is a substantial source of revenue for Indians and has a huge impact on the Indian economy. Crop development is essential for enhanced yield and higher-quality delivery. As a result, crop beds with ideal conditions and appropriate moisture can have a big influence on output. Traditional irrigation systems, such as stream flows from one end to the other, are usually used. As a result of this delivery, the moisture levels in the fields can alter. A designed watering system can help to enhance the management of the water system. This research proposes a terrain-specific programmable water system that will save human work while simultaneously improving water efficiency and agricultural productivity. The setup is made up of an Arduino kit, a moisture sensor, and a Wi-Fi module. Data is acquired by connecting our experimental system to a cloud framework. After then, cloud services analyse the data and take the necessary actions.

R. Nageswara Rao, B.Sridhar

https://ieeexplore.ieee.org/document/8399118

[6] Agrarian countries like India rely heavily on agriculture for their development. Agriculture has always been a roadblock to the country's development. Smart agriculture, which comprises modernising present agricultural systems, is the only answer to this challenge. As a result, the suggested strategy attempts to use automation and Internet of Things technologies to make agriculture smarter. Crop growth monitoring and selection, irrigation decision assistance, and other uses are possible thanks to the Internet of Things (IoT). To modernise and boost crop yield, a Raspberry Pi-based autonomous irrigation IOTsystem has been proposed. This project's main purpose is to produce crops using the least amount of water possible. Most farmers waste a lot of time in the fields in order to focus on water available to plants at the appropriate time. Water management should be improved, and the system circuit's complexity should be minimised. Based on the data collected from the sensors, the suggested system determines the amount of water required. Two sensors detect the humidity and temperature of the soil, as well as the humidity, temperature, and length of sunshine each day, and send the data to the base station. Based on these characteristics, the recommended systems must calculate the irrigation water quantity. The key benefit of the system is the integration of Precision Agriculture (PA) and cloud computing, which will reduce water fertiliser consumption while increasing crop yields and assisting in the evaluation of field weather conditions.

Shweta B. Saraf, Dhanashri H. Gawali

https://ieeexplore.ieee.org/document/8256711

[7] The Internet of Things (IoT) is the internet-based connectivity of a huge number of devices (IoT). A unique identity links each item, allowing data to be sent without human involvement It makes it possible to develop strategies for improved natural resource management. Smart gadgets with sensors, according to the IoT concept, enable interaction with the physical and logical worlds. The proposed system in this study is built on the Internet of Things and uses real- time input data. Over a wireless sensor network, a smart farm irrigation system uses an Android phone to remotely monitor and regulate drips. Between sensor nodes and base stations, Zigbee is utilised to communicate. A web-based java graphical user interface is used to process and present the server's real-time observed data. Field irrigation system wireless monitoring eliminates human interaction and enables for remote monitoring and control using an Android phone. Cloud computing is a potential choice due to the large volume of data created by the wireless sensor network. This research presents and examines a cloud-based wireless communication system for monitoring and controlling a collection of sensors and actuators in order to determine the water needs of plants.

Shrihari M

https://www.ijraset.com/research-paper/smart-agriculture-monitoring-and-control-system-using-iot

[8] The concept of automating agricultural production has been around since the early 1990s, and one of the primary challenges that both scientists and farmers confront is irrigation. Irrigation is a dynamic system that is heavily reliant on outside influences. This article describes a method that uses a custom-built mathematical model to handle data from wireless sensors on Google Cloud, resulting in a smart system. An IoT-enabled design that can scale up to big farms. According to Holistic Agricultural Studies, around 35 have been damaged by animals and people. This intelligent system uses Tensor flow and deep learning neural networks to recognise animals depending on their threat level, as well as human intruders who are not authorised on the farm, and to alert the farmer immediately. An android application is included with the device, which allows for remote access and surveillance through live video streaming.

G. Sushanth, and S. Sujatha

https://www.semanticscholar.org/paper/IOT-Based-Smart-Agriculture-System-Sushanth-Sujatha/03c6730a910da03674212d365eda38d138882b63

[9] Smart agriculture is a novel concept since IoT sensors can offer information about agricultural regions and then act on it based on user input. The purpose of this study is to develop a smart agricultural system that utilises cutting-edge technologies such as Arduino, Internet of Things, and wireless sensor networks. Through automation, the research tries to take use of emerging technologies such as the Internet of Things (IoT) and smart agriculture. The capacity to monitor environmental factors is a critical component in increasing crop efficiency. The purpose of this study is to develop a system that can monitor temperature, humidity, wetness, and even the movement of animals that might damage crops in agricultural areas using sensors, and then send an SMS notification as well as a notification on the app developed for the same to the farmer's smartphone via Wi-Fi/3G/4G if there is a discrepancy. The system uses a duplex communication link based on a cellular Internet interface, which allows data inspection and irrigation schedule to be changed using an android app. Because of its energy independence and inexpensive cost, the gadget has the potential to be useful in water-scarce, geographically isolated areas.

Vaishali S, Suraj S, Vignesh G, Dhivya S and Udhayakumar S

https://ieeexplore.ieee.org/document/8286792

[10] From the beginning of time, agriculture has been the most important practise in human society. Traditional irrigation methods, such overhead sprinklers and flood irrigation, are inefficient. They waste a lot of water and may even make people sick by causing fungus growth in the soil due to too much moisture. Due to the scarcity of water, an automated irrigation system is essential for water conservation and, as a result, agricultural profitability. Irrigation consumes around 85% of the world's total accessible water resources. This need is projected to increase in the coming years as the population grows. To meet this need, we must employ creative methods that lower the quantity of water utilised in irrigation. Sensors in the automated system monitor the availability of water to the crops, and watering is done as needed through controlled irrigation. Because of its practically limitless storage and processing capabilities, as well as its fast flexibility, cloud computing is an intriguing solution to the massive amount of data generated. The objective is to focus on factors like as temperature and soil moisture. This is a mobile integrated and smart irrigation system based on an Internet of Things-enabled application- controlled monitoring system. The main purpose of this project is to regulate the water supply and monitor the plants using a Smartphone.

