PROJECT REPORT

Project Name : **EMERGING METHODS FOR EARLY DETECTION OF FOREST FIRES.**
Team id : **PNT2022TMID03558**
Team members : **Team Leader - GOKUL RAJ. R**
ELANGOVAN. S

1. INTRODUCTION

Project overview

Wildfire, also called forest fire, bush or vegetation fire, can be described as any uncontrolled and non- prescribed combustion or burning of plants in a natural setting such as a forest, grassland, brush land or tundra, which consumes the natural fuels and spreads based on environmental conditions (e.g., wind, topography). Forest fires are a major environmental issue,creating economic and ecological damage whileendangering human lives. There are typically about 100,000 wildfires in the United States every year.
Over 9 million acres of land have been destroyed due to treacherous wildfires. It is difficult to predict and detect Forest Fire in a sparsely populated forest area and it is more difficult if the prediction is done using ground- based methods like Camera or Video-Based approach. Satellites can be an important source of dataprior and also during the Fire due to its reliability and efficiency. The various real-time forest fire detection and prediction approaches, with the goal of informing the local fire authorities.
This is a huge problem which needs to be tackled and thus through this project we provide away totackle the issue.

1.2 Purpose

The purpose of the project is to detect the forest fire earlier.

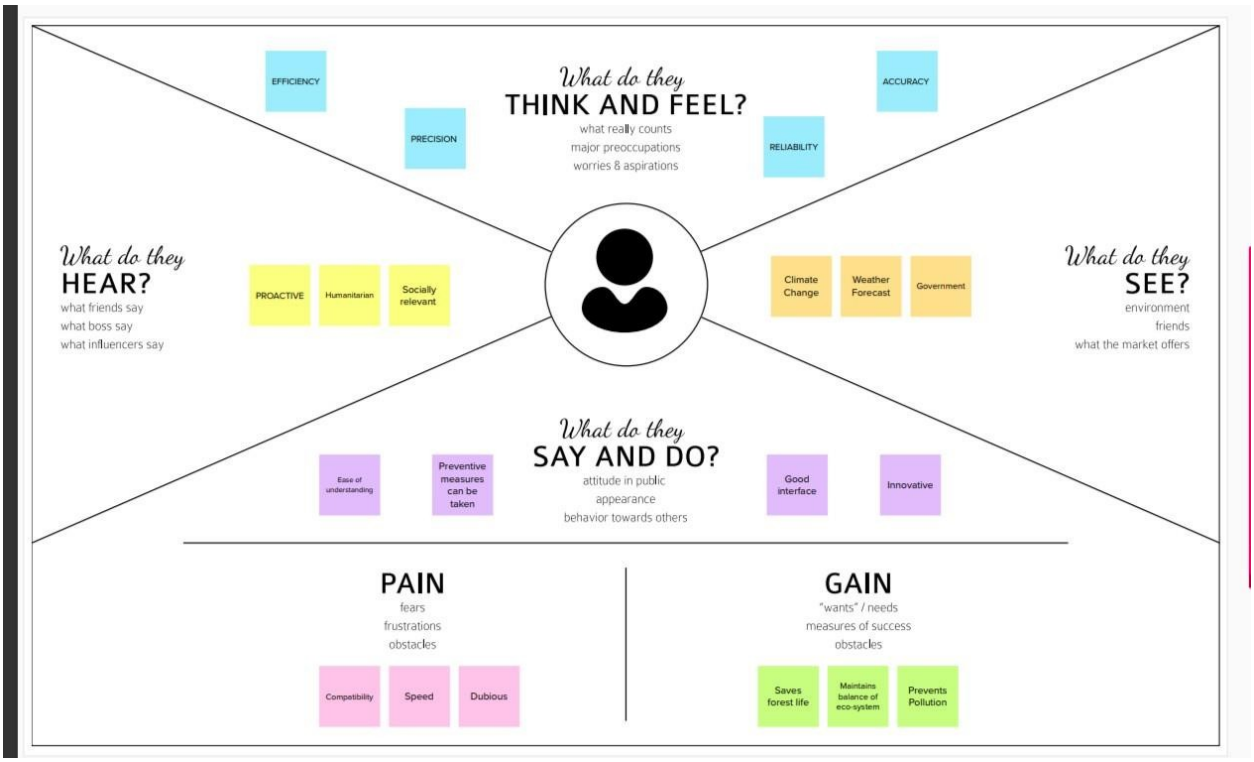
2. LITERATURE SURVEY

2.1 Reference

S. NO	TITLE	AUTHOR	YEAR
1.	Image Processing for Forest FireDetection.	Priyadharshini	2016
2.	Forest fire prediction and detectionsystem.	Faroudja Abid	2020
3.	systematic approaches in managingforestfires .	AdityaDhall	2020

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy map



3.2 Ideation & Brainstroming

Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

A **Team gathering**
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B **Set the goal**
Think about the problem you'll be focusing on solving in the brainstorming session.

C **Learn how to use the facilitation tools**
Use the Facilitation Superpowers to run a happy and productive session.

