PROJECT NAME	SmartFarmer - IoT Enabled Smart Farming Application
TEAM ID	PNT2022TMID20828
COLLEGE	SRI SAIRAM INSTITUTE OF TECHNOLOGY,CHENNAI.
TEAM LEADER	Jyothi B R
TEAM MEMBERS	Kirubavathi U Harini G Swarnapriya R
FACULTY MENTOR NAME	Jegatha R
INDUSTRY MENTOR NAME	Bharadwaj

SmartFarmer - IoT Enabled Smart Farming Application

INTRODUCTION

Agricultural information processing, also referred to as agriculture, is a field that uses sensor devices, farming data, and farming progress to produce services for agriculture that improve technology, knowledge delivery, and propagation through information and communications technologies (IOT, Internet of Things). Agriculture aims to improve agricultural and rural development by giving farmers important information. Conceptualization, architecture, progress, analysis, and many elements are all part of farming.

Project Overview

- IoT-based agriculture system helps the farmer in monitoring different parameters of his field like soil moisture, temperature, and humidity using some sensors.
- Farmers can monitor all the sensor parameters by using a web or mobile application even if the farmer is not near his field. Watering the crop is one of the important tasks for the farmers.
- They can make the decision whether to water the crop or postpone it by monitoring the sensor parameters and controlling the motor pumps from the mobile application itself

Purpose

IoT based agriculture system helps the farmer in monitoring different parameter ofhis field like soil moisture, temperature, humidity using the iot sensors. Farmers can monitor all the sensor parameters by using a web or

mobile application even if the farmer is not near his field in which the MITsends an alert notification to the farmer. Reduction in Manual work, which inturn increases the productivity.

LITERATURE SURVEY

Existing problem

[1] Alaa Husain, WZ Wan Hazan, Suhaide Shafie, Mohd Nizar Hamidon, Shyam S Pandey –"A review of transparent solar photovoltaic cells"- July 2018. "A review of transparent solar photovoltaic cells"- With the use of perovskite solar cells the transparency level of the semi-transparent solar panel can be increased which makes the radiations from the solar travel more number of layers and so there is a loss of radiations leads to loss of energy production.

[2] R. R. Lunt and V. Bulovic. "Transparent, near-infrared organic photovoltaic solar cells for window and energy-scavenging applications". Applied Physics Letters-2011. "Transparent, near-infrared organic photovoltaic solar cells for window and energy-scavenging applications"- Hereby using organic photovoltaic solar cells the energy for more electronic products such as mobiles, laptops, tablets, and much more gadgets can be made charged efficiently but the comparing this reference with my paper the efficiency is differing as they use organic photovoltaic cells for the absorption of solar power. Here I used to use the transparent solar panel which is composed of a TLSC-transparent luminescent solar component and so the efficiency is very high.

[3] C. J. Traverse, R. Pandey, M. C. Barr, and R. R. Lunt. "Emergence of highly transparent photovoltaics for distributed applications"NatureEnergy-2017. "Emergence of highly transparent photovoltaics for distributed applications" Nature Energy- In this, there is a contrast with my paper is the transparency in the solar light that enters through. While using the above

function or method the transparency of light is 100 percent that is entered through.

[4] “Design and development of bi-directional IoT gateway using ZigBee and Wi-Fi technologies with MQTT protocol”- Here they use the Internet of Things.

[5] “Design and development of smart energy meter for effective use of electricity in IoT applications”- There is a complexity in measuring the watts and current that it produces which results in clumsy and collapsed when it is done manually and there is a drawback in storing the pieces of information. from the above mentioned descriptive paper, we are using the sensors that are of IoT internet of things in which it measures the amount of current it produces and the watts does it produces also we are using a cloud platform to store and retrieve the information in an efficient way which makes the user simpler.

[6] From the above observations and thus the data is clear that lots of drawbacks in the existing paper are rectified by the above described methodology - transparent solar panel using Cloud and so to conclude that it is highly efficient with zero percent of drawback.

[7] D. Landerer, D. Bahro, Andetal. “Solar glasses: A case study on semi-transparent organic solar cells for self-powered, smart wearable devices”. Energy Technology,2017. “Solar glasses: A case study on semi-transparent organic solar cells for self-powered, smart wearable devices”. EnergyTechnology-The drawback in thisreference paper is they used semi-transparent organic solar panels in which comprise amorphous silicon, kesterite, chalcopyrite, Cdte, dye-sensitized, organic, and perovskite in which all these components restrict the light to pass through and so they are slightly opaque and slightly translucent.

[8] Dong Ma, Guohao Lan, Mahbub Hassan, Wen Hu, Mushfika BaiSakhi, Upama, An Uddin, Moustafa Youssef. “Gesture Recognition with Transparent Solar Cells” A Feasibility Study –
October 2018. “Gesture Recognition with Transparent Solar Cells” A Feasibility Study ”- Machine Learning is integrated for recognition which makes the structure opaque complex.

[9] P. Gopi Krishna et. al -“Design and development of bi-directional IoT gateway using ZigBee and Wi-Fi technologies with MQTT protocol” -2018. “Design and development of bi-directional IoT gateway using ZigBee and Wi-Fi technologies with MQTT protocol”- Here they use the Internet of Things.

