INTRODUCTION

IOT Based Crop Protection System against Birds and Wild Animal Attacks Smart crop protection system from wild animals using ArduinoSmart Crop Protection System from Animals and Fire using Arduino

PROJECT OVERVIEW

The IOT device is used to indicate the farmer by a message while someone enter into the farm and we are used SD card module that helps to store a specified sound to fear the animals. This project is smart crop protection system for protect the farm from animals as well as unknown person

PURPOSE

The purpose is to grant monitoring device for crop safety to animal outbreaks and environment circumstances . This supports to preserve stretch and cash by dipping the physical exertion, else obligatory if the cultivators themselves have to afford guard for their crops with their endless physical administration . Wildlife regularly wreck eminence crops, because of which annual manufacturing of vegetation reduces inflicting monetary victims to cultivators . Agriculturalist suicide is huge bother due to less harvest . This low harvest is duet the circumstance of two most significant purposes i.e. Crop wrecked via untamed animals and Crop wrecked by meteorological conditions . The ranchers will treasure these SMS containing location . The prime thing of this task is to furnish a great reply to this distress . Each time either the wild animal or species are identified through PIR sensor which stimulates the web camera and gives rise to alert the buzzer in the locality, associates to the farmer direct to the cloud . When the moisture content is inferior to a terrifying level the sensor planted makes the water pumps to turn on . This ensures the complete safety of crops from animals also as from the weather conditions thus prevent the farmers

LITERATURE SURVEY

The Arduino and Node MCU study reviews the efficiency insmart agriculture.Patil K. A et al. proposes a wise agricultural model inintegration with ICT. ICT have always mattered in Agriculturedomain. Over period, weather patterns and soil conditions andepidemics of pests and diseases changed, received updatedinformation allows the farmers to cope with and even benefit from these changes. It is really challenging task that needs to provide such knowledge because of highly localized nature ofagriculture information specifically distinct conditions. Thecomplete real-time and historical environment information helpsto achieve efficient management and utilization of resources. Theissue is that the technique can achieve convenient wirelessconnection within a short-distance.

EXISTING PROBLEM

Boundary walls and solar fences around the sensitiveareas are built to prevent the wild animal attacks. But this system doesn’t allow the animals to have a largeliving range and in-dependence of movement.Overhead or underground structures as in are built todivert the wild animals into a different path notinterfering with vehicle traffic. But this system takeslonger duration, labor and moreover not economicaland satisfactory some devices of informationtechnology, viz., radio collars with very highfrequency, global positioning system and satelliteuplink facilities, are being used by the researchinstitutions to monitor the movement of lions, tigers elephants, olive riley turtles, and other wild animalsto understand their movements and their use patternof the habitat. But installation of the system becomesdifficult and is not always possible

REFERENCES

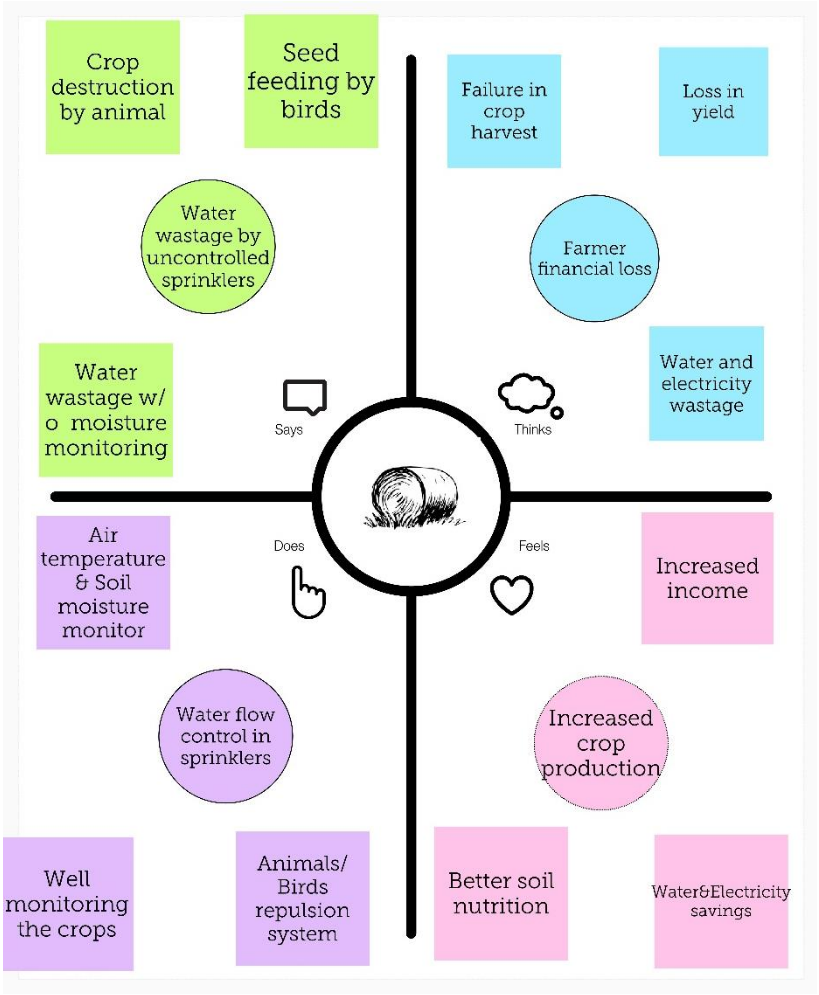
1. Mateos, L., & Araus, J. L. (2016). Hydrological, engineering agronomical, breeding and physiological pathways for the effective and efficient use of water in agriculture. Agricultural Water Management, 164, 190–196. doi:10.1016/j.agwat.2015.10.017
2. Wasson, T., Choudhury, T., Sharma, S., & Kumar, P. (2017). Integration of RFID and sensor in agriculture using IOT. 2017 Internationl Conference on Smart Technologies for SmartNation (SmartTechCon). doi:10.1109/smarttechcon.2017.835837 2
3. Gouadria, F., Sbita, L., & Sigrimis, N. (2017). A greenhouse system control based on a PSO tuned PI regulator. 2017 International Conference on Green Energy Conversion Systems (GECS).

