PROJECT REPORT

Project Name: IOT BASED SMART CROP PROTECTION SYSTEM FOR AGRICULTURE

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1. INTRODUCTION

Project Overview

Crops in farms are many times ravaged by local animals like buffaloes, cows, goats, birds etc. This leads to huge losses for the farmer. Due to over population, it occurs a deforestation this results in shortage of food, water and shelter in forest areas. So, animal's interference in residential areas is increasing day by day which affects human life and property causes human animal conflict but as per nature's rule every living creature on this earth has important role in eco-system. Elephants and other animals coming in to contact with humans, impact negatively in various means such as by depredation of crops, damaging grain stores, water supplies, houses and other assets, injuring and death of humans.

PURPOSE

The microcontroller now sounds an alarm to woo the animals away from the field as well as sends sms to the farmer so that he may know about the issue and come to the spot in case the animals don't turn away by the alarm. This ensures complete safety of crops from animals thus protecting the farmers loss.

2.LITERATURE SURVEY

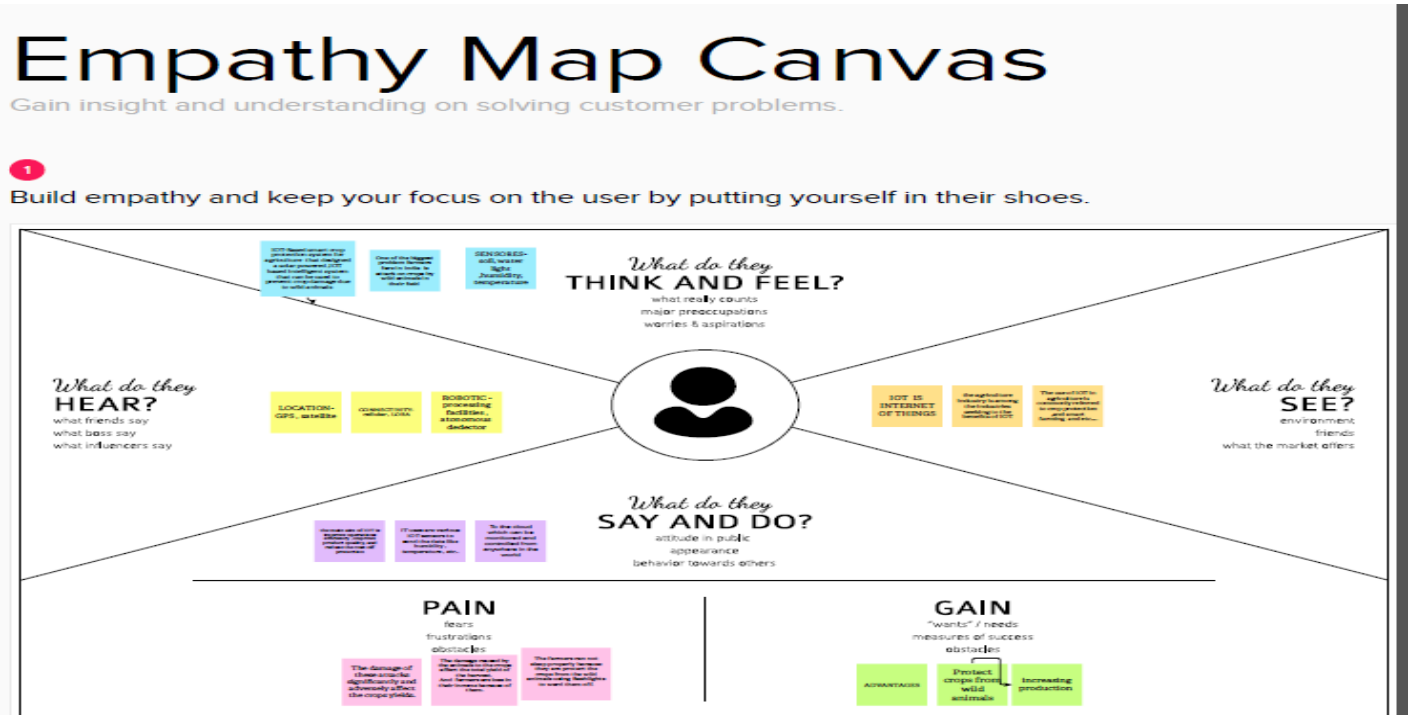
One of the major economic issues faced by the country is agriculture as this is the sector which is source of livelihood for about 54% of Indians till date. Still today this sector is not well developed and faces lots of problems resulting into low productivity of crops.

As 43% of land in India, is used for farming but contributes only 18% of the nation's GDP. The poor condition of agriculture in the country is the point of concern for Indians. The rural farmers in India suffer from poverty and most of them are illiterate so there is lack of good extension services.