Open article →

3

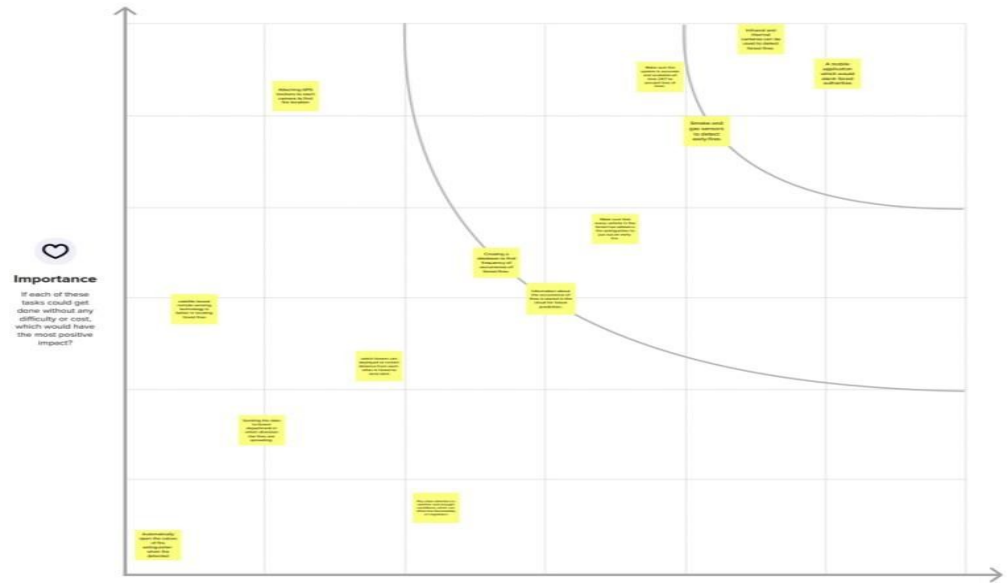
Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.



3.3 Proposed solution

S.NO:	PARAMETERS	REPRESENTATION
1.	**Problem Statement (Description of an issue to be addressed)**	• Fire was one of the first and greatest invention of man. But these days due to global warming and climate change, fires have become very violent and destructive. • Forest fires are one such evil looming the Earth destroying all the flora and fauna with the devastating fumes and flares it carries with itself. • Recent forest fires in California is an evident example of the intensity of the issue and the immediate action that needs to be taken.
2.	**Plan of Design and Execution**	• The propose a platform that uses Unmanned Aerial Vehicles (UAVs), which constantly patrol over potentially threatened by fire areas. • The UAVs also utilize the benefits from Artificial Intelligence(AI) and are equipped with on-board processing capabilities. • This allows them to use computer vision methods for recognition and detection of smoke or fire, based on the still images or the video input from the drone cameras. • The system is designed for monitor the causing factors of forest fires such as temperature, humidity , air pressure level,oxygen and Carbon dioxide on the surface of air. • The user interacts with a web camera to read the video.

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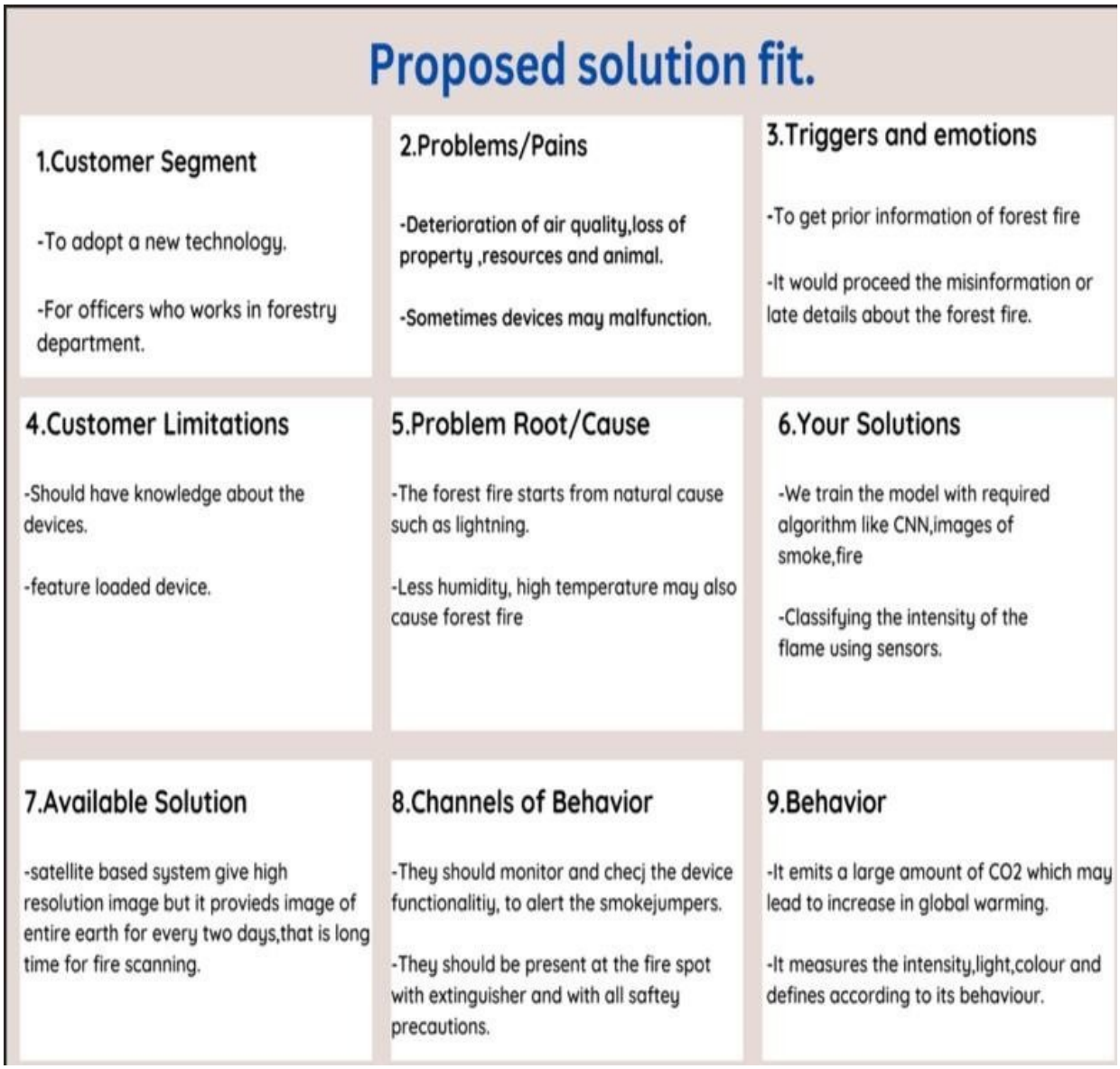
		• Once the input image from the video frame is sent to the model, if the fire is detected, it is showcased on the console, and alerting sound will be generated and an alert message will be sent to the Authorities. • We classify images using a Convolutional Neural Network and use other open CV tools.
3.	**Peculiarity/ Novelty**	• Makes use of real time monitoring and allows pre-cursors to potential issues (such as corrosion) to be flagged up and immediately be addressed before major issues occur.
4.	**Social Outlook / Customer Friendly**	• Will warn the customers before any fire outbreak. • Prevents any potential devastation and issues precautions. • Protects the flora and fauna from any unfortunate accidents. • Saves forest and human life prevents desertification.
5.	**Business Model**	• Focuses more on sensor probes, wireless sensor networks and machine learning which makes the deployment more easier.
6.	**Feasibility of Solution**	• Cost effective • More performance measure • Economical • Accurate • Effective • Reliable • Socially intact