PROBLEM STATEMENT DEFINITION

- Problem statement including use of ICT:
  Develop affordable app-based solution for Soil health monitoring and suggest which crop to be sown based on it.(Technology Bucket: IoT, AI, ML etc.)
- Expected Output:
  Create app-based solution to detect soil parameters like moisture content, temperature, relative humidity, nutrient, Ph, CEC, NPK etc.and provide crop suggestions to be produced based on soil parameters & environment values.Bonus Objective: Provide remedies & alerts on soil deficiencies likeWatering for low Moisture level, Fertilizers for Nutrient deficiencies etc.
- How Does it help:
  Currently farmers follow Traditional Crop yielding pattern andirrespective of soil condition, farmers take routine crops. Farmers irrespective of whether soil nutrient requirement uses blanket fertilizers for crop. Because of these issues, losses in crop yielding and soil health gets affected. With the help of solution, farmer can plan which crop to take based on soil condition and plan quickly possible remedies for soil deficiencies.

IDEATION & PROPOSED SOLUTION

EMPATHY MAP CANVAS



Says

Crop destruction by animal

Seed feeding by birds

Water wastage by uncontrolled sprinklers

Water wastage w/ o moisture monitoring

Thinks

Failure in crop harvest

Loss in yield

Farmer financial loss

Water and electricity wastage

Does

Air temperature & Soil moisture monitor

Water flow control in sprinklers

Well monitoring the crops

Animals/ Birds repulsion system

Feels

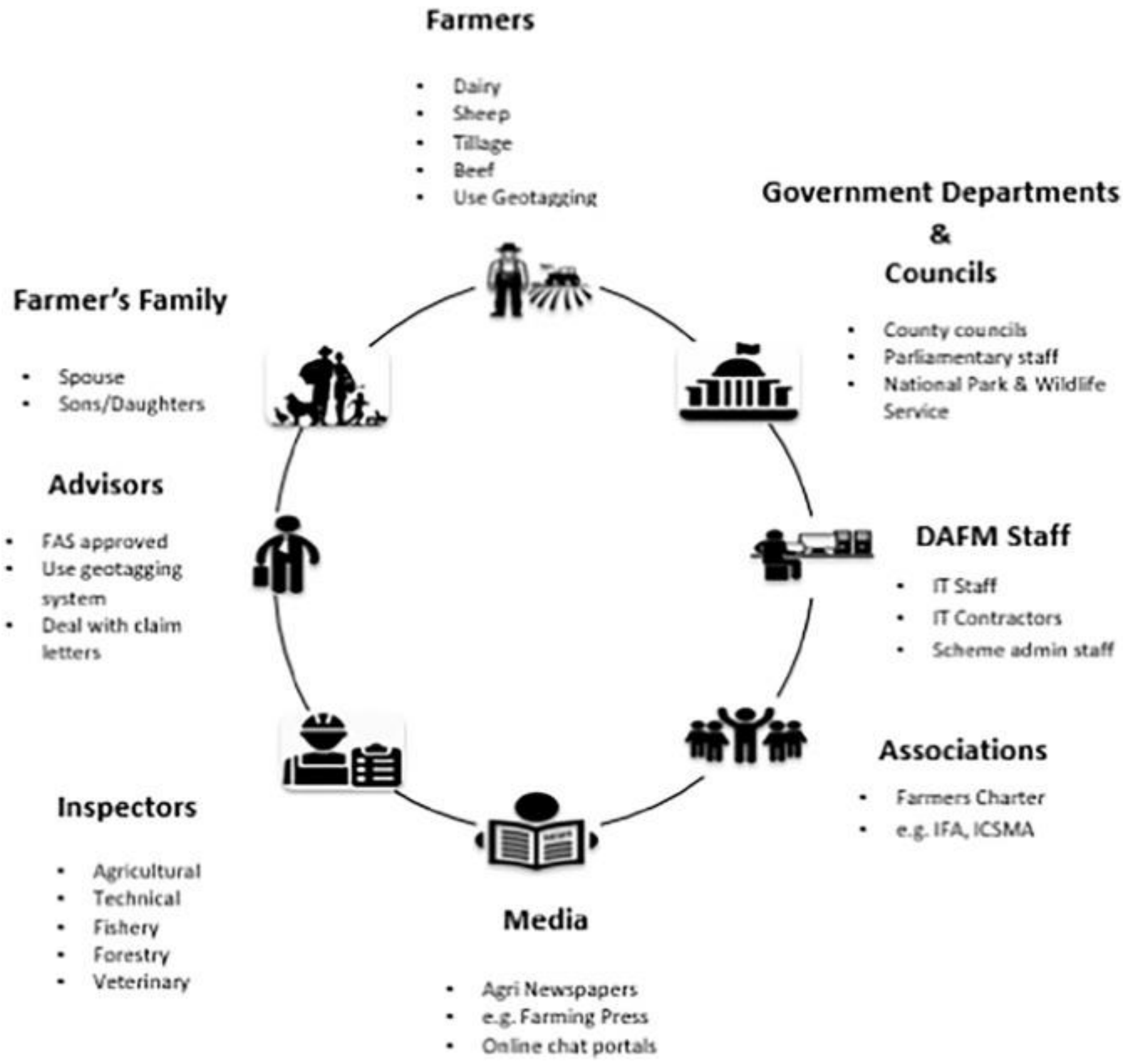