Hamza BENYEZZA,Mounir BOUHEDDA,Khaoula DJELLOUT,Amina SAIDI

https://ieeexplore.ieee.org/document/8651993

[11] Water management currently global problem to all of us to tackle them in near future we need to plan it smartly. As we are living in modern world filled with lots of useful sensors from which we can designed systems with water saving capabilities. The work in this paper is focusing on increasing effective use of water using field assist to farmer. Basically it works with soil moisture sensor which gives finding of moisture level in soil and reconnects with Thing Speaks cloud via Wi-Fi module

ESP8266 to observation of soil conditions. Proposed system also set with an algorithm such that on soil moisture pattern data it can predict decision on irrigation of crops. system also warns farmer about empty water source if it occurs . benefits of using this system also includes weather prediction through website. The device has the potential to be beneficial in water-scarce, geographically isolated places due to its energy independence and low cost. The fact that the technology is simple to use for farmers adds to its utility. It also saves water by preventing waste.

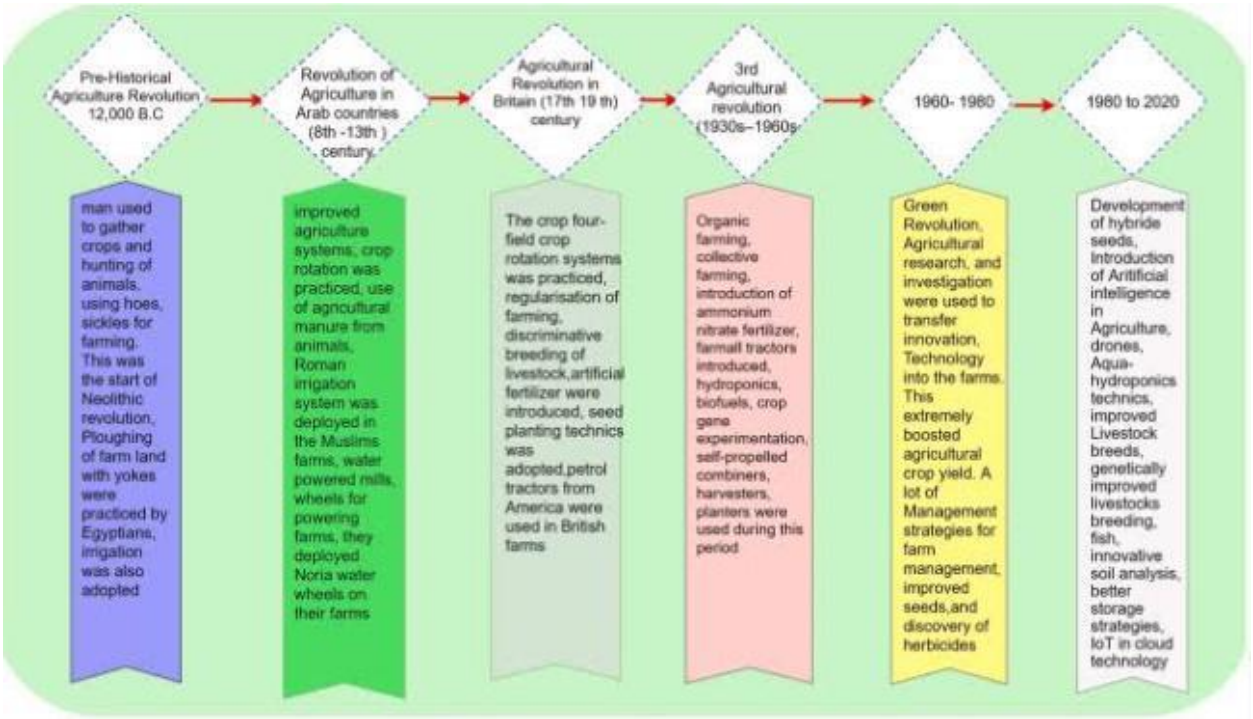
Shiny Rajendrakumar, Prof. V K Parvati, Prof. Rajashekarappa

https://www.researchgate.net/scientific-contributions/Shiny-Rajendrakumar-2120840153

[12] Agricultural Irrigation is very important for the production of crops. Many methods have developed to save water in different ways. In traditional irrigation systems we require an operator or farmer to put water on crops but he does not come to know which crop require how much amount of water to get proper amount of yields. Irrigation means planting the crops by water. There are so many traditional irrigation methods, but all these methods consume large amount of water. Automated irrigation is the method which saves the water from up to 97% as compared to traditional methods. By using these modern methods like ICT productivity can be improved without unnecessary wastage of water. Here we are concentrating on loT ie. Internet of Things technique in irrigation for the purpose to save water. In this paper author states that Soil constitution is related with the availability of elements of nourishment plant requires as well as the presence in soil of elements and chemical composition that exist at different proportion that are best nourishment to plants and soil organisms and appropriate water to plant is most essential for all of the other nourishment to work at best. The Arduino will on the buzzer to give an alert to the farmer. So Serial monitor of Arduino HE gives a message as "motion detected" when the buzzer is on and as "motion ended" when the buzzer is off. This innovation is prescribed for efficient automated agricultural watering system frameworks and it might give a profitable apparatus for preserving water arranging and watering system booking which is extendable other comparable horticultural harvests. The drawback of this proposed system is the whole system works on electricity, if in the case of electricity problem the farmer cannot on the motor to irrigate his land. The solution is to have generator, if there is no electricity so that generator gets on to run this framework and irrigate his land.

2.1 Existing problem

17Issues and Challenges in Smart Farming for Sustainable Agriculture ISSUES AND PROBLEMS FOR IMPLEMENTING SMART FARMINGTechnology has elevated the system of farming and has provided efficiency, accuracy and time complex-ity. Smart farming delivers an increase in productivity and yield crops. However, there are problems in adopting technologies in smart farming, these are:High Cost of TechnologyRecent technologies such as the Internet of Things and Machine



2.2 References

[1] Prathibha S., Hongal A., and Jyothi M. (2017). IOT Based Monitoring System in Smart Agriculture. 2017 International Conference on Recent Advances in Electronics And Communication Technology (ICRAECT). doi: 10.1109/icraect.2017.52.

[2] Lahande P., and Mathpathi D. (2018). IOT Based Smart Irrigation System. International Journal of Trend in Scientific Research and Development Volume-2(Issue-5), pp. 359-362. doi: 10.31142/ijtsrd15827.