3.4 Problem solution fit



4. REQUIREMENT ANALYSIS

4.1 Functional require

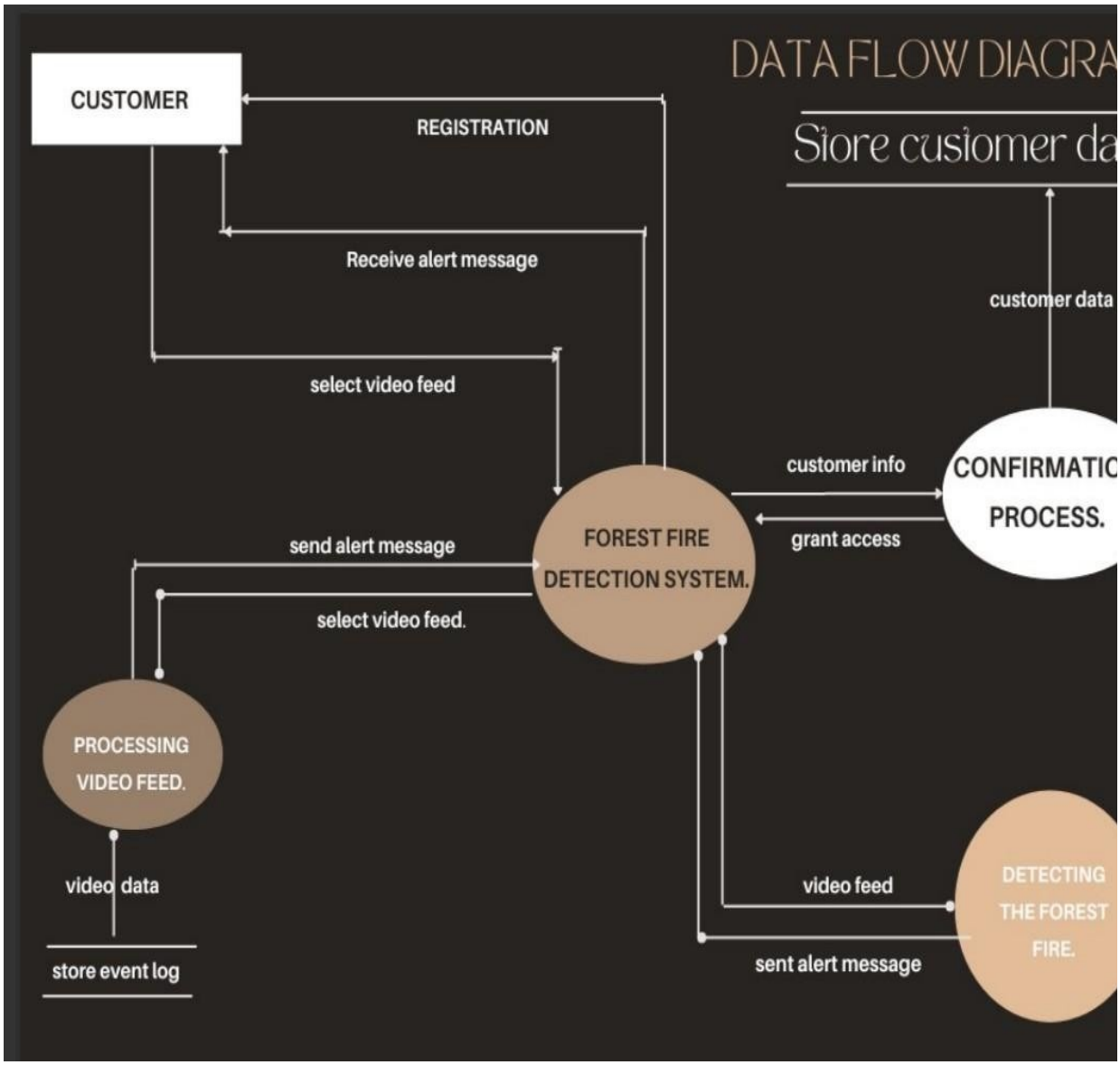
FR. NO.	Functional Requirement	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through wildfire portal.
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Data Prediction	Scientists create computer models to predict wildfire potential under a range of potential climate futures. Using different projections of temperature and downfall, scientists predict where and when wildfires are likely to occur