Increased income

Increased crop production

Better soil nutrition

Water&Electricity savings

IDEATION AND BRAINSTORMING



Farmers

- Dairy
- Sheep
- Tillage
- Beef
- Use Geotagging

Government Departments & Councils

- County councils
- Parliamentary staff
- National Park & Wildlife Service

DAFM Staff

- IT Staff
- IT Contractors
- Scheme admin staff

Associations

- Farmers Charter
- e.g. IFA, ICSMA

Media

- Agri Newspapers
- e.g. Farming Press
- Online chat portals

Inspectors

- Agricultural
- Technical
- Fishery
- Forestry
- Veterinary

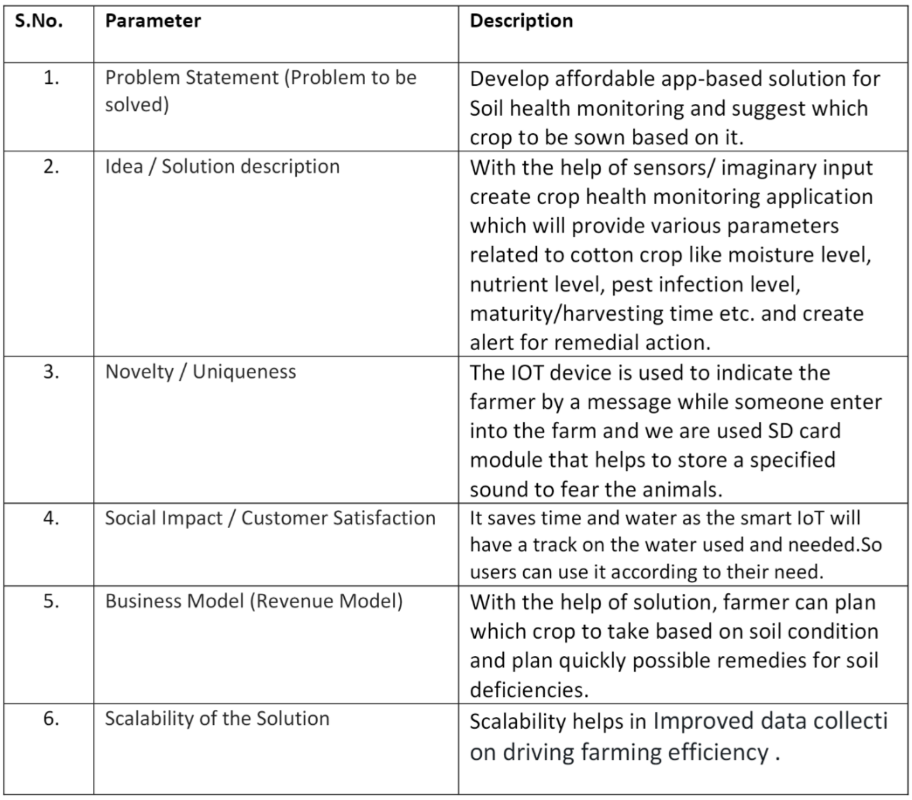
Advisors

- FAS approved
- Use geotagging system
- Deal with claim letters

Farmer's Family

- Spouse
- Sons/Daughters

Proposed Solution



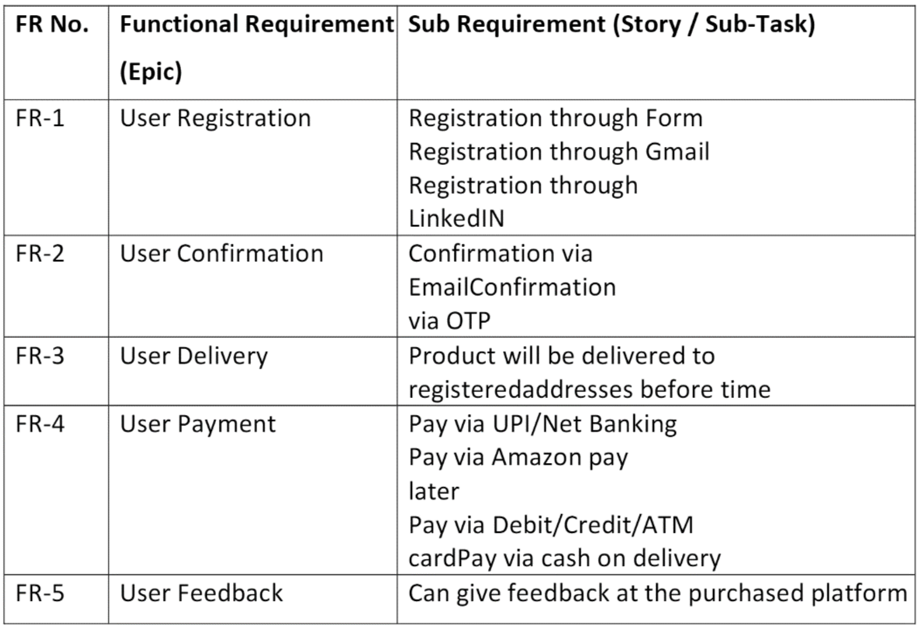
S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Develop affordable app-based solution for Soil health monitoring and suggest which crop to be sown based on it.
2.	Idea / Solution description	With the help of sensors/ imaginary input create crop health monitoring application which will provide various parameters related to cotton crop like moisture level, nutrient level, pest infection level, maturity/harvesting time etc. and create alert for remedial action.
3.	Novelty / Uniqueness	The IOT device is used to indicate the farmer by a message while someone enter into the farm and we are used SD card module that helps to store a specified sound to fear the animals.