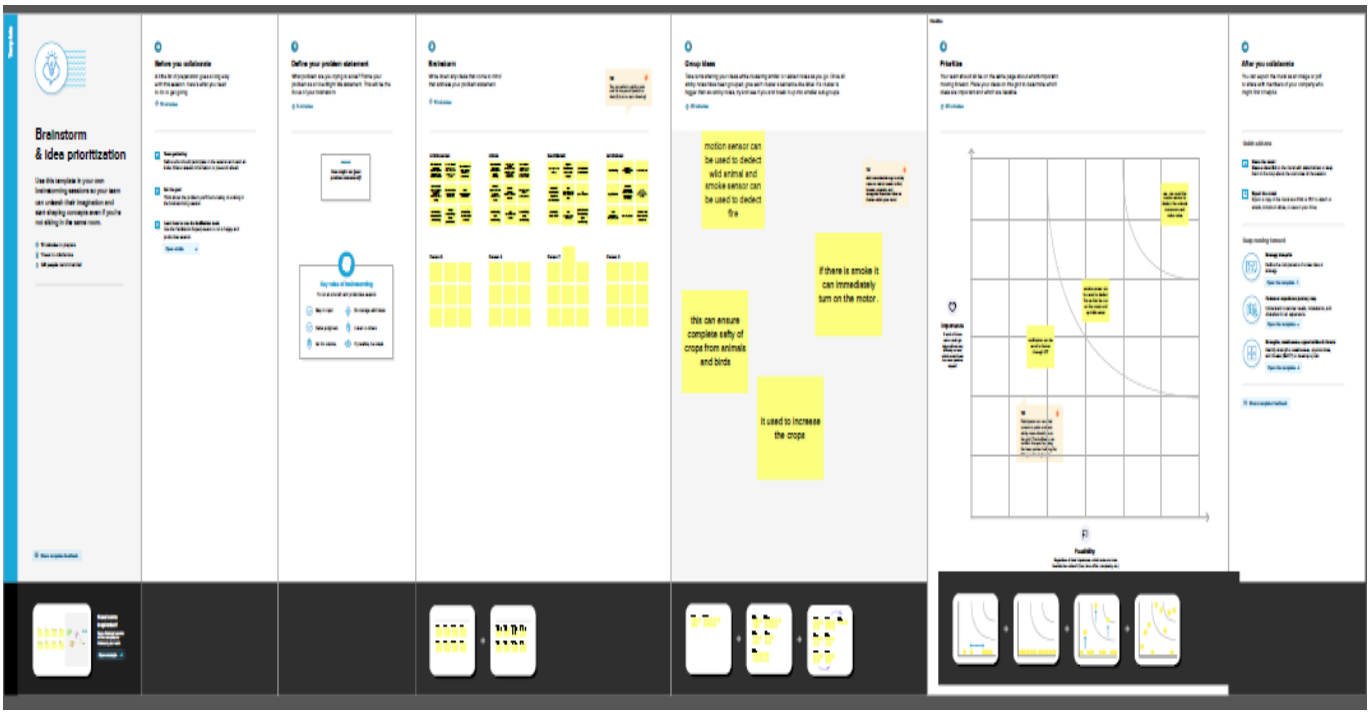
The problem of wild life attack on crops i.e., crop Vandalization is becoming very common in the states of Tamil Nadu, Himachal Pradesh, Punjab, Haryana, Kerala and many other states. Wild animals like monkeys, elephants, wild pigs, deer, wild dogs, bison, nilgais, estray animals like cows and buffaloes and even birds like parakeets cause a lot of damage to crops by running over them, eating and completely vandalizing them. This lead to poor yield of crops and significant financial loss to the owners of the farmland. This problem is so pronounced that sometimes the farmers decide to leave the areas barren due to such frequent animal attacks

3.IDEATION & PROPOSED SOLUTION

Empathy Map Canvas



Ideation & Brainstorming



Proposed Solution

1.Problem Statement (Problem to be solved) :

Usually crops in the fields are protected against birds and other unknown disturbances by human .this take an enormous amount of time. Creating a smart automatic system will benefit the farmers many different ways.

2.Idea / Solution description :

Smart farming has enabled farmers to reduce waste and enhance productivity with the help of sensors (light, temperature , soil moisture, etc..). further with the help of these sensors, farmers can monitor the field condition from anywhere

3.Novelty / Uniqueness :

Role of SENSORS : IOT smart agriculture products are designed to help monitor crop field using sensors and by automating irrigation system . As a result farmer can easily monitor the field condition from anywhere without any hassle.

4.Social Impact / Customer Satisfaction

Water conservation , saves lot of time , increased quality of production ,real time data and production insight , remove monitoring.

5.Business Model (Revenue Model)

A business start with an idea of how to generate value for a customer . so if it is a person looking for a table we can produce a table market it and receive payment for it.

6.Scalability of the Solution

Scalability in smart farming refers to the adaptability of a system to increase the capacity ,the number of technology devices such as sensors and fluctuators.