[3] Alipio M., Dela Cruz A., Doria J., and Fruto R. (2019). On the design of Nutrient Film Technique hydroponics farm for smart agriculture. Engineering in Agriculture, Environment and Food, 12(3), pp.315- 324. doi: 10.1016/j.eaef.2019.02.008.

[4] Benyezza H., Bouhedda M., Djellout K., and Saidi A. (2018). Smart Irrigation System Based Thingspeak and Arduino. International Conference on Applied Smart Systems (ICASS). doi: 10.1109/icass.2018.8651993.

[5] Kiani F., and Seyyedabbasi A. (2018). Wireless Sensor Network and Internet of Things in Precision Agriculture. International Journal of Advanced Computer Science and Applications, 9(6). doi: 10.14569/ijacsa.2018.090614.

2.3 Problem Statement

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 are given below.

1. Tea Industry

a) Use of pesticides / fertilisers more than required quantity leads to rejection of the produced Tea.

b) Plucking coarse leaves will lead to drop in the quality of made Tea.

c) Tea pruning is widely used to keep the plants in ideal shape. However, too much pruning leads to destruction of the plant.

d) Processing of Tea from the leaves (withering, curled, fermentation, dried, sieves and packed) is a hectic and robust job.

e) Maintaining ideal storage condition.

f) Exported / supplied stocks are rejected by the customers due to undesired quality.

2. IoT enabled micro irrigation and farming land health logging system

History-based soil health parameters like soil moisture, pHlevel, temperature etc. are very essential of organic cultivation. IoT applications may assist in controlling the irrigation pump, opening and closing water flowing gates and also data logging the soil health conditions for present and future purpose. Further, with the help of IoT applications, provision for live guidance based on stored date of soil health from professional/experts to farmers in remote

3.IDEATION & PROPOSED SOLUTION

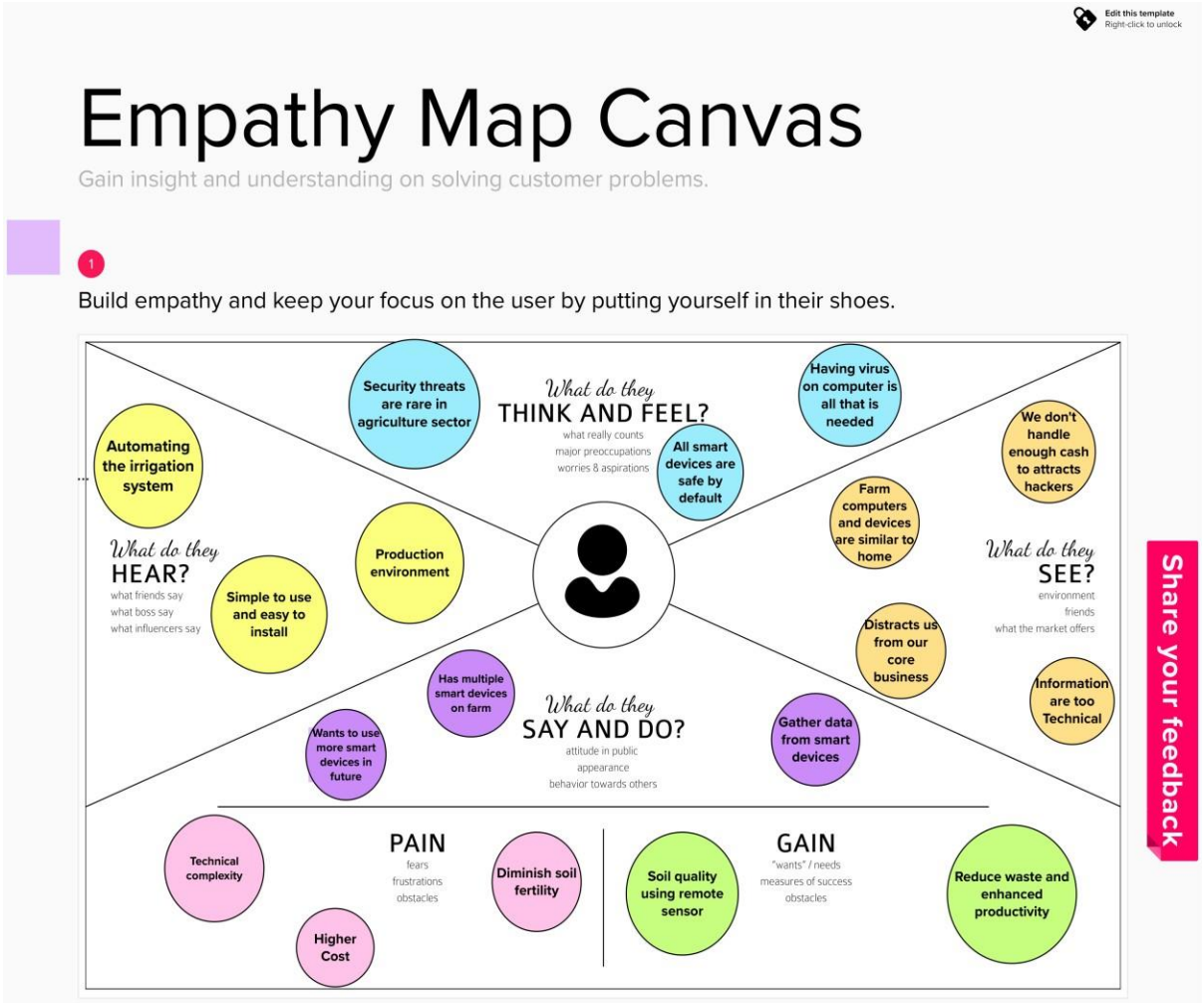
3.1 Empathy Map Canvas

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes.

It is a useful tool to helps teams better understand their users.

Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

TITLE: **Smart Farmer – IOT Enabled Smart Farming Application**



3.3 Proposed Solution

Proposed Solution Template: Project team shall fill the following information in proposed solution template

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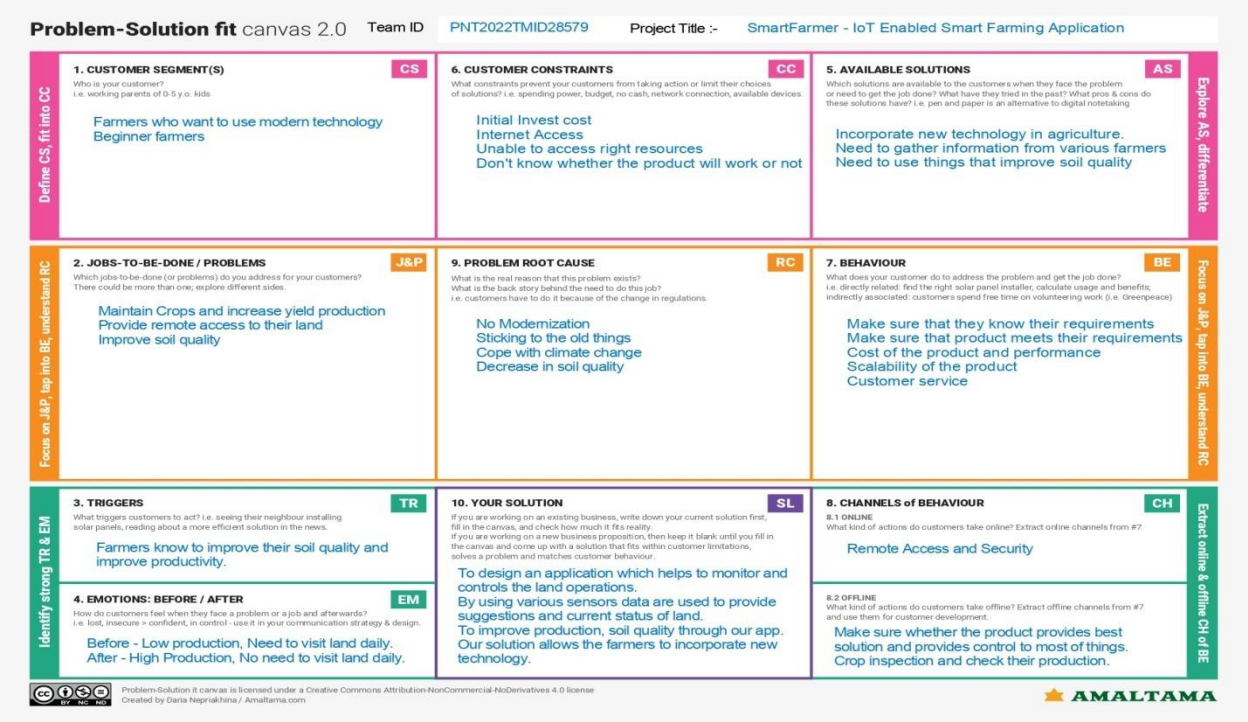
S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	To solve farmer issues like • Lack of Modernization and Mechanization • Invest in farm productivity and improving yield production. • Cope with climate change, soil erosion
2.	Idea / Solution description	An application and device is introduced to know about various data about their land remotely, where they can schedule some events for a month or a day. It also provides suggestions to users based on the crop they planted.
3.	Novelty / Uniqueness	Providing suggestions, Planning events
4.	Social Impact / Customer Satisfaction	Farmers can track and control their land, suggestions of next plant crops and improving yield gives satisfaction.
5.	Business Model (Revenue Model)	• It's a subscription model, where user have to pay for their internet. • Customer services are supported • It supports third party devices also • Reach customers via Referral, Agents, Third party applications
6.	Scalability of the Solution	Our product is scalable with our devices (extra addons) as well as third party devices also. Ability to provides various features in a application like reports generation etc.

3.4 Problem Solution Fit



The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioral patterns and recognize what would work and why.

Purpose:

- Solve complex problems in a way that fits the state of your customers.
- Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behavior.
- Sharpen your communication and marketing strategy with the right triggers and messaging.
- Increase touch-points with your company by finding the right problembehavior fit and building trust by solving frequent annoyances, or urgent or costly problems.
- Understand the existing situation in order to improve it for your target.

4.REQUIREMENT ANALYSIS

4.1 Functional Requirements

The functional requirements indicate the functions and services of the present system. They describe the behaviour of the system in relation to the needs:

- Measure Temperature.
- Measure soil moister.
- Display the sensor readings on the LCD screen.
- Calculating the date and time.
- Irrigating the soil if needed.
- Turning on the fan if needed.

4.2 Non-functional Requirements:

The non-functional requirements for the present system consider the following:

- **Availability:** The proposed product can be available and operable successfully all the time.

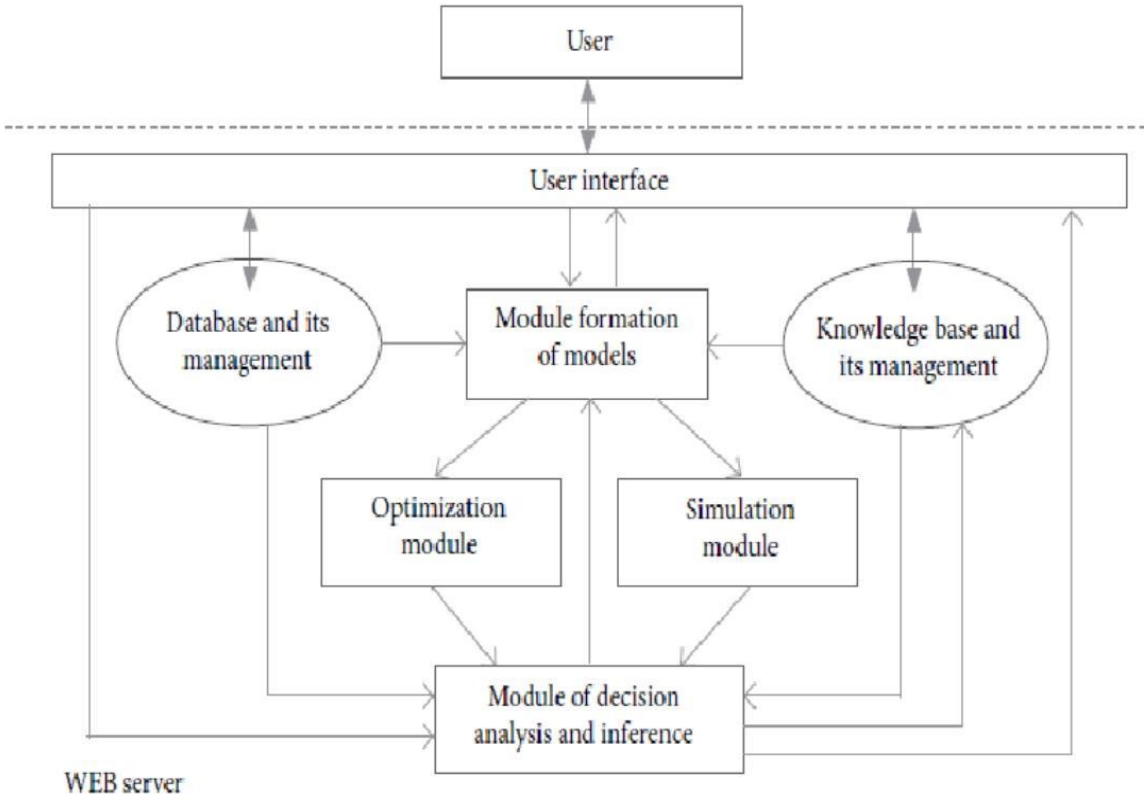
- **Reliability:** The system provides an accurate measurement of data, and it can have a longer lifespan.