4.2 Non-Functional requirement

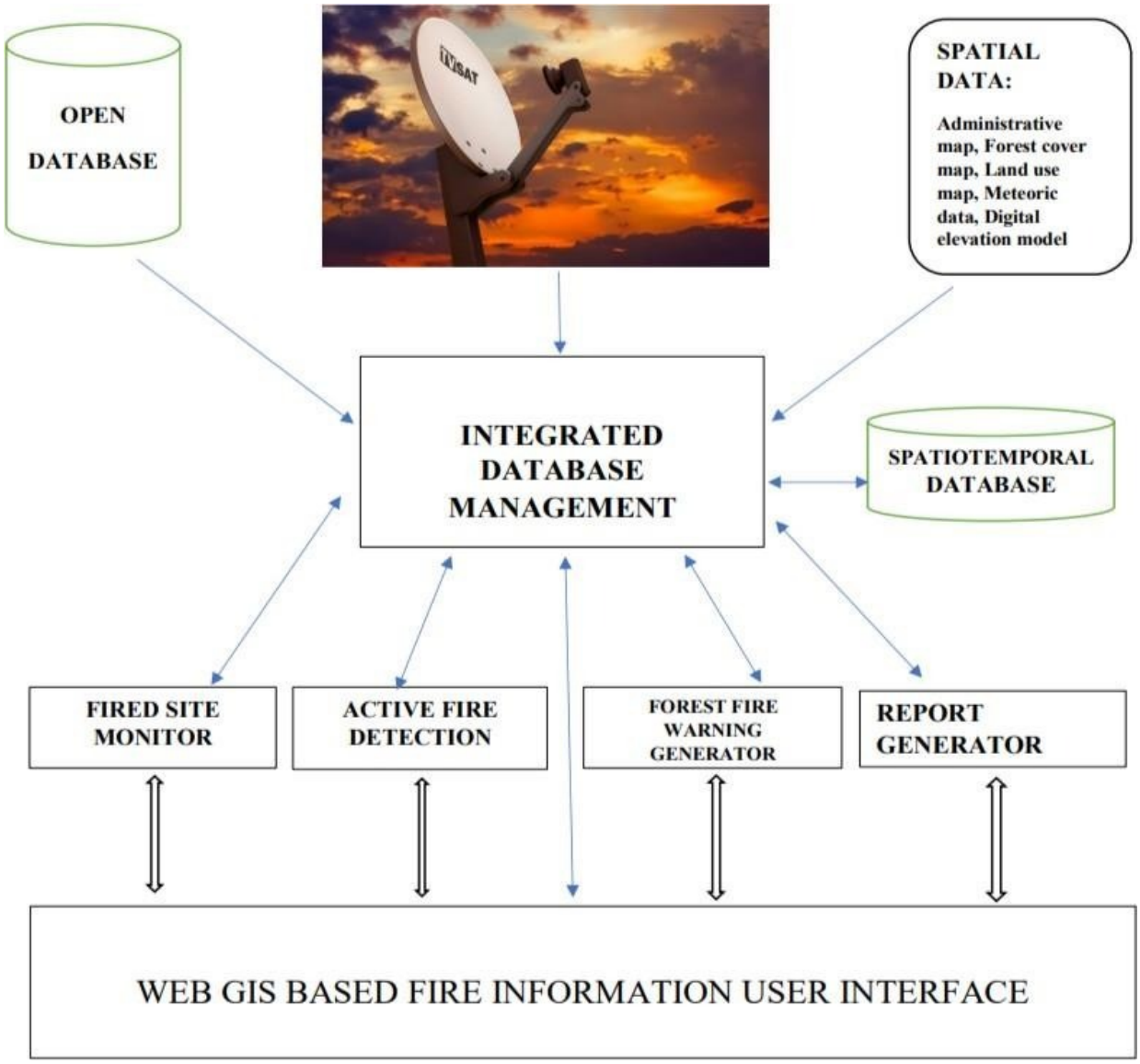
FR. NO.	Non-Functional Requirement	Description
NFR-1	Usability	Many methods have been proposed to detect forest fires, such as camera-based systems, WSN-based systems, and machine learning coating-based systems, with both positive and negative aspects and performance figures of detection.
NFR-2	Protection	We have designed this project to secure the forest from wild fires.
NFR-3	Performance	In the event of a fire, the primary objective of using drones is to gather situational consciousness, which can be used to direct the efforts of the firefighters in locating and controlling hot spots. Just like urban fires, forest fires to require monitoring so that firefighters know what they are dealing with.