4.	Social Impact / Customer Satisfaction	It saves time and water as the smart IoT will have a track on the water used and needed.So users can use it according to their need.
5.	Business Model (Revenue Model)	With the help of solution, farmer can plan which crop to take based on soil condition and plan quickly possible remedies for soil deficiencies.
6.	Scalability of the Solution	Scalability helps in Improved data collecti on driving farming efficiency .

Problem Solution fit

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Develop affordable app-based solution for Soil health monitoring and suggest which crop to be sown based on it.
2.	Idea / Solution description	With the help of sensors/ imaginary input create crop health monitoring application which will provide various parameters related to cotton crop like moisture level, nutrient level, pest infection level, maturity/harvesting time etc. and create alert for remedial action.
3.	Novelty / Uniqueness	The IOT device is used to indicate the farmer by a message while someone enter into the farm and we are used SD card module that helps to store a specified sound to fear the animals.
4.	Social Impact / Customer Satisfaction	It saves time and water as the smart IoT will have a track on the water used and needed.So users can use it according to their need.
5.	Business Model (Revenue Model)	With the help of solution, farmer can plan which crop to take based on soil condition and plan quickly possible remedies for soil deficiencies.
6.	Scalability of the Solution	Scalability helps in Improved data collecti on driving farming efficiency .