- **Maintainability:** The present system can be improved easily by integrating new components with enhanced features

- **Simplicity:** The proposed system is user friendly. The usage of this product doesn't require any prior learning.

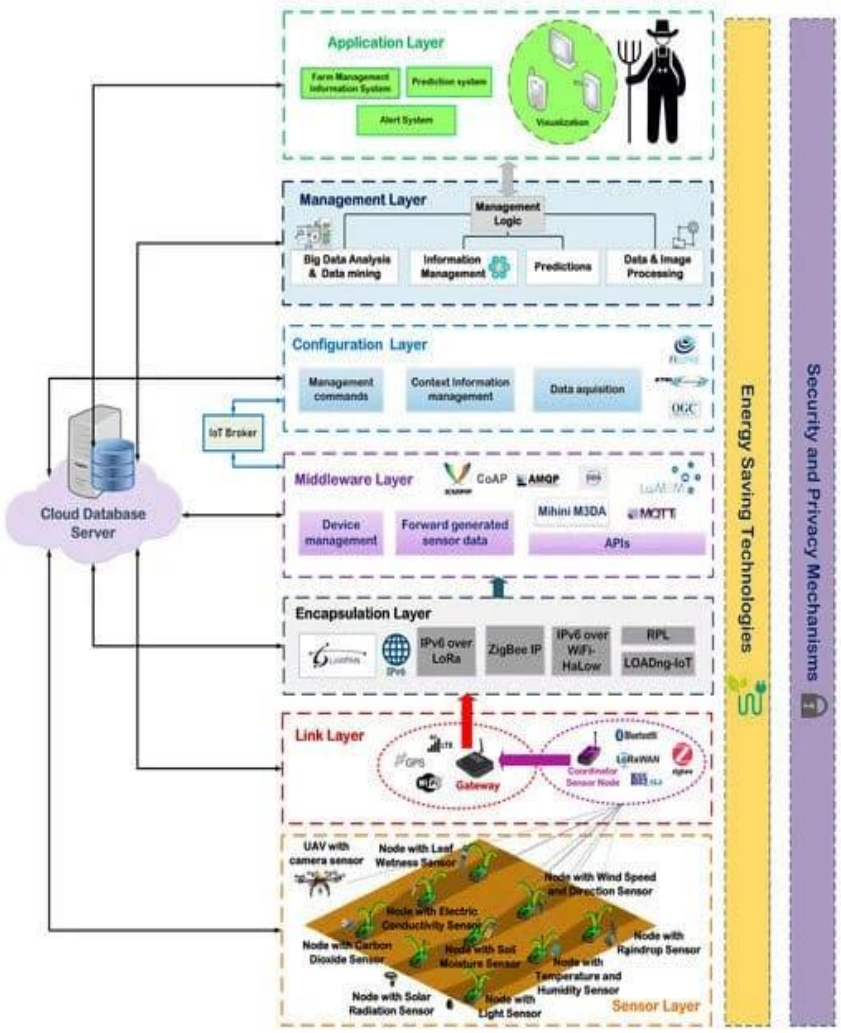
5. PROJECT DESIGN

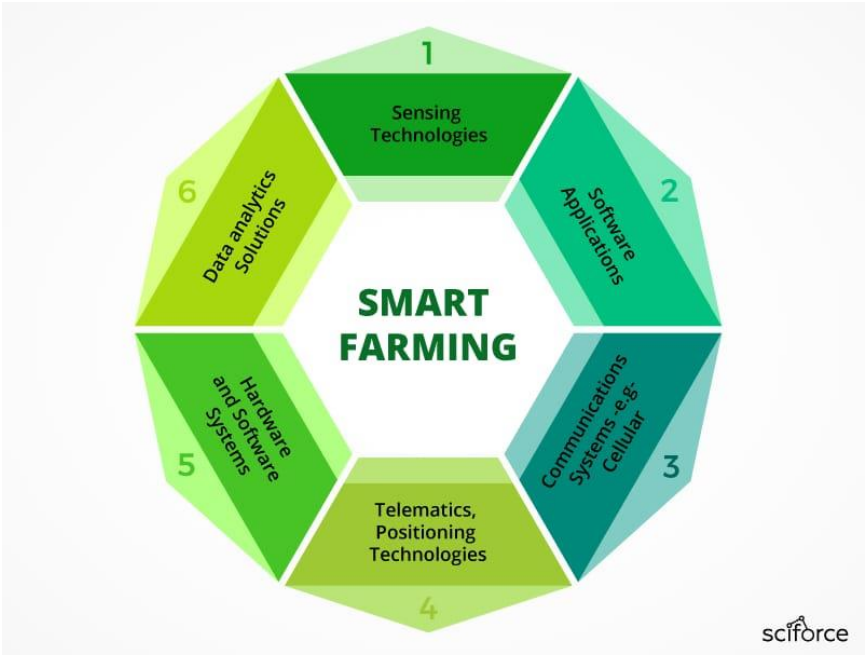
5.1 Data Flow Diagram



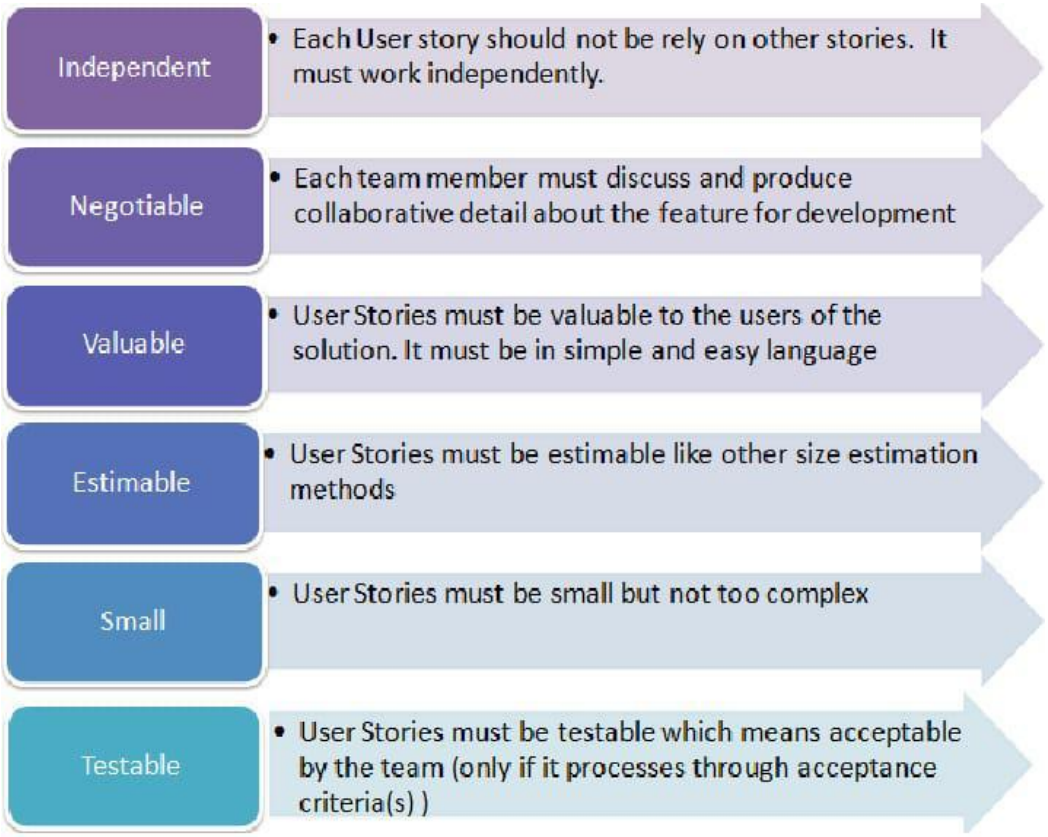
5.2 Solution &Technical Architecture

Smart farming" is an emerging concept that refers to managing farms using technologies like IoT, robotics, drones and AI to increase the quantity and quality of products while optimizing the human labor required by production. The Internet of Things (IoT) has provided ways to improve nearly every industry imaginable.


Application Layer
Farm Management Information System
Prediction system
Alert System
Visualization
Management Layer
Management Logic
Big Data Analysis & Data mining
Information Management
Predictions
Data & Image Processing
Configuration Layer
Management commands
Context Information management
Data aquisition
OGC
IoT Broker
Cloud Database Server
Middleware Layer
CoAP
AMQP
Mihini M3DA
MQTT
Device management
Forward generated sensor data
APIs
Encapsulation Layer
IPv6 over LoRa
ZigBee IP
IPv6 over WiFi-HaLow
RPL
LOADng-IoT
Link Layer
Gateway
Coordinator Sensor Node
UAV with camera sensor
Node with Leaf Wetness Sensor
Node with Wind Speed and Direction Sensor
Node with Electric Conductivity Sensor
Node with Carbon Dioxide Sensor
Node with Soil Moisture Sensor
Node with Raindrop Sensor
Node with Temperature and Humidity Sensor
Node with Solar Radiation Sensor
Node with Light Sensor
Sensor Layer
Energy Saving Technologies
Security and Privacy Mechanisms


1
Sensing Technologies
2
Software Applications
3
Communications Systems -e.g. Cellular
4
Telematics, Positioning Technologies
5
Hardware and Software Systems
6
Data analytics Solutions
SMART FARMING
sciforce

5.3 User stories



6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

I. Internet of Things plays a critical role in smart agricultural farming and other areas presently. In the future, as the

II. Mobile network connectivity system develops and farmers can access more loans, IoT applications would also