[10] P. Gopi Krishna et. Al - “Design and development of smart energy meter for effective use of electricity in IoT applications” International Journal of Engineering & Technology”-2018. “Design and development of smart energy meter for effective use of electricity in IoT applications”- There is a complexity in measuring the watts and current that it produces which results in clumsy and collapsed when it is done manually and there is a drawback in storing the pieces of information. from the above mentioned descriptive paper, we are using the sensors that are of IoT internet of things in which it measures the amount of current it produces and the watts does it produces also we are using a cloud platform to store and retrieve the information in an efficient way which makes the user simpler.

References

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[2] R. R. Lunt and V. Bulovic. “Transparent, near-infrared organic

photovoltaic solar cells for window and energy-scavenging applications". Applied Physics Letters-2011.

[3] C. J. Traverse, R. Pandey, M. C. Barr, and R. R. Lunt. "Emergence of highly transparent photovoltaics for distributed applications"NatureEnergy-2017.

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[8] Dong Ma, Guohao Lan, Mahbub Hassan, Wen Hu, Mushfika BaiSakhi, Upama, An Uddin, Moustafa Youssef. "Gesture Recognition with Transparent Solar Cells" A Feasibility Study –
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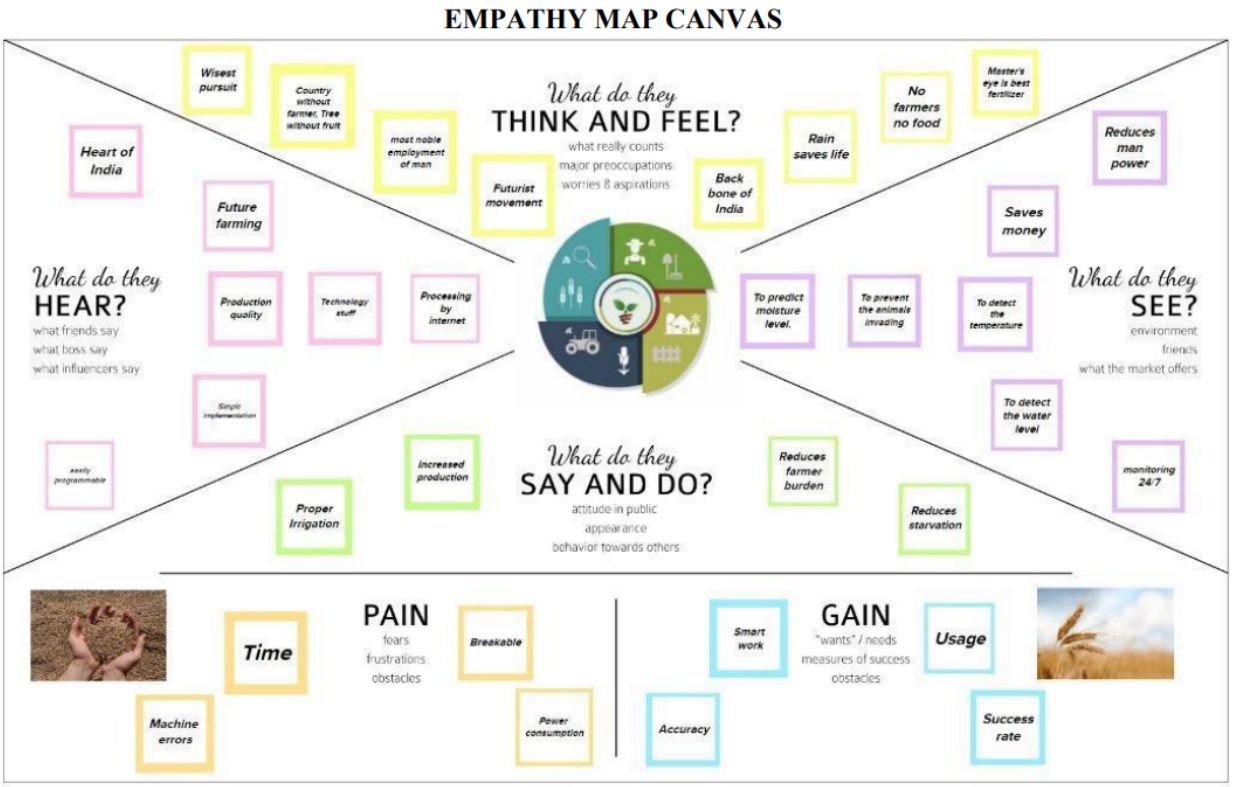
[10] P. Gopi Krishna et. Al - "Design and development of smart energy meter for effective use of electricity in IoT applications" International Journal of Engineering & Technology"-2018.