Problem Solution fit

4. REQUIREMENT ANALYSIS

Functional requirement

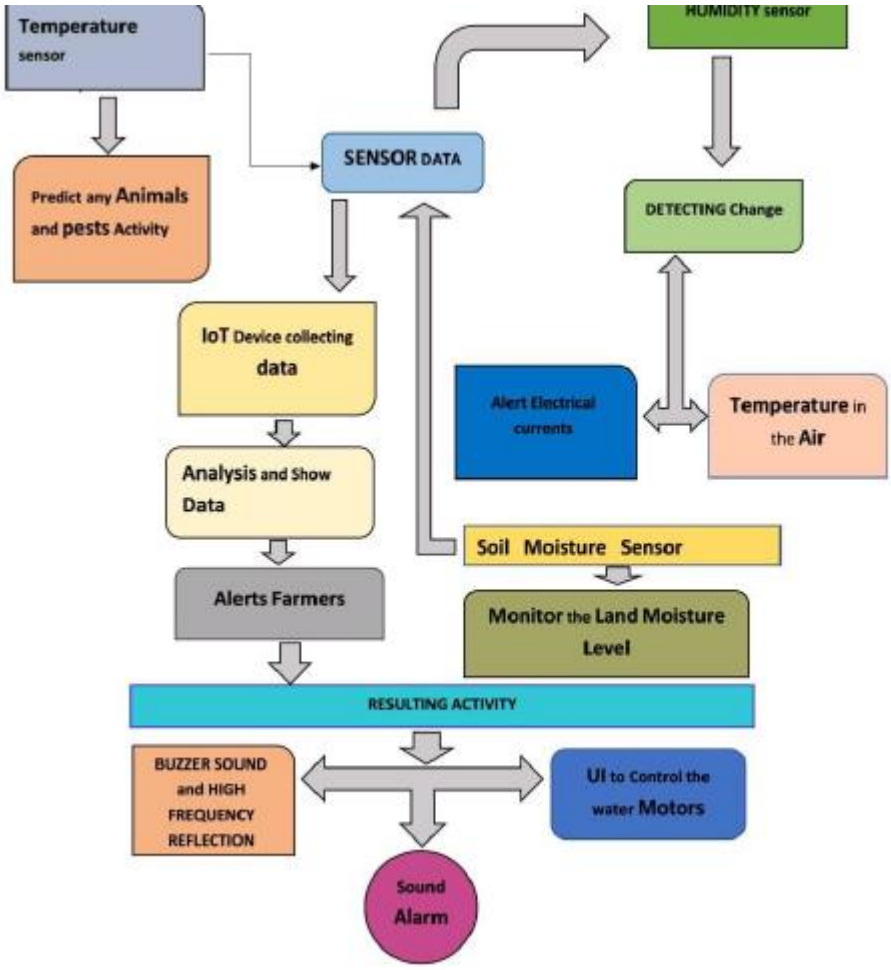
FR- NO	FUNCTIONAL REQUIREMENTS	SUB-REQUIREMENTS
FR-1	Fertilizing frame service .	Documentation Requirements and assisting information
FR-2	Economical service	Assisting information
FR-3	Technology assessment service	Selecting fertilizing features
FR-4	Feature assessment service	Updated technical information and machinery selection
FR-5	Information acquisition service	Assisting information about fertilizing rules
FR-6	Farm and field customizing service	Potential data acquisition service
FR-7	Field inspection	Spatial field information
FR-8	Field observation service	Analysed risks
FR-9	Assisting remote controlling	Inspecting and controlling fertilizing task
FR-10	Assisting “operational performance service”	Economical analysis of current technology

Non- functional requirement:

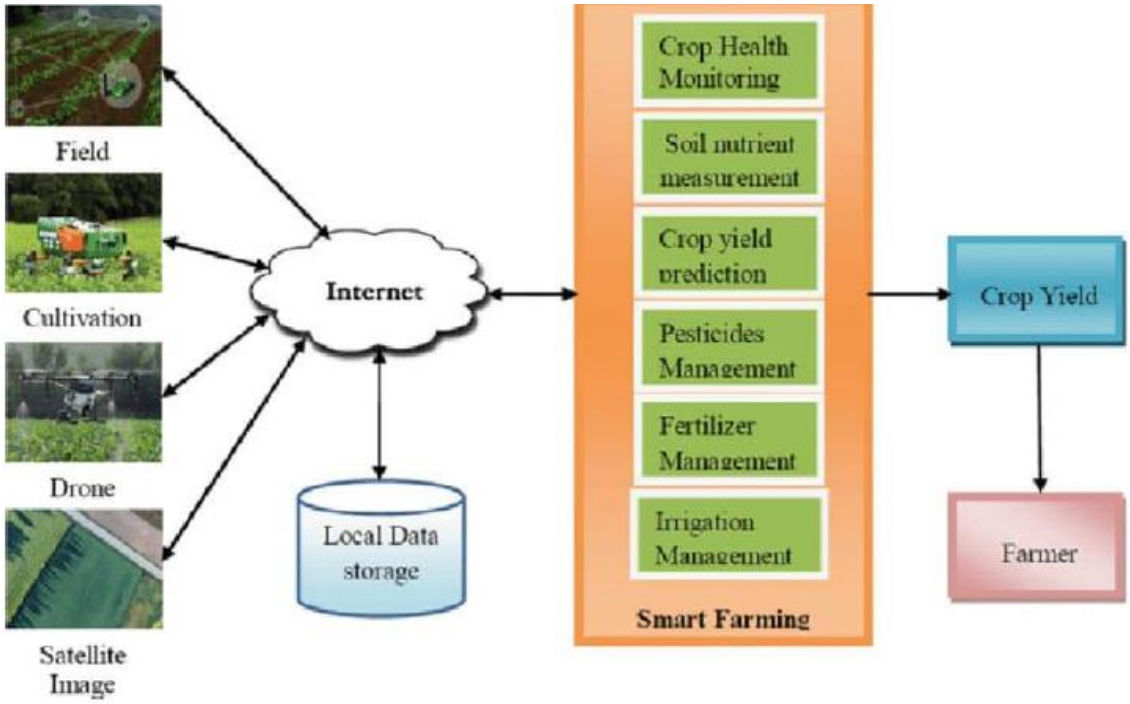
NRF.NO	NON FUNCTIONAL REQUIREMENTS	DESCRIPTION
NRF-1	Usability	To use new technologies a increase the quantity and qualitynd
NRF-2	Security	Protect the field from animals
NRF-3	Reliability	Increasing the demand for food with minimum resource
NRF-4	Performance	Maintain good yield and provide suitable quantity
NRF-5	Availability	Agricultural fence are quit and wild animal protection
NRF-6	Scalability	The developed system will not harmfull and injurious to animals as well as human begin