5. PROJECT DESIGN

5.1 Data flow Diagram



5.2 Solution Architecture



6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Image Processing	USN-1	Processing the image to find the fire is detected or not.	1	Medium	1.Devi Sravanti 2.Esther 3.Divya Sri 4.Akshara
Sprint-1		USN-2	The output would have to give high accuracy.	2	High	1.Devi Sravanti 2.Esther 3.Divya Sri 4.Akshara
Sprint-2	Video Processing	USN-3	The drone videos will be split into frames to detect the fire.	3	High	1.Devi Sravanti 2.Esther 3.Divya Sri 4.Akshara
Sprint-3	Alerting	USN-4	After the fire is detected the alert message have to be sent.	2	High	1.Devi Sravanti 2.Esther 3.Divya Sri 4.Akshara
Sprint-4	Location tracking	USN-5	The exact location of the drone will be predicted and sent along with the alert message.	2	High	1.Devi Sravanti 2.Esther 3.Divya Sri 4.Akshara

6.2 Sprint delivery schdule

Project Tracker, Velocity & Burndown Chart:

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	20	6 Days	25 Oct 2022	30 Oct 2022	30	30 Oct 2022
Sprint-2	20	6 Days	1 Nov 2022	06 Nov 2022	20	06 Nov 2022
Sprint-3	20	6 Days	08 Nov 2022	13 Nov 2022	20	13 Nov 2022
Sprint-4	20	6 Days	15 Nov 2022	20 Nov 2022	20	20 Nov 2022

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's now calculate the team's average velocity (AV) periteration unit (story points per day)

$$AV = \text{Sprint duration}/\text{Velocity}$$
$$= 20/6 = 3$$

6.3 sprint-1

In [1]:
```
import tensorflow as tf
import numpy as np
from tensorflow import keras
import os
import cv2
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.preprocessing import image
import matplotlib.pyplot as plt
```

In [2]:
```
train = ImageDataGenerator(rescale=1/255)
test = ImageDataGenerator(rescale=1/255)

train_dataset = train.flow_from_directory("/content/drive/MyDrive/train_set",
                                          target_size=(150,150),
                                          batch_size = 32,
                                          class_mode = 'binary')

test_dataset = test.flow_from_directory("/content/drive/MyDrive/test_set",
                                          target_size=(150,150),
                                          batch_size =32,
                                          class_mode = 'binary')
```

```
Found 442 images belonging to 2 classes.
Found 121 images belonging to 2 classes.
```

In [3]:
```
test_dataset.class_indices
```

Out[3]:
```
{'forest': 0, 'with fire': 1}
```

6.4 Sprint-2

```
import tensorflow as tf
import numpy as np
from tensorflow import keras
import os
import cv2
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.preprocessing import image
import matplotlib.pyplot as plt



train =
ImageDataGenerator(rescale=1/255)
test =
ImageDataGenerator(rescale=1/255)

train_dataset =
train.flow_from_directory(r"/content/drive/MyDrive/train_set",
                                          target_size=(150,15
                                          0),batch_size = 32,
                                          class_mode =
                                          'binary')


test_dataset =
test.flow_from_directory(r"/content/drive/MyDrive/test_set",
                                          target_size=(150,15
                                          0),batch_size =32,


                                          class_mode = 'binary')
Found 442 images belonging to 2
classes.
Found 121 images belonging to 2
classes.
```

```
test_dataset.class_indices
```

```
{'forest': 0, 'with fire': 1}
```

```
model = keras.Sequential()
model.add(keras.layers.Conv2D(32,(3,3),activation='relu',input_shape
=(150,150,3)))
model.add(keras.layers.MaxPool2D(2,2))
model.add(keras.layers.Conv2D(64,(3,3),activation='relu'))
model.add(keras.layers.MaxPool2D(2,2))
model.add(keras.layers.Conv2D(128,(3,3),activation='relu'))
model.add(keras.layers.MaxPool2D(2,2))
model.add(keras.layers.Conv2D(128,(3,3),activation='relu'))
model.add(keras.layers.MaxPool2D(2,2))
model.add(keras.layers.Flatten())
model.add(keras.layers.Dense(512,activation='relu'))
model.add(keras.layers.Dense(1,activation='sigmoid'))
model.summary()
Model: "sequential"
```