Problem Statement Definition

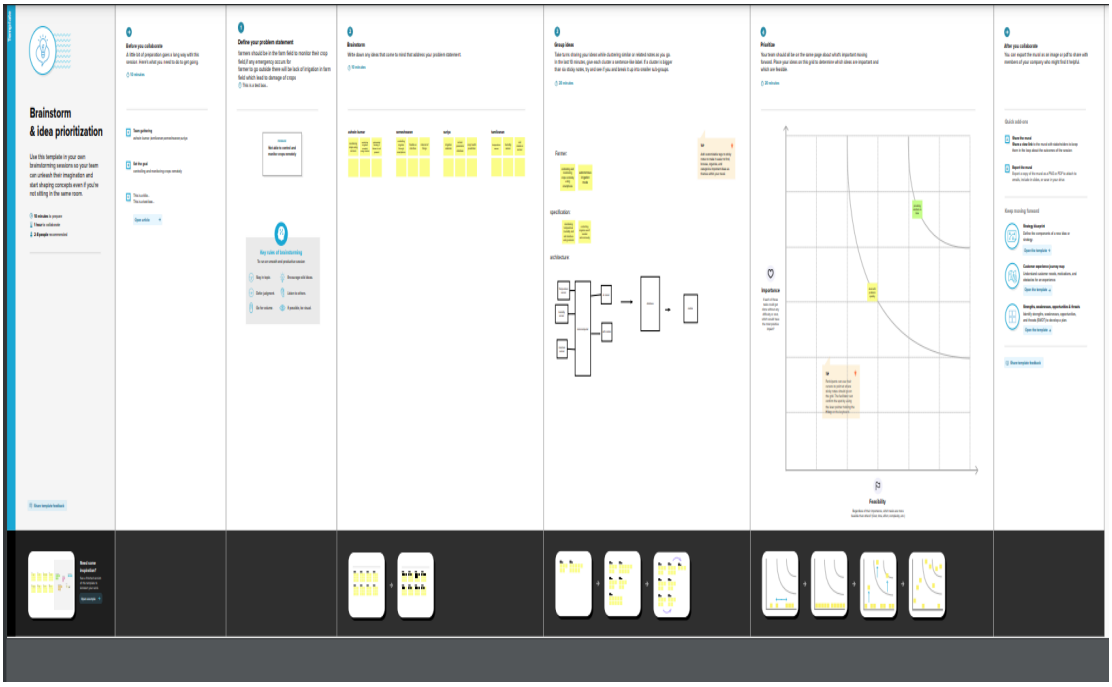
Rural and urban areas in our nation face a variety of similar issues related to agriculture, communal structures, water resources, highways and transportation, access to markets, health and education, and this necessitates similar but regionally significant solutions to be organised towards resolving issues related to these similarities. This analysis suggests using IoT, to dispatch servicing to rural commodities in our nation in order to meet the demands of agricultural commodities, alleviate poverty, and reduce the intelligence gap between town and village areas. Inorder to help farmers from monitoring till irrigation.Every area of the average person's life has undergone a change because to Internet of Things (IoT) technology, by giving everything a sense of intelligence. IoT stands for a network of interconnected, self-configuring devices. IoT-based devices for intelligent smart farming are being developed daily. The face of agricultural production by improving it, making it more cost-effective, and cutting waste. The purpose of this paper is to suggest an IoT-based smart farming system that helps farmers obtain real-time data (temperature, soil moisture) for effective environment monitoring, allowing them to improve overall production and product quality. This research proposes an IoT-based Smart Farming System that incorporates Internet of Things and IBM cloud services.

IDEATION & PROPOSED SOLUTION:

Empathy Map Canvas:



Ideation & Brainstorming:



Proposed Solution

- Gain knowledge of Watson IoT Platform.
- Connecting IoT devices to the Watson IoT platform and exchanging the sensor data.
- Explore python client libraries of Watson IoT Platform.
- Gain knowledge on IBM Cloudant DB
- Configuring APIs using Node-RED for communicating with a mobile application.
- Creating a Mobile Application through which the user interacts with the IoT device.

Problem Solution:

- The parameters like temperature, humidity, and soil moisture are updated to the Watson IoT platform
- The device will subscribe to the commands from the mobile application and control the motors accordingly
- APIs are developed using Node-RED service for communicating with Mobile Application
- A mobile application is developed using the MIT App inventor to monitor the sensor parameters and control the motors.

To accomplish this, we have to complete all the activities and tasks listed below:

- Create and configure IBM Cloud Services
    - Create IBM Watson IoT Platform
    - Create a device & configure the IBM IoT Platform
    - Create Node-RED service
    - Create a database in Cloudant DB to store all the sensor parameters
- Develop a python script to publish and subscribe to the IBM IoT platform
- Configure the Node-RED and create APIs for communicating with mobile application
- Develop a mobile application to display the sensor parameters and control the motors