5. PROJECT DESIGN

Data Flow Diagrams



Solution & Technical Architecture



6.PROJECT PLANNING & SCHEDULING

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1		US-1	Create the IBM Cloud services which are being used in this project.	6	High	Noorjahan beevi Nisha Rajeswari Murugan
Sprint-1		US-2	Configure the IBM Cloud services which are being used in completing this project.	4	Medium	Noorjahan beevi Nisha Rajeswari Murugan
Sprint-2		US-3	IBM Watson IoT platform acts as the mediator to connect the web application to IoT devices, so create the IBM Watson IoT platform.	5	Medium	Noorjahan beevi Nisha Rajeswari Murugan
Sprint-2		US-4	In order to connect the IoT device to the IBM cloud, create a device in the IBM Watson IoT platform and get the device credentials.	5	High	Noorjahan beevi Nisha Rajeswari Murugan

Sprint-3		US-1	Configure the connection security and create API keys that are used in the Node-RED service for accessing the IBM IoT Platform.	10	High	Noorjahan beevi Nisha Rajeswari Murugan
Sprint-3		US-2	Create a Node-RED service.	10	High	Noorjahan beevi Nisha Rajeswari Murugan
Sprint-3		US-1	Develop a python script to publish random sensor data such as temperature, moisture, soil and humidity to the IBM IoT platform	7	High	Noorjahan beevi Nisha Rajeswari Murugan
Sprint-3		US-2	After developing python code, commands are received just print the statements which represent the control of the devices.	5	Medium	Noorjahan beevi Nisha Rajeswari Murugan
Sprint-4		US-3	Publish Data to The IBM Cloud	8	High	Noorjahan beevi Nisha Rajeswari Murugan
Sprint-4		US-1	Create Web UI in Node- Red	10	High	Noorjahan beevi Nisha Rajeswari Murugan
Sprint-4		US-2	Configure the Node-RED flow to receive data from the IBM IoT platform and also use Cloudant DB nodes to store the received sensor data in the	10	High	Noorjahan beevi Nisha Rajeswari Murugan

7.CODING & SOLUTIONING

Features code

```
import wiotp.sdk.device import time
import os import datetime import random myConfig ={
"identity": {
```

"orgId": "0hzydu",

"typeId": "NodeMCU", "deviceId": "12345"

},

"auth": {

"token": "12345678"

}

}

client =
wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)
client.connect ()

def myCommandCallback (cmd) :

print("Message received from IBM IoT Platform: %s"
%cmd.data['command']) m=cmd.data['command']

if (m=="motoron"): print("Motor is switchedon")

elif (m=="motoroff"):

print ("Motor is switchedOFF") print (" ")

while True: moist =random.randint (0,100)

temp=random.randint (-20, 125)

hum=random.randint (0, 100)
myData={'moisture':moist,'temperature':temp,'humidity':hum}
client.publishEvent (eventId="status", msgFormat="json", data=myData,
qos=0 ,

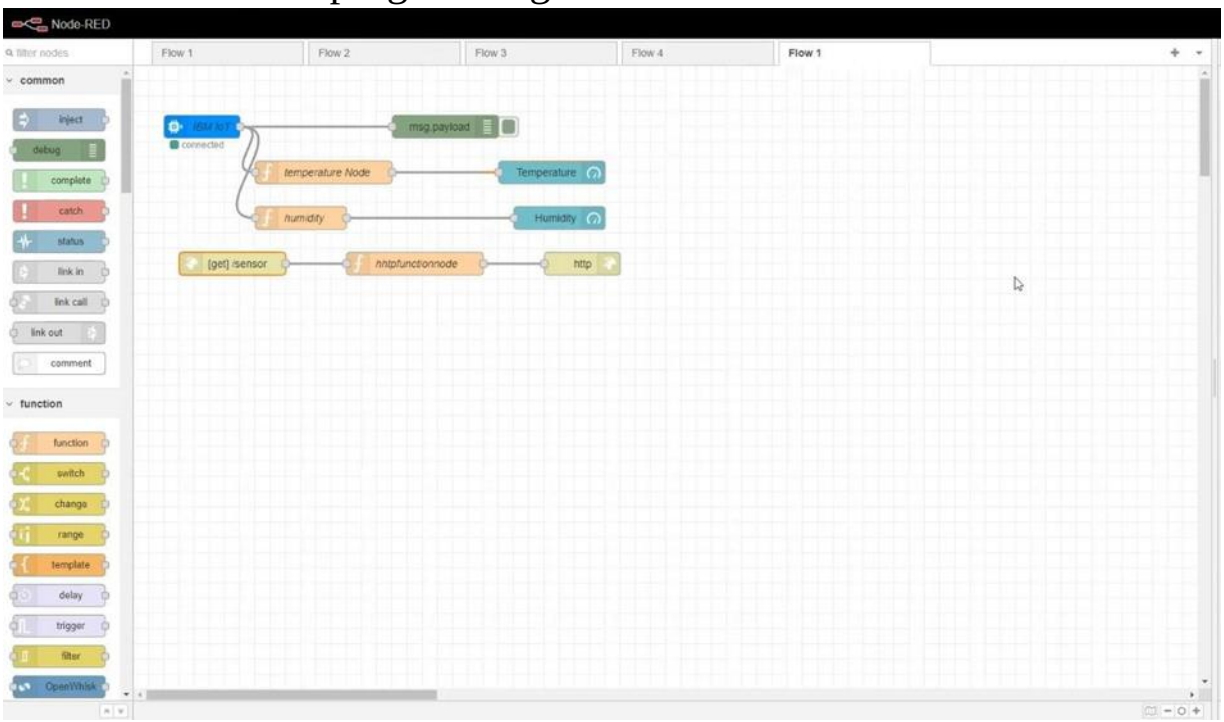
onPublish=None)

print ("Published data Successfully: %s",myData) time.sleep (2)