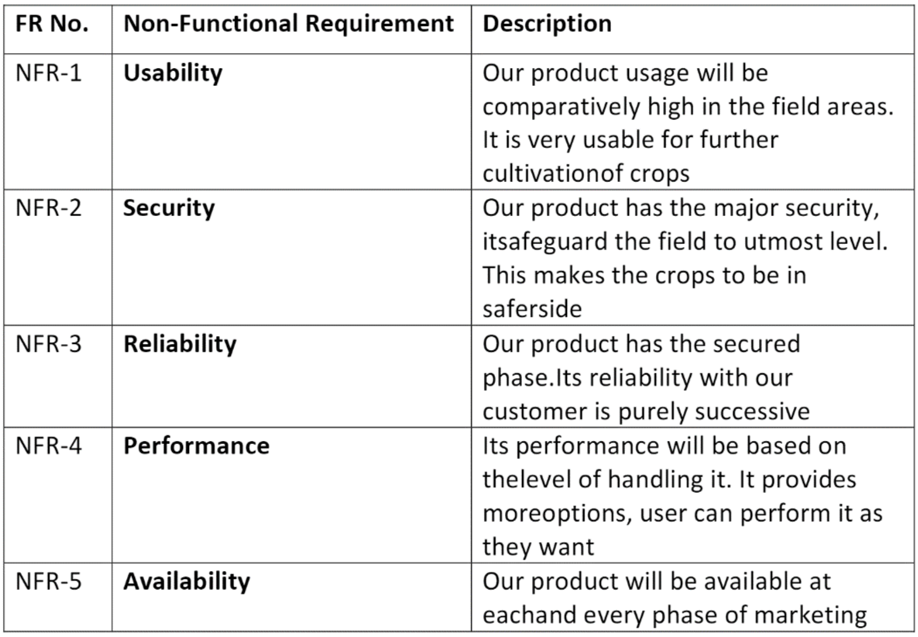
REQUIREMENT ANALYSIS

Functional requirement



FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via EmailConfirmation via OTP
FR-3	User Delivery	Product will be delivered to registeredaddresses before time
FR-4	User Payment	Pay via UPI/Net Banking Pay via Amazon pay later Pay via Debit/Credit/ATM cardPay via cash on delivery
FR-5	User Feedback	Can give feedback at the purchased platform

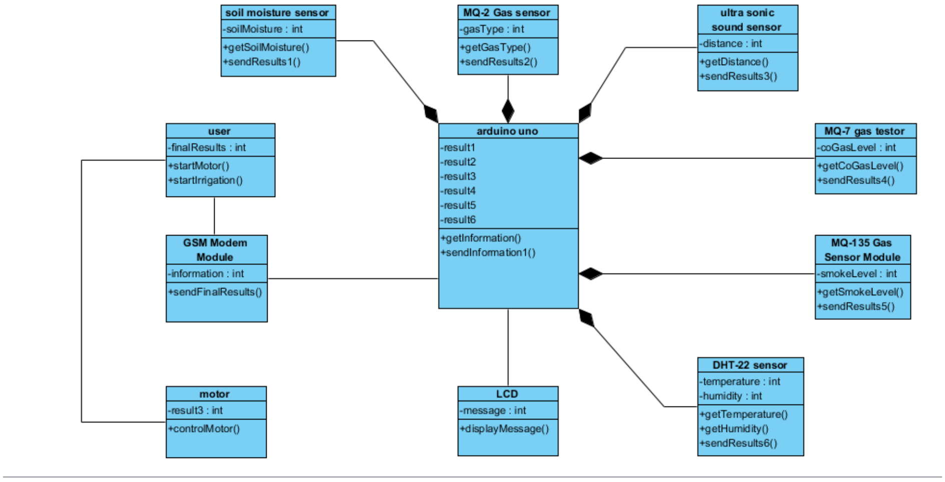
Non Functional requirement



FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Our product usage will be comparatively high in the field areas. It is very usable for further cultivationof crops
NFR-2	**Security**	Our product has the major security, itsafeguard the field to utmost level. This makes the crops to be in saferside
NFR-3	**Reliability**	Our product has the secured phase.Its reliability with our customer is purely successive
NFR-4	**Performance**	Its performance will be based on thelevel of handling it. It provides moreoptions, user can perform it as they want
NFR-5	**Availability**	Our product will be available at eachand every phase of marketing