REQUIREMENT ANALYSIS

Functional requirement

- IBM Watson IoT Platform
- Node-RED Service
- Cloudant DB
- Python IDLE

Non-Functional requirements

Computer

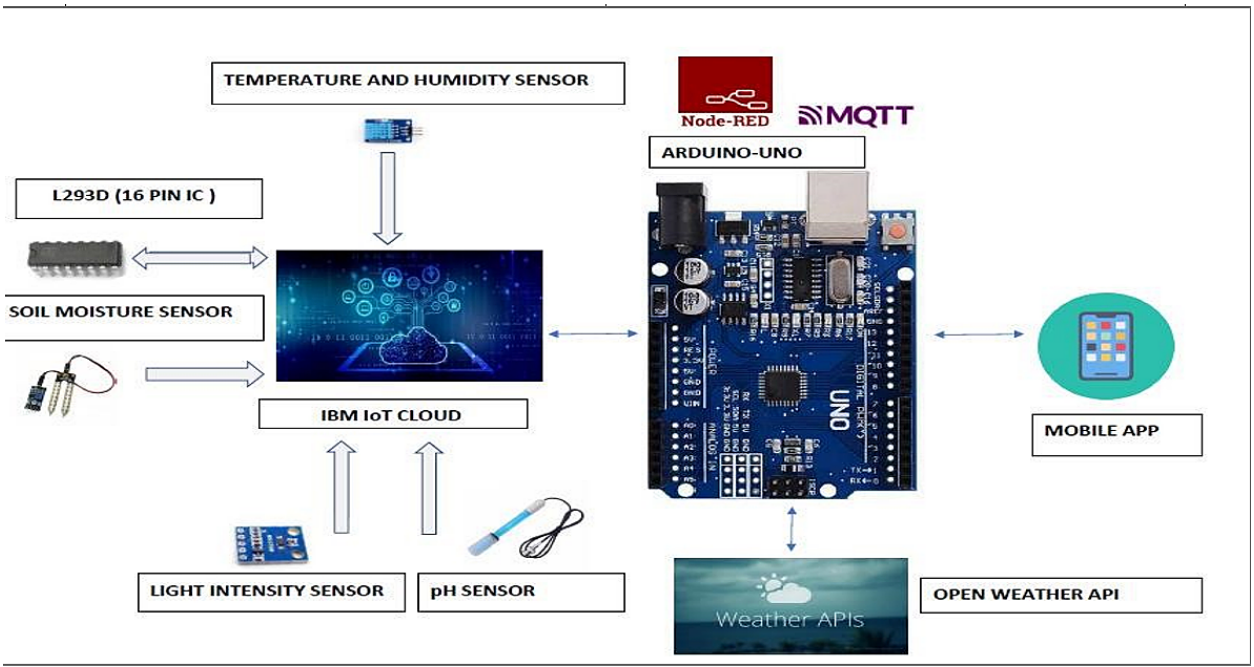
5.PROJECT DESIGN

5.1 Data Flow Diagrams:

The framework will begin its working From approving the user with the appropriate Username and password. . On the off chance that username and password, neither of them matches, then the framework will send the error message. On the off chance that username exists and the password is right then the introduction of the framework will occur, by initialization, it implies that every one of the sensors which is deployed, for example, humidity sensor, water level pointer sensor, and temperature sensor will be introduced to zero, thus restarting the memory including information or filed values if any showed. The information consequently detected by the sensors i.e. temperature of the earth, soil moisture content, water level, every one of these elements are detected will be gathered and exchanged to the base server station situated in the field. The base server station will additionally exchange the information to the main server framework over a solid convention.

The main server station will break down the information sent by the base server station situated in light of the limit values set for every substance. The dissected information will then be shown to the client. In light of this outcome, the rancher can take the choices as needs be which are great for the productive cultivating.

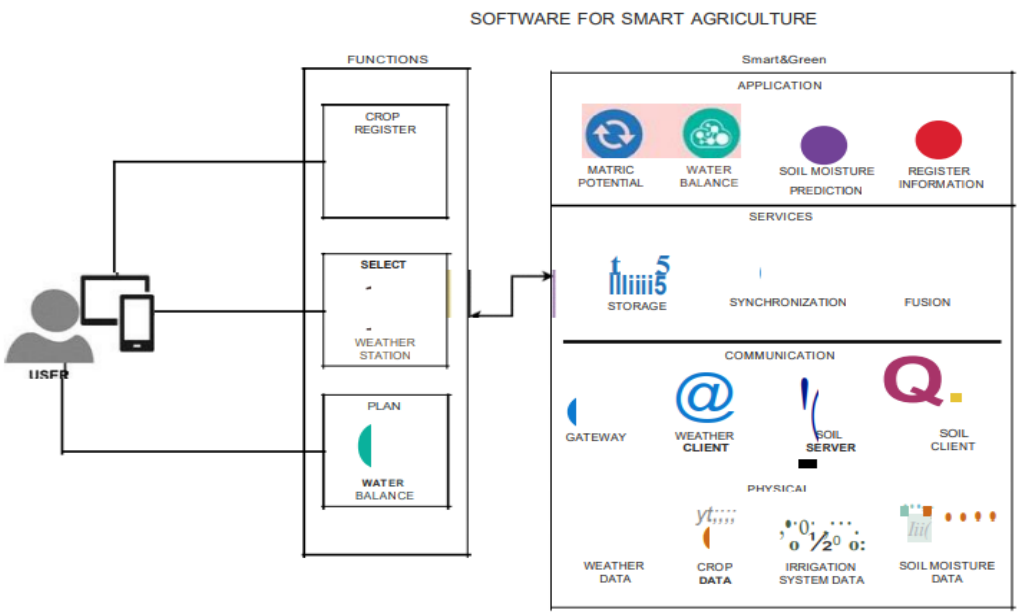
In the event that the farmer wishes to proceed with the framework information then as opposed to leaving it will advise the framework to proceed and the sensors will be instated again rehashing the entire cycle. On the off chance that the client is fulfilled and needs to leave the framework, then the client will exit and the framework will end. The below illustrated figure demonstrates how the framework will carry on from client login to client logout. All the accessible exercises are appeared in the figure, and in addition central framework, Base station framework and Data analysis framework, these elements are enrolled which are key substances of the design. How this calculation functions can be better comprehended by taking a gander at depictions of GUI's which will demonstrate the alternatives accessible for client.



5.2 Solution & Technical Architecture:

The objective of this analysis is to spot associate degreed increase a responsive requirements of Indian rural agriculture areas and what interference may be rendered in terms of IoT technology. These IoT techniques have implied to mitigate impoverishment and improve the quality of living of the agriculturist.

The result has known possible functions of IoT in rural and urban areas for feasible agriculture evolution. It shows the benefits which will be derived from internet of things by many regions of rural areas as well as urban areas. These regions embody water administration, meteorology, life administration, investments, weed and infection administration, shipment and storage of rural-agricultural manufacturing. The research is supposed to significance guideline on the acceptance of internet of things in rural and urban agriculture.