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 148, 148, 32)	896
max_pooling2d (MaxPooling2D)	(None, 74, 74, 32)	0
conv2d_1 (Conv2D)	(None, 72, 72, 64)	18496
max_pooling2d_1 (MaxPooling2D)	(None, 36, 36, 64)	0
conv2d_2 (Conv2D)	(None, 34, 34, 128)	73856
max_pooling2d_2 (MaxPooling2D)	(None, 17, 17, 128)	0
conv2d_3 (Conv2D)	(None, 15, 15, 128)	147584

```
 max_pooling2d_3 (MaxPooling  (None, 7, 7, 128)         0
 2D)

  flatten (Flatten)           (None, 6272)              0

  dense (Dense)               (None, 512)               3211776

  dense_1 (Dense)             (None, 1)                 513

=================================================================
Total params: 3,453,121
Trainable params: 3,453,121
Non-trainable params: 0
_________________________________________________________________
```

```
model.compile(optimizer='adam',loss='binary_crossentropy',metrics=['
accuracy'])


r = model.fit(train_dataset,
          epochs = 10,
          validation_data =
test_dataset)Epoch 1/10
14/14 [==============================] - 140s 10s/step - loss: 0.5568 -
accuracy: 0.7466 - val_loss: 0.2537 - val_accuracy:
0.9504Epoch 2/10
 14/14 [==============================] - 37s 3s/step -      0.2948 -
 loss:
 accuracy: 0.8914 - val_loss: 0.0443 - val_accuracy: 0.9835
 Epoch 3/10
 14/14 [==============================] - 38s 3s/step -      0.2028 -
 loss:
 accuracy: 0.9231 - val_loss: 0.1178 - val_accuracy: 0.9752
 Epoch 4/10
 14/14 [==============================] - 37s 3s/step -      0.1618 -
 loss:
```

```
 accuracy: 0.9389 - val_loss: 0.0174 - val_accuracy: 1.0000
 Epoch 5/10
 14/14 [==============================] - 35s 3s/step -      0.2101 -
 loss:
 accuracy: 0.9276 - val_loss: 0.0741 - val_accuracy: 0.9835
 Epoch 6/10
 14/14 [==============================] - 37s 3s/step -      0.1757 -
 loss:
 accuracy: 0.9367 - val_loss: 0.1567 - val_accuracy: 0.9174
 Epoch 7/10
 14/14 [==============================] - 39s 3s/step -      0.1656 -
 loss:
 accuracy: 0.9367 - val_loss: 0.0986 - val_accuracy: 0.9504
 Epoch 8/10

14/14 [==============================] - 38s 3s/step - loss: 0.1422 -
accuracy: 0.9502 - val_loss: 0.0220 - val_accuracy:
1.0000Epoch 9/10
14/14 [==============================] - 38s 3s/step - loss: 0.1242 -
accuracy: 0.9615 - val_loss: 0.0337 - val_accuracy:
1.0000Epoch 10/10
14/14 [==============================] - 38s 3s/step - loss: 0.0923 -
accuracy: 0.9706 - val_loss: 0.0392 - val_accuracy:

0.9669


model.save("forest1.h5")

predictions = model.predict(test_dataset)
predictions = np.round(predictions)
                      4/4 [==============================] - 6s 1s/step
predictions

array([[1.],
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       [1.]], dtype=float32)
```
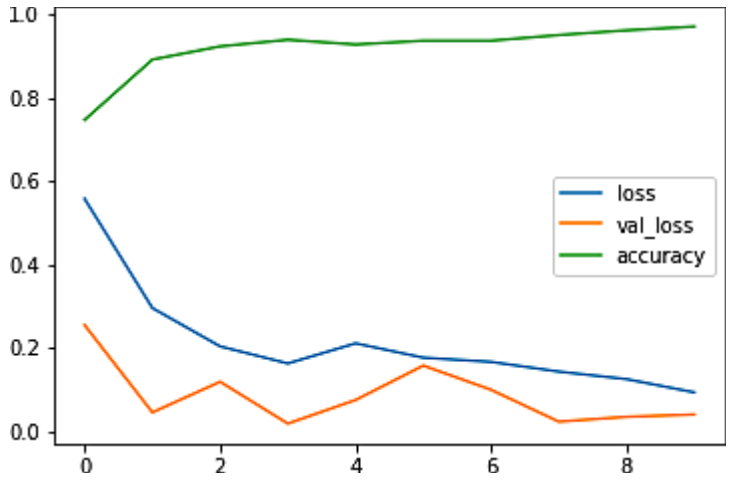
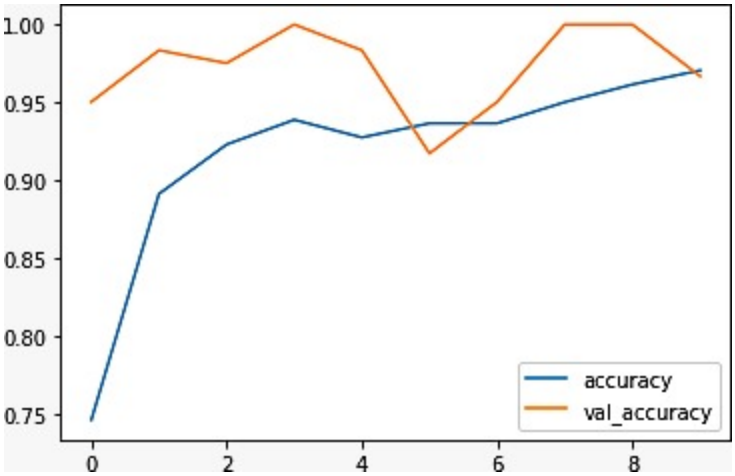

```
print(len(predictio
ns))121
```

```
import matplotlib.pyplot as plt
plt.plot(r.history['loss'], label='loss')
plt.plot(r.history['val_loss'],
label='val_loss')
plt.plot(r.history['accuracy'],
label='accuracy')plt.legend()
```




```
plt.plot(r.history['accuracy'], label='accuracy')
plt.plot(r.history['val_accuracy'], label='val_accuracy')plt.legend()
```




```
def predictImage(filename):
    img1 =
    image.load_img(filename,target_size=(150,150))
    plt.imshow(img1)
    Y =
    image.img_to_array(im
    g1)
    X =
    np.expand_dims(Y,axis
    =0)
```

```
    val =
    model.predict(X)
    print(val)
    if val == 1:
        plt.xlabel("Fire")
    elif val == 0:
        plt.xlabel("No
        Fire")
```