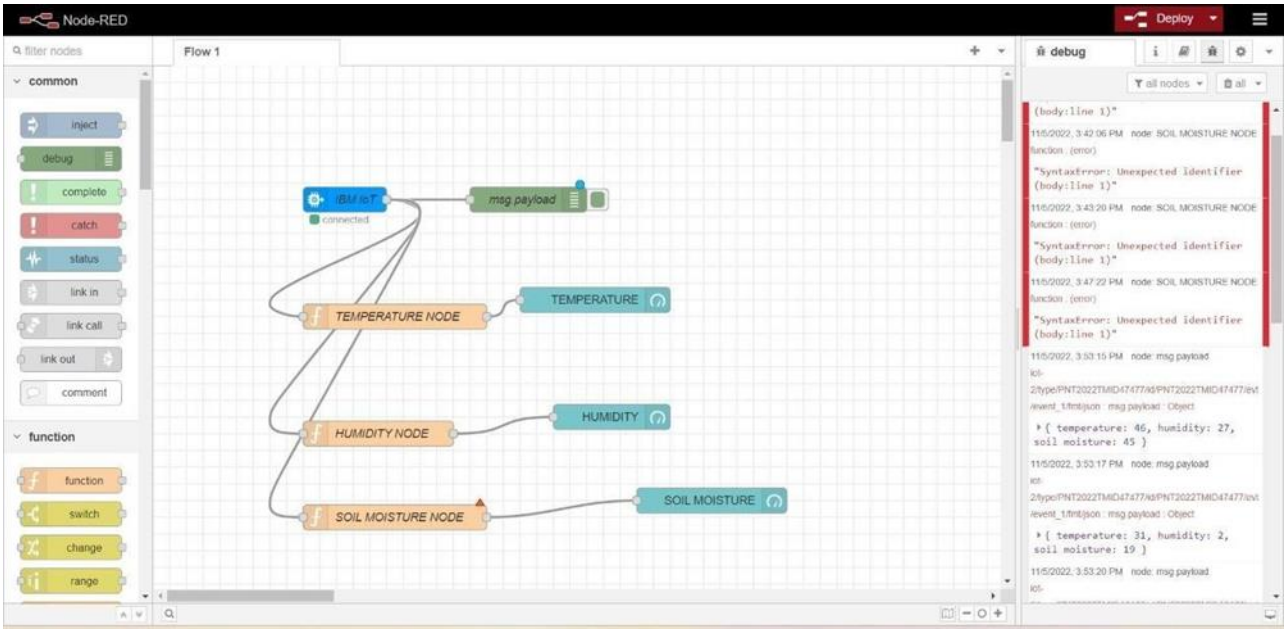
client.commandCallback =myCommandCallback client.disconnect ()

8.TESTING

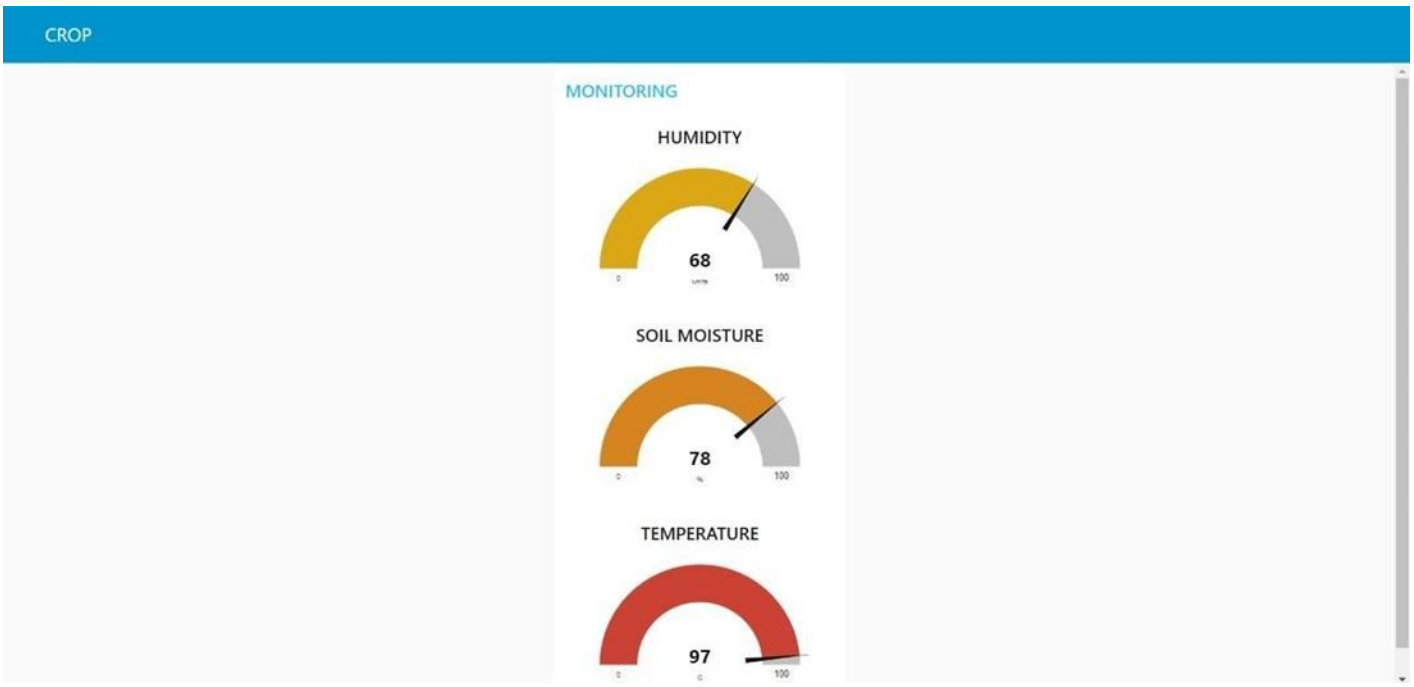
STEP1: Simulated program to get the random values.