5.3 User Stories:

The User Stories or requirement are based on the following questions:

- What are the rural desires of the agricultural commodities that, once self-interest, can cause the upliftment of their lives and poorness mitigation?
- What internet of things automation are breathing and what internet of things will within the coming up architecture and developed to fulfill these requirements.

The analysis aim can be:

- Analyze current research on the rural challenges in our country. Establish the internet of things automation which will direct these requirements via use cases. In the name of directing the analysis drawback, an informative path is employed .

As a user, I can register for the application by entering my email, password, and confirming my password.
As a user, I will receive confirmation email once I have registered for the application .
As a user, I can register for the web application by entering my email, password, and confirming my password.
As a user I can contact the customer care service through phone or mail medium .
As a user I want the administrator to use good working hardware .

6.PROJECT PLANNING & SCHEDULING:

In planning phase, plan is made and strategies are set, taking into consideration the company policies, procedures and rules Planning provides direction, unifying frame work, performance standards, and helps to reveal future opportunities and threats in planning.

Forward Planning

- Planner starts from the initial event and builds up the events and activities logically and sequentially until the end event is reached.
- What event comes next?
- What are dependent events?
- What events can take place concurrently?

Milestone and Activity List:

S.NO	ACTIVITY TITLE	ACTIVITYDESCRIPTION	DURATION
1.	**Understanding TheProject**	Assign the team members afterthat create repository in theGitHub and then assigntasktoeachmemberand guidethemhow to accesstheGitHubwhilesubmitting theassignments	1 week
2.	**StartingThe Project**	TeamMemberstoAssignAllt heTasksBasedonSprintsand WorkonItAccordingly	1 week
3.	**Completing EveryTask**	TeamLeadershouldensureth atwhethereveryteammember havecompletedtheassignedtask or not	1 week
4.	**StandUpMeetings**	Team Lead Must Havea Stand-UpMeeting with The Team and	1 week

		WorkonTheUpdatesand Requirement Session	
5.	**Deadline**	Ensurethatteammembersar ecompleting everytaskwithinthe deadline	1 week
6.	**BudgetandScopeofProje ct**	Analyzetheoverallbudgetwhich mustbewithin certainlimititshouldbefavorableto everyperson	1 week

6.1 Sprint Planning & Estimation:

Sprint	Functional Requireme nt	User Story Numbe r	User Story / Task	Story Poin ts	Prioirit y	Team Members
Sprint -1	Code	USN - 1	Developing a Python Code	2	High	Harini G
Sprint - 2	Software	USN - 2	Creating device in the IBM Watson IOT scenarious using NodeRed	2	High	Kirubavathi U
Sprint - 3	MIT App Inventor	USN - 3	Develop an application for the Smart farmer project using MIT App InvSoentor.	2	High	Harini G

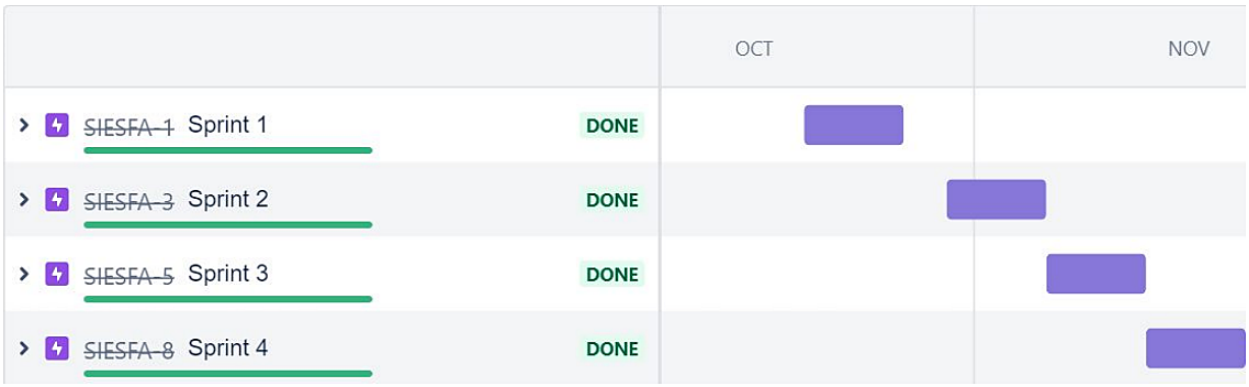
Sprint - 3	Dashboard	USN - 3	Design the Modules and test the app	2	High	Jyothi B R

Sprint - 4	Web UI	USN - 4	To make the user to interact with software	2	High	Swarna Priya R

6.2 Sprint Delivery Schedule:

Sprint	Total Story Points	Sprint Start Date (Planned)	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)	Duration
Sprint - 1	20	26 Oct 2022	31 Oct 2022	20	31 Oct 2022	6 Days
Sprint - 2	20	01 Nov 2022	05 Nov 2022	20	05 Nov 2022	6 Days
Sprint - 3	20	06 Nov 2022	13 Nov 2022	20	13 Nov 2022	6 Days
Sprint - 4	20	14 Nov 2022	17 Nov 2022	20	17 Nov 2022	6 Days

6.3 Reports from JIRA:



7.CODING & SOLUTIONING:

7.1 Feature 1:

Python Code

* Its for "Remote ON and OFF"
* Identifing Soil Moisture Temperature and Humidity

```
                import wiotp.sdk.device
import time
import os
import random
myconfig = {
                "identity": {
                                "orgId":"3lnltf",
                                "typeId":"NodeMCU",
                                "deviceId":"12345"
                                },
                                "auth":{
                                        "token":"12345678"
                                        }
                                }
                client = wiotp.sdk.device.DeviceClient(config=myconfig, logHandlers=None)
client.connect()
def myCommandCallback(cmd):
                print("Messure recived from IBM ToT Platform: %s" % cmd.data['command'])
                m=cmd.data['command']
                if(m=="Motor is switched on"):
                        print("Motoris switched on")
                elif(m=="motoroff"):
                        print("Motor is switched OFF")
                        print("")
                while True:
                        soil=random.randint(22, 100)
```

```
                temp=random.randint(-20, 125)
                hum=random.randint(0, 100)
                myData={'soil_moisture':soil, 'temperature':temp,'humidity':hum}
                client.publishEvent(eventId="status",msgFormat="json",
data=myData,qos=0, onPublish=None )
                print ("Published data Successfully: %s",myData)
                time.sleep(2)
                client.commandCallback= myCommandCallback
                client.disconnect()
```

7.2 Feature 2:

For MIT App Inventor

```
<!DOCTYPE html>
<!--                                saved
from
url=(0048)http://ai2.appinventor.mit.edu/#5592391764279
296_-->
<html style="overflow: auto;"><head><meta http-
equiv="Content-Type" content="text/html;
charset=UTF-8"><style>HTML{margin:0
!important;border:none !important;}.dragdrop-
handle{cursor:move;user- select:none;-khtml-user-
select:none;-moz-user-select:none;}.dragdrop-
draggable{zoom:1;}.dragdrop-
dragging{zoom:normal;}.dragdrop-positioner{border:1px
dashed #1e90ff;margin:0
!important;zoom:1;z- index:100;}.dragdrop-flow-panel-
positioner{color:#1e90ff;display:inline;text-
align:center;vertical-align:middle;}.dragdrop-
proxy{background- color:#7af;}.dragdrop-
selected,.dragdrop-dragging,.dragdrop-
proxy{filter:alpha(opacity \=
```

```
30);opacity:0.3;}.dragdrop-movable-panel{z-
index:200;margin:0 !important;border:none
!important;}</style>
   <meta http-equiv="X-UA-Compatible" content="IE=10">
   <!--meta name="gwt:property" content="locale=en_US"-->
   <!-- Title is set at runtime. -->
   <title>MIT App Inventor</title>
        <!-- Google Analytics. -->
        <script       type="text/javascript"
async=""                        src="./MIT                      App
Inventor_files/ga.js.download"></script><script
type="text/javascript">
          var _gaq = _gaq || [];
                  _gaq.push(['_setAccount', 'UA-28621056-1']);
          _gaq.push(['_setDomainName', 'ai2.appinventor.mit.edu']);
          _gaq.push(['_setAllowLinker', true]);
          _gaq.push(['_t
          rackPageview'
          ]); (function() {
            var      ga      =
document.createElement('script');                    ga.type
= 'text/javascript'; ga.async = true;
            ga.src = ('https:' == document.location.protocol ?
'https://ssl' : 'http://www') + '.google-analytics.com/ga.js';
            var        s        =
document.getElementsByTagName('script')[0];
s.parentNode.insertBefore(ga, s);
          })();
```

```
        </script>
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/gwt.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/blockly.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/ai2blockly.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/dialog.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/hsvapalette.css">
    <link type="text/css" rel="stylesheet" href="./MIT App
Inventor_files/font- awesome.min.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/leaflet.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/leaflet.toolbar.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/leaflet-vector-markers.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/Ya.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/android_holo.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/android_material.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/iOS.css">
    <link        type="text/css"        rel="stylesheet"
href="./MIT App Inventor_files/DarkTheme.css">
```

```
    <noscript>
      <div class="floatingBox">
        <h2> App Inventor needs JavaScript enabled to run.</h2>
      </div>
    </noscript>
  <script                                src="./MIT
App
Inventor_files/07550E3C801A777506EB0AD54C97601D.ca
che.js.downloa d"></script><style type="text/css">/*
Chart.js */
@keyframes
chartjs-render-
animation{from{opacity:.99}to{opacity:1}}.chartjs-render-
monitor{animation:chartjs-render-animation
1ms}.chartjs-size- monitor,.chartjs-size-monitor-
expand,.chartjs-size-monitor-
shrink{position:absolute;direction:ltr;left:0;top:0;right:0;botto
m:0;overflow:hi dden;pointer-events:none;visibility:hidden;z-
index:-1}.chartjs-size-monitor-
expand>div{position:absolute;width:1000000px;height:1000
000px;left:0;top
:0}.chartjs-size-monitor-
shrink>div{position:absolute;width:200%;height:200%;left:0;t
op:0}</style><s tyle>.blocklyDraggable {}
.blocklySvg {
        Light {
                display: none;
                }
          .badBlock>.blocklyPath {
```

```
                stroke-width: 3px;
                stroke: #f00;
                }
}
.badBlock>.bl
 ocklyPathLig
 ht { display:
 none;
}
.blocklyDragging>.blocklyPath,
.blocklyDragging>.bl
ocklyPathLight { fill-
opacity: .8;
stroke-opacity: .8;
}
.blocklyDragging>.bl
ocklyPathDark {
display: none;
}
.blocklyDisable
d>.blocklyPath
{ fill-opacity: .5;
stroke-opacity: .5;
}
.blocklyDisabled>.blocklyPathLight,
.blocklyDisabled>.bl
ocklyPathDark {
display: none;
```

```
}
.blocklyText {
        cursor: default;
        fill: #fff;
        font-family: sans-serif;
         font-size: 11pt;
        }
        .blocklyNonEditableText>text {
          pointer-events: none;
}
.blocklyNonEditableText>rect,
.blocklyEdi
tableText>
rect { fill:
#fff;
fill-opacity: .6;
}
.blocklyNonEditableText>text,
.blocklyEdi
tableText>
text { fill:
#000;
}
.blocklyEditableText:hover>rect {
      cursor: default;
      fill: #fff;
      font-family: sans-serif;
      font-size: 11pt;
       }
```

```
.blocklyNonEditableText>text {
        pointer-events: none;
}
.blocklyNonEditableText>rect,
.blocklyEditableText>rect {
        fill: #fff; fill-opacity: .6;

        } .blocklyNonEditableText>text,
.blocklyEditableText>text {
        fill: #000;
         }
         .blocklyEditableText:hover>rect {
                stroke: #fff; stroke-width: 2;
                }
        .blocklyBubbleText {
                fill: #000;
         }
        .blocklyFlyout {
        position: absolute;
        z-index: 20;
        }
        .blocklyFlyoutButton {
        fill: #888; cursor: default;
        }
        .blocklyFlyoutButtonShadow {
                fill: #666;
         }
        .blocklyFlyoutButton:hover {
                fill: #aaa;
                }
        .blocklyFlyoutLabel {
                cursor: default;
```