III. grow. Currently, it is correct to say that IoT application in farming is still at its take-off stage. However, the following

IV. challenges have slowed down the mass application of IoT devices in agriculture and farming.

V. Investment capital: capital investment is necessary for the implementation and maintenance of IoT devices and

VI. systems. The various important devices connected to the network are relatively expensive.

However, they are

VII. integral to the installation of IoT devices on farms. For instance, to gather field data, numerous sensor devices need

VIII. to be installed at different points on the field. Also, there are the analytical parts, connectivity structures, and the

IX. main application. Therefore, the various parts need significant investment upfront.

X. Weak network: There are usually poor connectivity issues in remote and rural areas around the world. However,

XI. satellite internet and mobile network coverage improved substantially towards the end of the 2010s. Nevertheless,

XII. network connectivity issues persist, especially in the growth of the Internet of Things in smart Agriculture, mostly

XIII. in Asia and Africa. Some areas lack the required internet connection power to transmit a huge volume of data from

XIV. the fields to the mobile applications held by the farm admin or owner.

XV. Security Threats: Data protection is essential in any enterprise. Several marketers sell data transmission and

XVI. connectivity from the data-gathering stage through IoT sensors, the data processing stage in which the data is

XVII. displayed and monitored on the farmer's screen. There are several farm data securities that can be breached

XVIII. . There are many sensitive and secret data even though the agricultural sector relies

XIX. substantially on the abundance of shared and open data. Some companies have been established to deal with such

XX. vulnerabilities by developing Agritech software. With the increased number of security breaches reported yearly,

XXI. this issue has become a paramount focus for several investor

XXII. Since sprint schedules outline the basic elements of a sprint, there are some universal elements that you should always include.