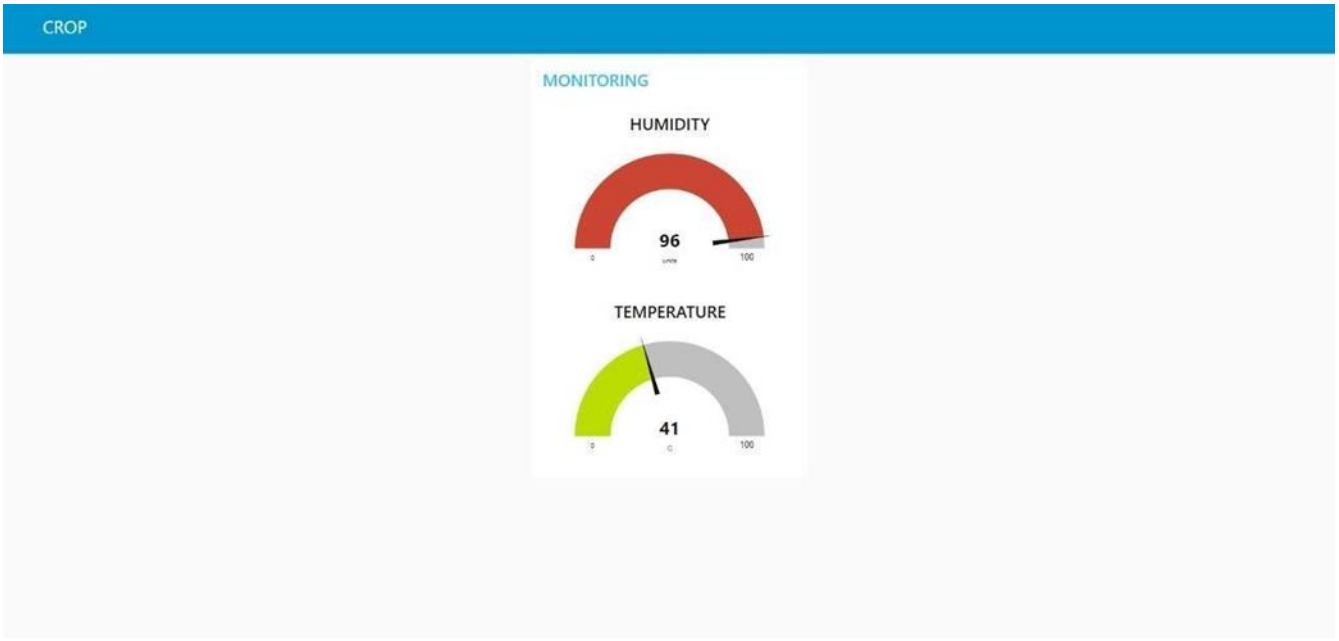


STEP2: Generate debug message from IBM Watson IoT Platform and connect the nodes.

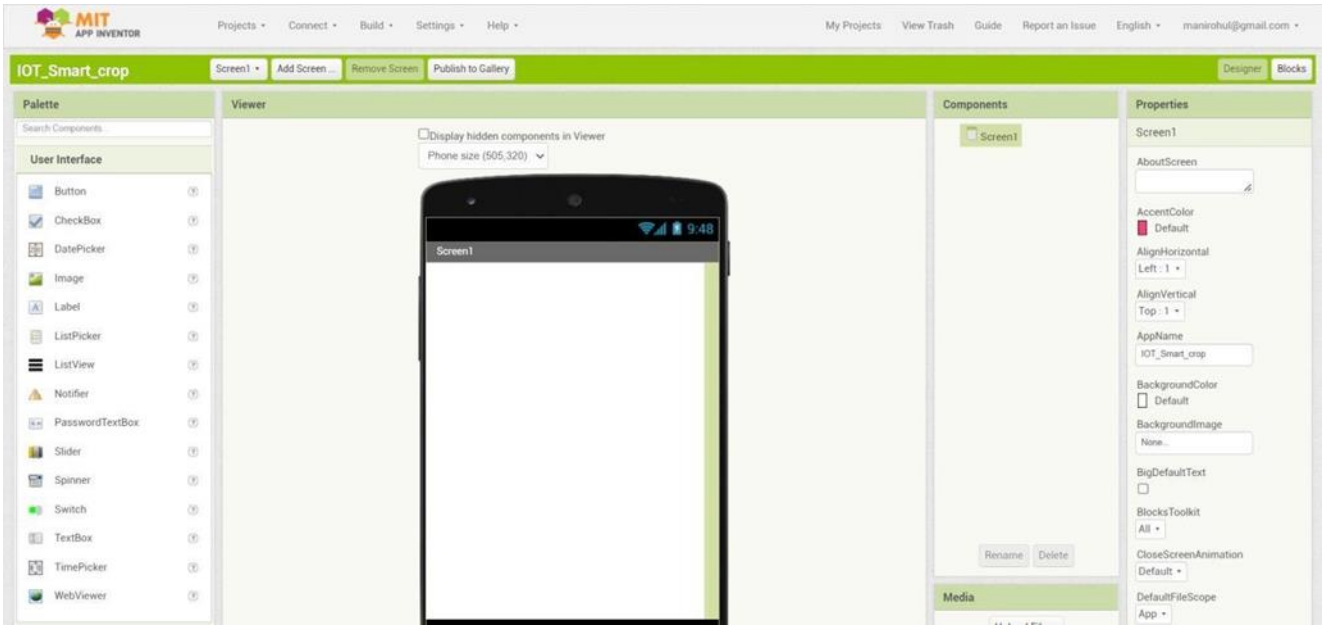


STEP3: Generate the some output from recent events.