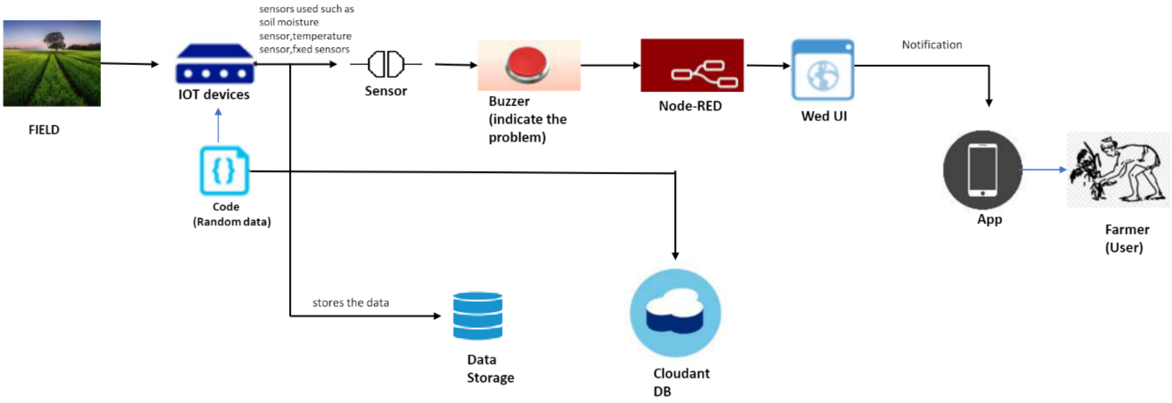
PROJECT DESIGN

Data Flow Diagrams

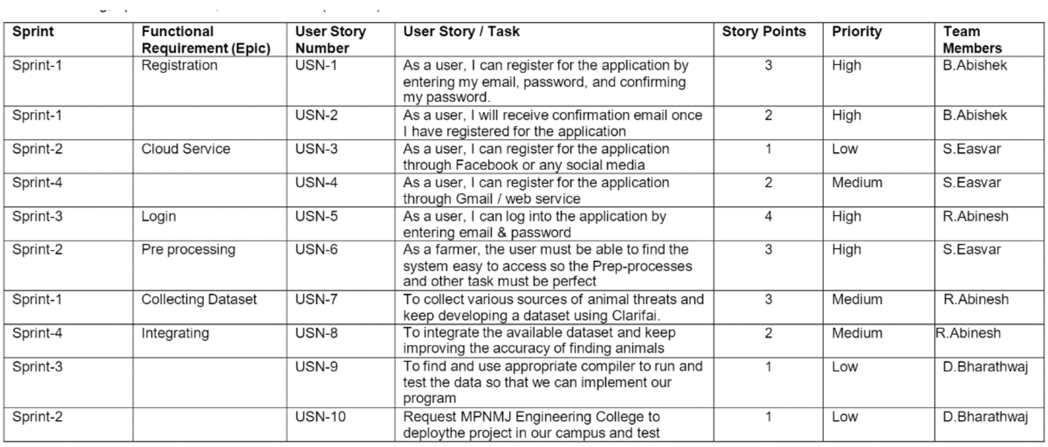


Solution & Technical Architecture

Solution Architecture Diagram:



PROJECT PLANNING & SCHEDULING



Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	3	High	B.Abishek
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	2	High	B.Abishek
Sprint-2	Cloud Service	USN-3	As a user, I can register for the application through Facebook or any social media	1	Low	S.Easvar
Sprint-4		USN-4	As a user, I can register for the application through Gmail / web service	2	Medium	S.Easvar
Sprint-3	Login	USN-5	As a user, I can log into the application by entering email & password	4	High	R.Abinesh
Sprint-2	Pre processing	USN-6	As a farmer, the user must be able to find the system easy to access so the Prep-processes and other task must be perfect	3	High	S.Easvar
Sprint-1	Collecting Dataset	USN-7	To collect various sources of animal threats and keep developing a dataset using Clarifai.	3	Medium	R.Abinesh
Sprint-4	Integrating	USN-8	To integrate the available dataset and keep improving the accuracy of finding animals	2	Medium	R.Abinesh
Sprint-3		USN-9	To find and use appropriate compiler to run and test the data so that we can implement our program	1	Low	D.Bharathwaj
Sprint-2		USN-10	Request MPNMJ Engineering College to deploythe project in our campus and test	1	Low	D.Bharathwaj