XXIII.

XXIV. Start and End Dates

In order to meet your deadlines, you have to provide specific start and end dates for projects and individual sprints. In general, it's a good idea to communicate with your team before sprint planning to make sure the dates are viable.

6.2 Sprint Delivery Schedule

XXV. To illustrate, you may have several team members going out of town or working on other projects throughout the month. If you don't check their availability, you could wind up proposing impossible deadlines, which doesn't help anyone. By researching availability ahead of time, it's easier to make sure the schedule works for everyone.

XXVI.

XXVII. Sprint Goals

Every software project and sprint needs clear and concise goals to be effective.

7. CODING & SOLUTIONING

7.1 Features

```
// library
// https://github.com/adafruit/Adafruit_ADS1X15
// https://github.com/manrueda/ESP8266HttpClient
// https://github.com/ekstrand/ESP8266wifi
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>
#include <Adafruit_ADS1015.h>
WiFiClient client;
String thingSpeakAddress= "http://api.thingspeak.com/update?";
String writeAPIKey;
String tsfield1Name;
String request_string;
HTTPClient http;
Adafruit_ADS1115 ads;
void setup()
{
Serial.begin(115200);
delay(3000);
WiFi.disconnect();
Serial.println("START");
WiFi.begin("DESKTOP","asdfghjkl");   // Wifi ("ID","Password")
while ((!(WiFi.status() == WL_CONNECTED))){
delay(300);
Serial.println("...");
}
Serial.println("I AM CONNECTED");
Serial.println("Hello!");
Serial.println("Getting single-ended readings from AIN0..3");
Serial.println("ADC Range: +/- 6.144V (1 bit = 3mV/ADS1015,
    0.1875mV/ADS1115)");
ads.begin();
}
void loop()
{
int16_t adc0, adc1, adc2, adc3;
Serial.println(" ");
```

```
adc0 = ads.readADC_SingleEnded(0);
adc0 = adc0 / 25;
adc1 = ads.readADC_SingleEnded(1);
adc1 = adc1 / 25;
adc2 = ads.readADC_SingleEnded(2);
adc2 = adc2 / 25;
adc3 = ads.readADC_SingleEnded(3);
adc3 = adc3 / 25;
Serial.print("SOIL MOISTURE in persent 1% : "); Serial.println(adc0);
Serial.print("SOIL MOISTURE in persent 2% : "); Serial.println(adc1);
Serial.print("SOIL MOISTURE in persent 3% : "); Serial.println(adc2);
Serial.print("SOIL MOISTURE in persent 4% : "); Serial.println(adc3);
Serial.println(" ");
if (client.connect("api.thingspeak.com",80))
{
request_string = thingSpeakAddress;
request_string += "key=";
request_string += "2YGO2FHN3XI3GFE7";
request_string += "&";
request_string += "field1";
request_string += "=";
request_string += adc0;
http.begin(request_string);
http.GET();
http.end();
}
delay(10);
if (client.connect("api.thingspeak.com",80))
{
request_string = thingSpeakAddress;
request_string += "key=";
request_string += "2YGO2FHN3XI3GFE7";
request_string += "&";
request_string += "field2";
request_string += "=";
request_string += adc1;
http.begin(request_string);
http.GET();
http.end();
}
delay(10);
```

```
if (client.connect("api.thingspeak.com",80))
{
request_string = thingSpeakAddress;
request_string += "key=";
request_string += "2YGO2FHN3XI3GFE7";
request_string += "&";
request_string += "field3";
request_string += "=";
request_string += adc2;
http.begin(request_string);
http.GET();
http.end();
}
delay(10);
if (client.connect("api.thingspeak.com",80))
{
request_string = thingSpeakAddress;
request_string += "key=";
request_string += "2YGO2FHN3XI3GFE7";
request_string += "&";
request_string += "field4";
request_string += "=";
request_string += adc3;
http.begin(request_string);
http.GET();
http.end();
}
delay(10);}
```

This circuit is for the second nodemcu.

8. TESTING

8.1 Test Cases

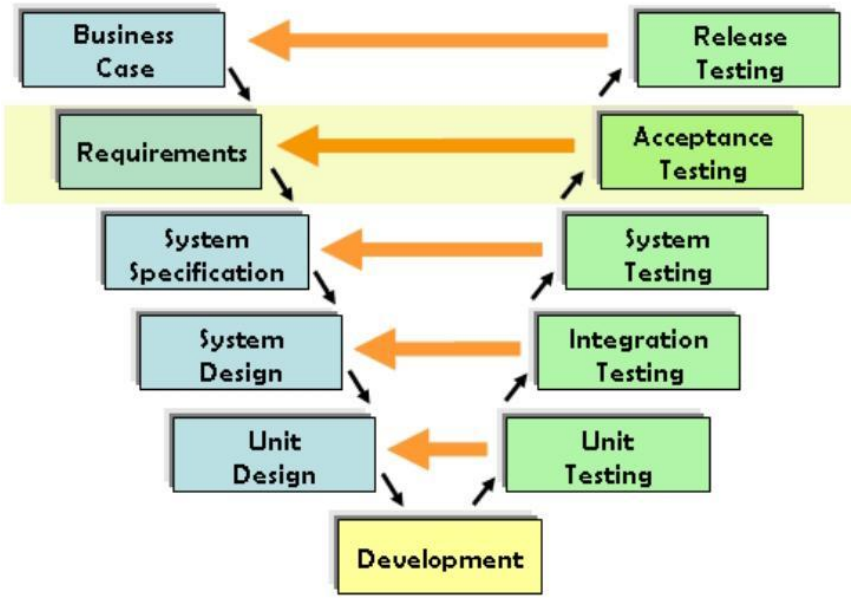
3. Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