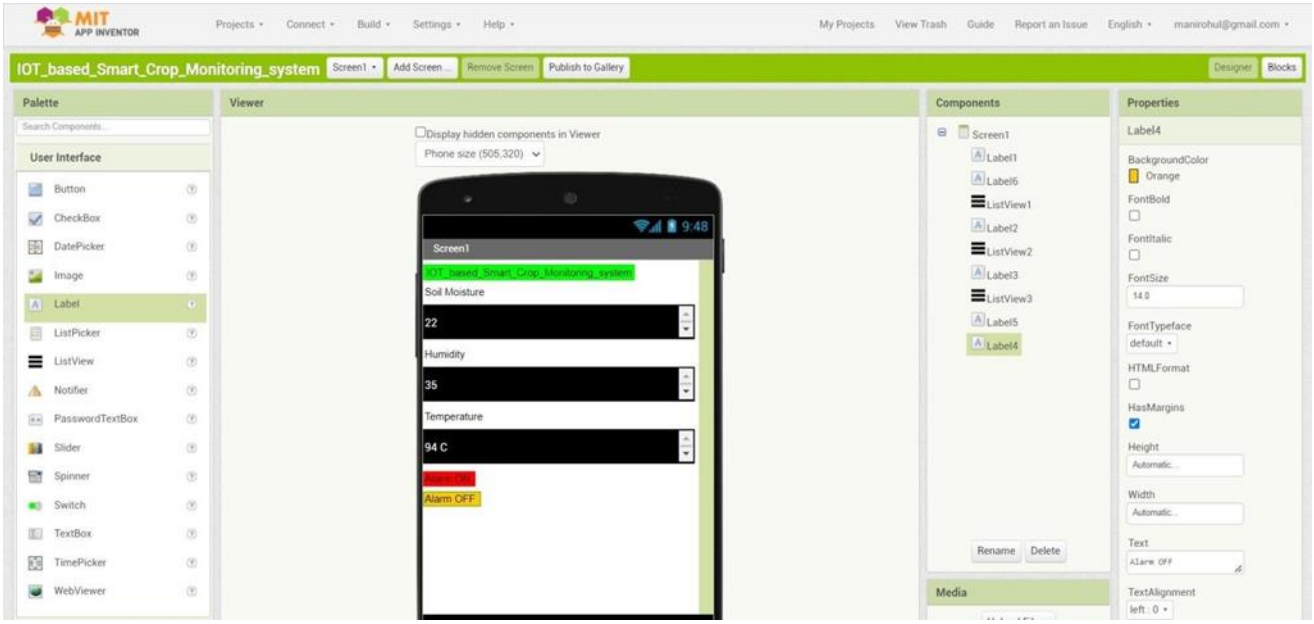




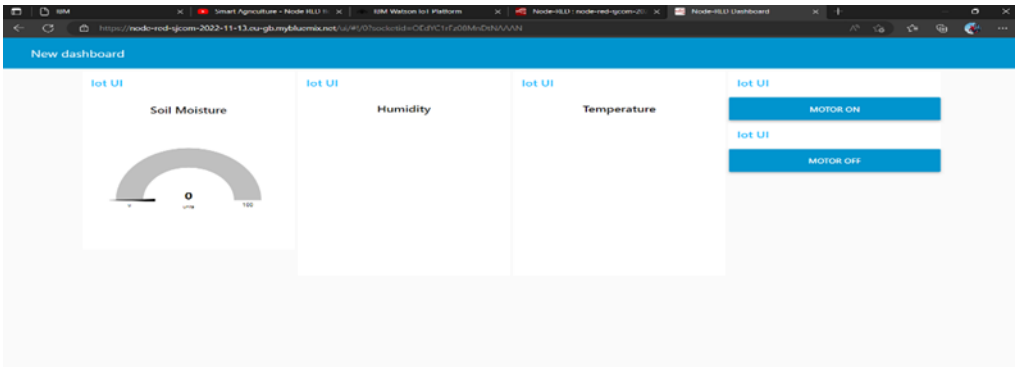
STEP 1: MIT APP inventor to design the APP.

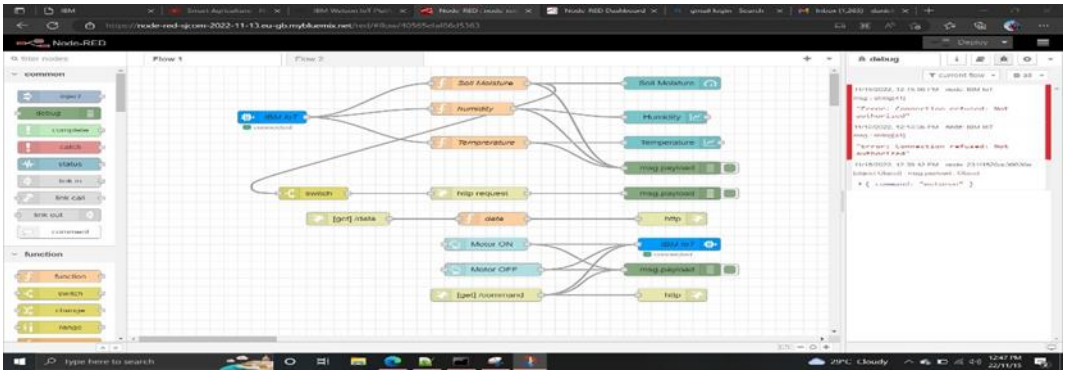


STEP 2: Customize the App interface to Display the Values.