CODING & SOLUTIONING

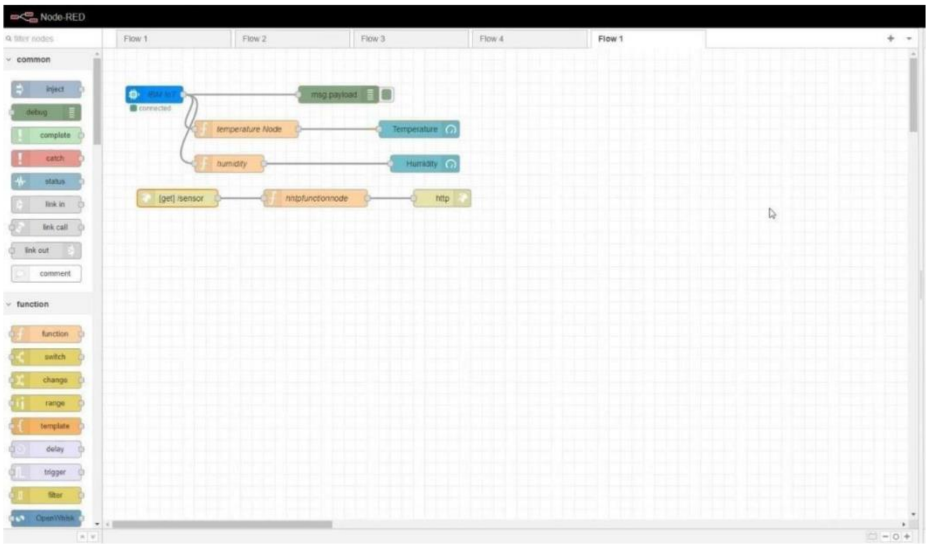
```
import datetime
import ibm_boto3
from ibm_botocore.client import Config, ClientError
import cv2
import numpy as np
import sys
import ibmiotf.application
import ibmiotf.device
import random
import time

from cloudant.client import Cloudant
from cloudant.error import CloudantException
from cloudant.result import Result, ResultByKey

organization = "bb2bpw"
deviceType = "RaspberryPi"
deviceId = "24102001"
authMethod = "token"
authToken = "raspberry"

def myCommandCallback(cmd):
    print("Command received: %s" % cmd.data)
    print(cmd.data['command'])

    if cmd.data['command']=="sirenon":
        print("SIREN ON")

    if cmd.data['command']=="sirenoff":
        print("SIREN OFF")
    if cmd.data['command']=="ledon":
        print("BLINKING LED ON")

    if cmd.data['command']=="ledoff":
        print("BLINKING LED OFF")

    if cmd.data['command']=="motoron":
        print("MOTOR ON")

    if cmd.data['command']=="motoroff":
        print("MOTOR OFF")


try:

    deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method": authMethod, "auth-token": authToken}
    deviceCli = ibmiotf.device.Client(deviceOptions)

except Exception as e:
    print("Caught exception connecting device: %s" % str(e))
    sys.exit()

deviceCli.connect()

animal_classifier=cv2.CascadeClassifier("haar-animal.xml")

video=cv2.VideoCapture(0)

COS_ENDPOINT = "https://s3.jp-tok.cloud-object-storage.appdomain.cloud"
COS_API_KEY_ID = "ffU9G4WuxXvsAV0muEVv-iAi2x3oS_dcS5Q8qceZ2ZXA"
```