6.5 Sprint-3


```
{
 "nbformat": 4,
 "nbformat
 _minor":
 0,
 "metadata
 ": {
  "colab": {
   "provenance": []
  },
  "kernelspe
   c": {
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   "python3
   ",
   "display_name": "Python 3"
  },
  "langua
   ge_info
   ": {
   "name
   ":
   "pytho
   n"
  }

 },
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```

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 "metadata
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   localhost:8080/",
   "height": 35
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 },
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    ],
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     "type":"string"
    }
   },
   "metadata
   ": {},
   "execution
   _count": 1
  }
 ],
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    [ "pwd"
 ]
},
{
 "cell_type":
 "code","source":[
```

```
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    "!pip install
    tensorflow\n", "!pip
    install opencv-
    python"
   ],
   "metadata": {
    "colab": {

     "base_uri": "https:/ localhost:8080/"
    },
    "id": "UnpPHFm0y4lm",
    "outputId": "543ceb28-d9f5-4c1c-9934-02075c827323"
   },
   "execution
   _count": 2,
   "outputs":
   [
    {
     "output_type
     ": "stream",
     "name":
     "stdout",
     "text": [
      "Looking in indexes: https:/ pypi.org/simple, https:/ us-python.pkg.dev/colab-
      wheels/public/simple/\n","Requirement already satisfied: keras in
      /usr/local/lib/python3.7/dist-packages (2.9.0)\n", "Looking in indexes: https:/
      pypi.org/simple, https:/ us-python.pkg.dev/colab-
wheels/public/simple/\n",
      "Requirement already satisfied: tensorflow in /usr/local/lib/python3.7/dist-packages
      (2.9.2)\n","Requirement already satisfied: six>=1.12.0 in /usr/local/lib/python3.7/dist-
      packages (from
tensorflow) (1.15.0)\n",
      "Requirement already satisfied: keras<2.10.0,>=2.9.0rc0 in /usr/local/lib/python3.7/dist-
packages (fromtensorflow) (2.9.0)\n",
      "Requirement already satisfied: libclang>=13.0.0 in /usr/local/lib/python3.7/dist- packages
(fromtensorflow) (14.0.6)\n",
      "Requirement already satisfied: gast<=0.4.0,>=0.2.1 in /usr/local/lib/python3.7/dist-
packages (fromtensorflow) (0.4.0)\n",
```

"Requirement already satisfied: protobuf<3.20,>=3.9.2 in /usr/local/lib/python3.7/dist-packages (fromtensorflow) (3.19.6)\n",

"Requirement already satisfied: flatbuffers<2,>=1.12 in /usr/local/lib/python3.7/dist-packages(from tensorflow) (1.12)\n",

"Requirement already satisfied: wrapt>=1.11.0 in /usr/local/lib/python3.7/dist-packages (fromtensorflow) (1.14.1)\n",

"Requirement already satisfied: packaging in /usr/local/lib/python3.7/dist-packages (fromtensorflow) (21.3)\n",

"Requirement already satisfied: tensorflow-estimator<2.10.0,>=2.9.0rc0 in /usr/local/lib/python3.7/dist-packages (from tensorflow) (2.9.0)\n",

"Requirement already satisfied: h5py>=2.9.0 in /usr/local/lib/python3.7/dist-packages (fromtensorflow) (3.1.0)\n",

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packages (from tensorflow) (1.6.3)\n",

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"Requirement already satisfied: google-pasta>=0.1.1 in /usr/local/lib/python3.7/dist-packages (fromtensorflow) (0.2.0)\n",

"Requirement already satisfied: opt-einsum>=2.3.2 in /usr/local/lib/python3.7/dist-packages (fromtensorflow) (3.3.0)\n",

"Requirement already satisfied: keras-preprocessing>=1.1.1 in /usr/local/lib/python3.7/dist-packages (from tensorflow) (1.1.2)\n",

"Requirement already satisfied: numpy>=1.20 in /usr/local/lib/python3.7/dist-packages (fromtensorflow) (1.21.6)\n",

"Requirement already satisfied: setuptools in /usr/local/lib/python3.7/dist-packages (fromtensorflow) (57.4.0)\n",

"Requirement already satisfied: tensorboard<2.10,>=2.9 in /usr/local/lib/python3.7/dist-packages (fromtensorflow) (2.9.1)\n",

"Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.23.1 in /usr/local/lib/python3.7/dist-packages (from tensorflow) (0.27.0)\n",