9. RESULTS





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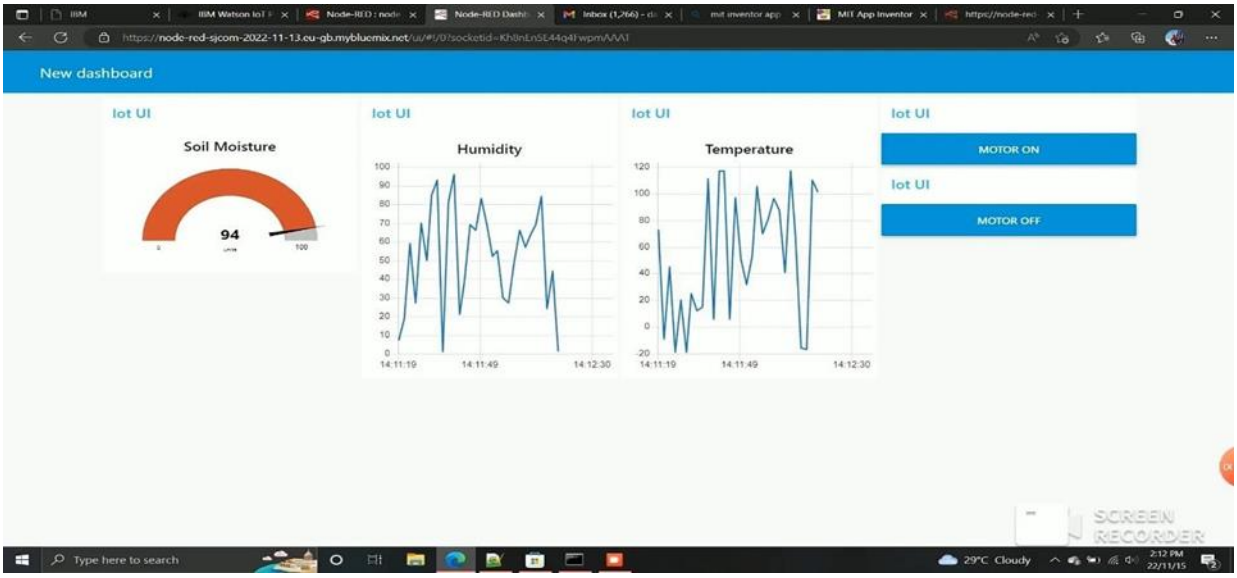

10.ADVANTAGES & DISADVANTAGES

Advantages:

- conserving biodiversity and nutrients in the earth
- optimizing the resources used, such as water, land, and labor, and consequently increasing the quality and lowering the food cost.
- this ensures complete safety of crops from animals thus protecting the farmers loss.
- Submersible weight sensors or ultrasonic sensors can screen the degree of tanks, lakes, wells and different kinds of fluid stockpiling like fuel and compost. The product figures volume dependent on the tank or lake geometry after some time. It conveys alarms dependent on various conditions.

Disadvantages:

- ✓ The main disadvantage is the time it can take to process the information.
- ✓ Farmers are so busy with harvesting and caring for their crops that they may not have time to process data.
- ✓ There are also issues with the water supply, as well as issues with the cost of the technology, which can be quite expensive.

11. CONCLUSION

The problem of crop vandalization by wild animals and fire has become a major social problem in current time. It requires urgent attention as no effective solution exists till date for this problem. Thus, this project carries a great social relevance as it aims to address this problem. This project will help farmers in protecting their or- chards and fields and save them from significant financial losses and will save them from the unproductive efforts that they endure for the protection their fields. This will also help them in achieving better crop yields thus leading to their economic wellbeing.

12.Future scope

In the current project we have implemented the project that can protect and maintain the the crop. In this project the farmer monitor and control the field remotely. In future we can add or update few more things to this project

. • We can create few more models of the same project ,so that the farmer can have information of a entire.

•We can update the this project by using solar power mechanism. So that the power supply from electric poles can be replaced with solar panels. It reduces the power line cost. It will be a one time investment. We can add solar fencing technology to this project.

•We can use GSM technology to this project so that the farmers can get the information directly to his home through SMS. This helps the farmer to get information if there is a internet issues.

13.APPENDIX

Source Code

```
import wiotp.sdk.device
 import time
import os
 import datetime
 import random
 myConfig ={
"identity": {
"orgId": "0hzydu",
"typeId": "NodeMCU", "deviceId": "12345"
},
"auth": {
"token": "12345678"
}
}
client = wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)
client.connect ()
def myCommandCallback (cmd) :
    print("Message received from IBM IoT Platform: %s" %cmd.data['command'])
m=cmd.data['command']
  if (m=="motoron"): print("Motor is switchedon")
  elif (m=="motoroff"):
  print ("Motor is switchedOFF") print (" ")
while True:
moist =random.randint (0,100)
temp=random.randint (-20, 125)
hum=random.randint (0, 100)

myData={'moisture':moist,'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 ()

Github link: https://github.com/IBM-EPBL/IBM-Project-48252-1660806012