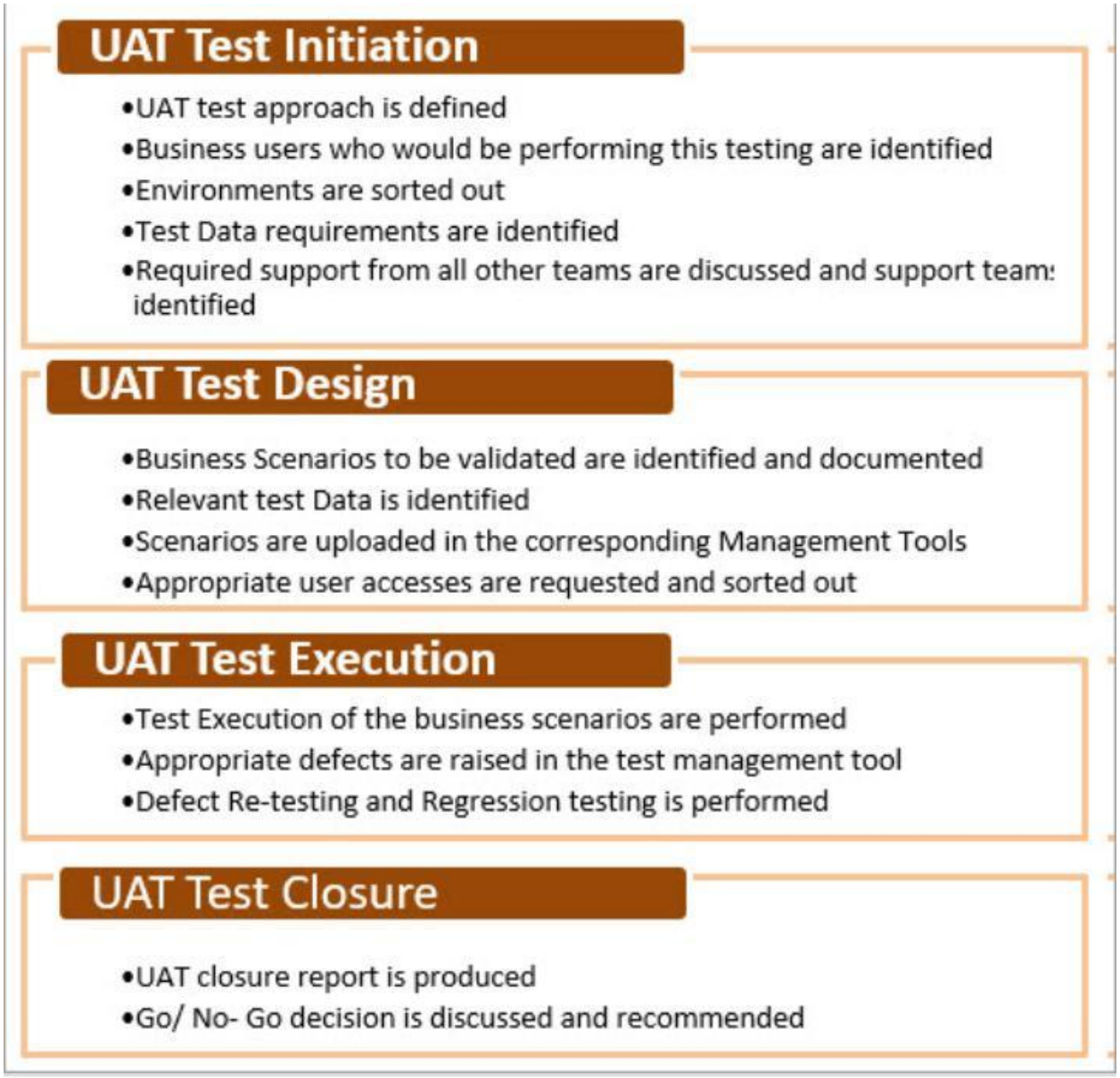
Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

8.2 User Acceptance Testing

User Acceptance Testing (UAT), or application testing, is the final stage of any software development or change request lifecycle before go-live. It is the final stage of any development process to determine that the software does what it was designed to do in real-world situations.




Analyze product requirements and define key deliverables
Choose the time and form, depending on the methodology (Agile or waterfall)
Recruit users and form UAT team
Implement end-user testing tools and onboard testers
Create testing environment and conduct training
Run the tests
Collect and analyze output information
Fix bugs, re-test, and sign-off



10.ADVANTAGES & DISADVANTAGES

Following are the **benefits or advantages of Smart Agriculture**
:

➡It allows farmers to maximize yields using minimum resources such as water, fertilizers, seeds etc.

➡Solar powered and mobile operated pumps save cost of electricity.

➡Smart agriculture use drones and robots which helps in many ways. These improves data collection process and helps in wireless monitoring and control.

➡It is cost effective method.

➡It delivers high quality crop production.

Following are the **drawbacks or disadvantages of Smart Agriculture**:

➡The smart agriculture needs availability of internet continuously. Rural part of most of the developing countries do not fulfil this requirement. Moreover internet connection is slower.
➡The smart farming based equipments require farmers to understand and learn the use of technology. This is major challange in adopting smart agriculture farming at large scale across the countries.

11.CONCLUSION

Agriculture monitoring system is needed to reduce the need for humanintervention in farming. This process is aimed to educate the farmer on the use of an integrated technology system to monitor the farm land to increase the quantity of the production of the crops. This project helps in efficient usage of water. This project can also be used in various farm lands. It can be used in gardening, greenhouse farming, horticulture etc. In this project intruder can be detected by pir sensor farmer now no need to be afraid of theft of his crops and destruction of his crops by animals.

12.FUTURE SCOPE

For the future improvements we can implement the smart farming system with the use of AI, IoT, Machine learning and implement of cloud for the further improvement in the better analyses and getting more harvest in the agriculture field. The machine learning can be used to analyze the field and determine the harvest amount and quality. The AI technology, IoT and cloud computing technologies can be used to improvise the farming harvest and technologies. Cloud computing and technology is used to store the data and collect it and analyze it using machine learning. With more research and advancement in technology we can improvise the agriculture field so that we can minimize the wastage as much as much as possible and get maximum output to fulfill the demands of the growing population. Additional sensors like NPK sensor, humidity sensor and cameras can be used for better analysis and growth in the field of farming. For future enhancement, we would like to attain more data so that we canrun training and testing of the data. We will also validate the data with different subset. The fuzzy systems itself will be adjusted to be applicablefor all types of crops. Different

kinds of sensors such as pH sensors, carbon dioxide sensors, and light sensors can be installed .