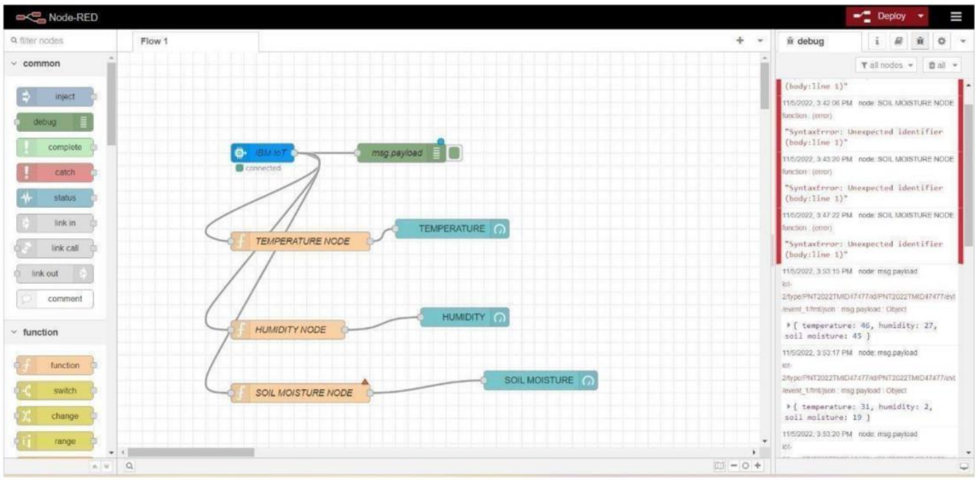
```
COS_AUTH_ENDPOINT = "https://iam.cloud.ibm.com/identity/token"
COS_RESOURCE_CRN = "crn:v1:bluemix:public:cloud-object-storage:global:a/8899ffc5103f4b6c824747890ea97e9f:a7ddbd11-4325-464e-82b5-d07c670c2642::"


client = Cloudant("apikey-v2-3r2lgzf2d6tor5oq125zsnodnm119qtsqnorjqjaff4","2481c47aba0e16cdeca03d4a11c6deca", url="https://apikey-v2-3r2lgzf2d6tor5oq125zsnodnm119qtsqnorjqjaff4:2481c47aba0e16cdeca03d4a11c6deca@ebc43d84-877b-439c-be4f-3f20160e4b30-bluemix.cloudantnosqldb.appdomain.cloud")
client.connect()
database_name = "securitycamera"


cos = ibm_boto3.resource("s3",
  ibm_api_key_id=COS_API_KEY_ID,
  ibm_service_instance_id=COS_RESOURCE_CRN,
  ibm_auth_endpoint=COS_AUTH_ENDPOINT,
  config=Config(signature_version="oauth"),
  endpoint_url=COS_ENDPOINT
)


def multi_part_upload(bucket_name, item_name, file_path):
  try:
    part_size = 1024 * 1024 * 5

    file_threshold = 1024 * 1024 * 15

    transfer_config = ibm_boto3.s3.transfer.TransferConfig(
      multipart_threshold=file_threshold,
      multipart_chunksize=part_size
      )
```

```
        multi_part_upload("cloud-object-storage-wb-cos-standard-kcg",picname,pic+".jpg")
        if my_database.exists():
            print("'{database_name}' successfully created.")
            json_document = {
                "_id": pic,
                "link":COS_ENDPOINT+"/cloud-object-storage-wb-cos-standard-kcg/"+picname
                }
            new_document = my_database.create_document(json_document)
            if new_document.exists():
                print("Document '(new_document)' successfully created.")
            time.sleep(1)
            t=26
            h=63
            m=38
            data = {"d":{ 'temperature': t, 'humidity': h, 'soilmoisture': m, 'mammal': mammal}}

            def myOnPublishCallback():
                print ("Published data to IBM Watson")

            success = deviceCli.publishEvent("data", "json", data, qos=0,
on_publish=myOnPublishCallback)
            if not success:
                print("Not connected to IoTF")
                time.sleep(1)
                mammal=0

        deviceCli.commandCallback = myCommandCallback



    Key=cv2.waitKey(1)
    if Key==ord('q'):
```

```
video.release()
deviceCli.disconnect()
cv2.destroyAllWindows()
break
```

RESULTS





```
(body:line 1)"
11/5/2022, 3:42:06 PM   node: SOIL MOISTURE NODE
function : (error)
"SyntaxError: Unexpected identifier
(body:line 1)"
11/5/2022, 3:43:20 PM   node: SOIL MOISTURE NODE
function : (error)
"SyntaxError: Unexpected identifier
(body:line 1)"
11/5/2022, 3:47:22 PM   node: SOIL MOISTURE NODE
function : (error)
"SyntaxError: Unexpected identifier
(body:line 1)"
11/5/2022, 3:53:15 PM   node: msg.payload
iot-
2/type/PNT2022TMID47477/id/PNT2022TMID47477/evt
/event_1/fmt/json : msg.payload : Object
▸{ temperature: 46, humidity: 27,
soil moisture: 45 }
11/5/2022, 3:53:17 PM   node: msg.payload
iot-
2/type/PNT2022TMID47477/id/PNT2022TMID47477/evt
/event_1/fmt/json : msg.payload : Object
▸{ temperature: 31, humidity: 2,
soil moisture: 19 }
11/5/2022, 3:53:20 PM   node: msg.payload
iot-
```