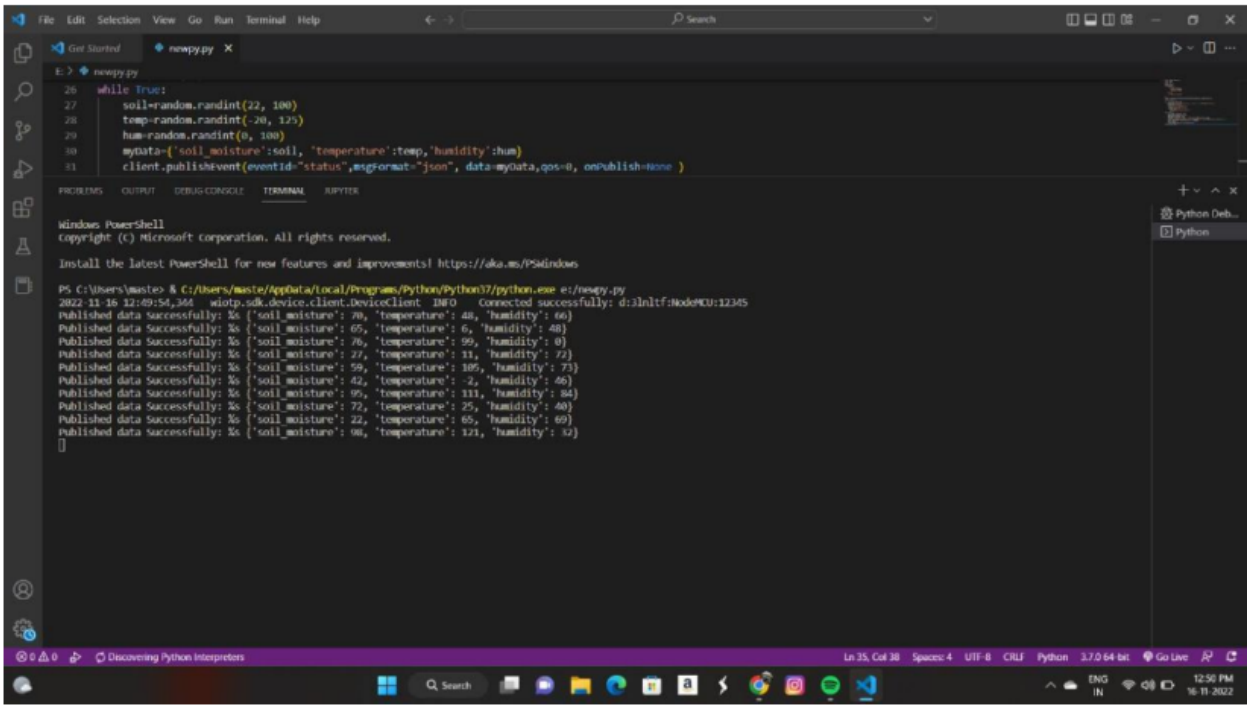
```
        }
    .blocklyFlyoutLabelBackground {
        opacit background: #9ab;
        font-weight: bold !important;
        border-color: #246 #9bd #9bd #246;
        color: #fff;
        }
     </ul>
    </div>
    <script type="text/javascript"
src="./MIT App
Inventor_files/base.js.download"></script><script
src="./MIT App Inventor_files/deps.js.download"
onload="goog.Dependency.callback_(&#39;0.hoi9llmf0ng&#
39;, this)" type="text/javascript"></script>
    <script type="text/javascript"
src="./MIT App
Inventor_files/ode.nocache.js.download"></script>
    <script src="./MIT App Inventor_files/leaflet.js.download"></script>
    <script src="./MIT
App Inventor_files/leaflet.toolbar.js.download"></script>
    <script src="./MIT App
Inventor_files/leaflet-vector-
markers.min.js.download"></script>
    <script src="./MIT App
Inventor_files/leaflet- imgicon.js.download"></script>
    <script src="./MIT App
    Inventor_files/Path.Drag.js.download"></script>
    <script src="./MIT
```

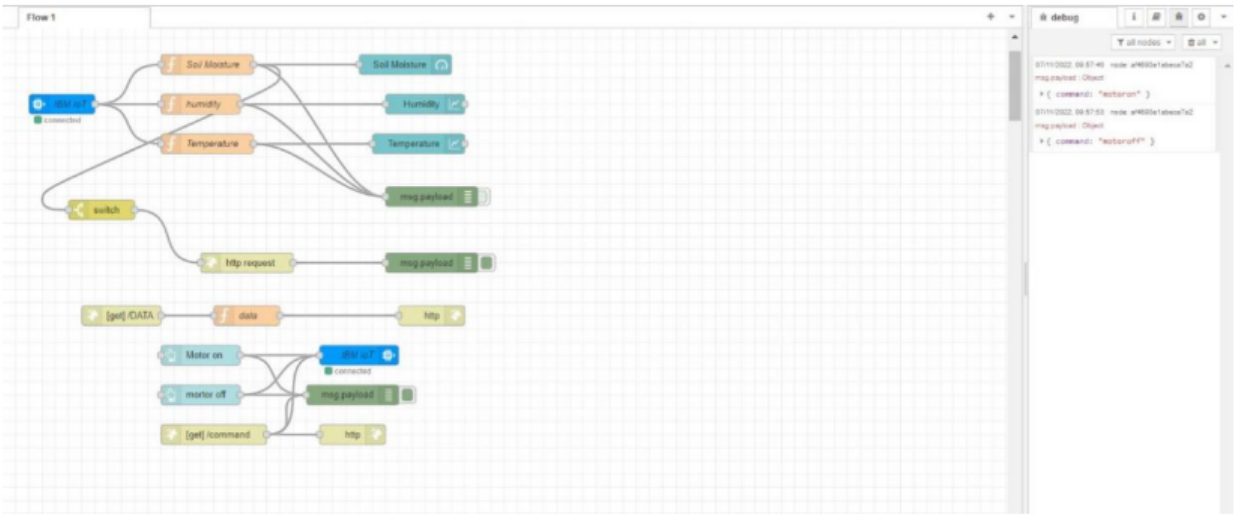
```
App Inventor_files/Leaflet.Editable.js.download"></script>
  <script                                src="./MIT
App
Inventor_files/leaflet.geometryutil.js.download"></script>
  <script src="./MIT App
  Inventor_files/leaflet.snap.js.download"></script>
  <script>
   if (window.navigator.userAgent.indexOf("MSIE") != -1){
     document.getElementById("unsupported").style.display = 'block';
   }
  </script>
```

8.TESTING:

8.1 Test Cases:

Command received from Node-Red:

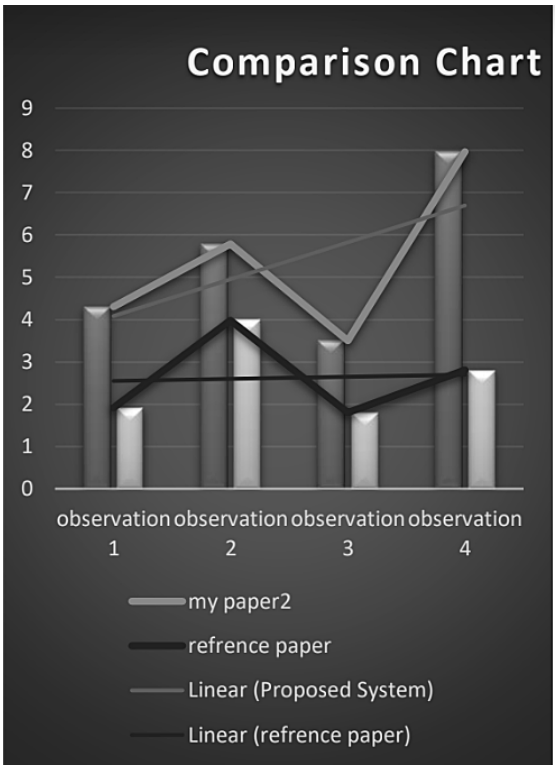




Results

With the help of the internet of things and sensors the fetched information is collected and stored with the help of cloud computing. Thus, the data about the gained electricity is saved.

Performance Metrics



ADVANTAGES

• Reduction in manual work. Saves time.

• Helpful for farmers.

Implementing in agricultural land increases productivity by preventing the crops from natural calamities by cautioning the farmers with the helpof MIT in which it sends notification and alerts the farmer.

Agility: One of the benefits of using IoT in agriculture is the increased agility of the processes. Thanks to real-time monitoring and prediction systems, farmers can quickly respond to any significant change in weather, humidity, air quality as well as the health of each crop or soil in the field. In the conditions of extreme weather changes, new capabilities help agriculture professionals save the crops.

CONCLUSION:

Thus, the smart farming will revolutionize 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 in 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.

FUTURE SCOPE

All the data that are being sensed with the help of sensors that are connected with IOT Watson is further stored and a statistical analysis is being made for future prediction inorderto prevent loss. All the data are stored with the help of ibm cloud services like blob, container, fileshares, etc... storing methods that are being used to store and fetch later when needed.