"Requirement already satisfied: wheel<1.0,>=0.23.0 in /usr/local/lib/python3.7/dist-packages (fromastunparse>=1.6.0->tensorflow) (0.38.3)\n",

"Requirement already satisfied: cached-property in /usr/local/lib/python3.7/dist-

packages (fromh5py>=2.9.0->tensorflow) (1.5.2)\n",

"Requirement already satisfied: werkzeug>=1.0.1 in /usr/local/lib/python3.7/dist-packages (fromtensorboard<2.10,>=2.9->tensorflow) (1.0.1)\n",

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>tensorflow) (3.2.2)\n",
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     "batch_size = 32,\n",
     "class_mode = 'binary')\n",
     "x_test = test_dataset =
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0.6855 - val_loss: 0.1756 - val_accuracy:
 0.9339\n","Epoch3/10\n",
 "14/14 [==============================] - 21s 1s/step - loss: 0.2968 - accuracy:
0.8688 - val_loss: 0.1248 - val_accuracy:
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 "14/14 [==============================] - 21s 2s/step - loss: 0.2413 - accuracy:
0.9072 - val_loss: 0.1233 - val_accuracy:
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0.9321 - val_loss: 0.0887 - val_accuracy:
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0.9706 - val_loss: 0.0514 - val_accuracy:
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0.9774 - val_loss: 0.0272 - val_accuracy:
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0.9774 - val_loss: 0.0266 - val_accuracy:
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packages (from watson-machine-learning-client) (2.23.0)\n",
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(from watson-machine-learning-client) (4.64.1)\n",
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requests->watson-machine-learning-client) (2.10)\n",
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pandas-
>watson-machine-learning-client) (1.21.6)\n",
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d\n",
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py3-none-any.whl size=89778

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sdk- core-2.12.0ibm-cos-sdk-s3transfer-2.12.0 jmespath-0.10.0 lomond-0.3.3 requests-2.28.1
s3transfer-0.6.0 urllib3-
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     "   #print(space)\n",
     " return(next(item for item in space['resources']if item['entity'][\"name\"] ==
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    },
    "execution_
    count": 25,
    "outputs": []
   }
  ]
}
```
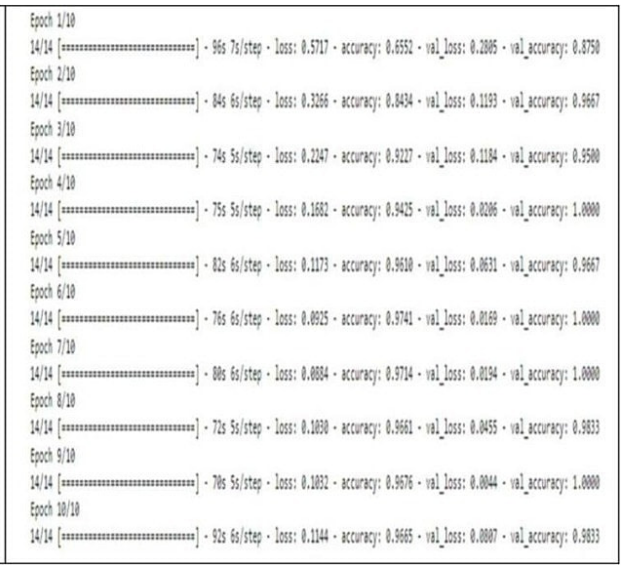


7. TESTING AND RESULTS

7.1 Performance Testing

S. No	Parameter	Values	Screenshot
1.	Model Summary	3,453,213	Layer (type) Output Shape Param # conv2d (Conv2D) (None, 148, 148, 32) 896 max_pooling2d (MaxPooling2D) (None, 74, 74, 32) 0 conv2d_1 (Conv2D) (None, 72, 72, 64) 18496 max_pooling2d_1 (MaxPooling2 (None, 36, 36, 64) 0 conv2d_2 (Conv2D) (None, 34, 34, 128) 73856 max_pooling2d_2 (MaxPooling2 (None, 17, 17, 128) 0 conv2d_3 (Conv2D) (None, 15, 15, 128) 147584 max_pooling2d_3 (MaxPooling2 (None, 7, 7, 128) 0 flatten (Flatten) (None, 6272) 0 dense (Dense) (None, 512) 3211776 dense_1 (Dense) (None, 1) 513 Total params: 3,453,121 Trainable params: 3,453,121 Non-trainable params: 0

2.	Accuracy	Training Accuracy - 0.9663 Validation Accuracy -0.9795	

7.2 User acceptance testing

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	1	1	2	0	4
Duplicate	0	0	0	0	0
External	0	0	2	1	3
Fixed	4	2	4	1	11
Not Reproduced	0	0	0	0	0
Skipped	0	0	1	1	2
Won't Fix	0	0	0	1	1
Totals	5	3	9	4	21

7.3 Test case

				Date	08-Nov-2022			
				Team ID	PNT2022TMID03558			
				Project Name	Emerging Methods for Early Detection of Forest fire			
				Maximum Marks	4 marks			
Test case ID	**Feature Type**	**Component**	**Test Scenario**	**Expected Result**		**Actual Result**	**Status**	**BUGID**	**Executed By**
Home Page_ TC_OO1	UI	Home Page	Display the Emerging Methods of Forest Fires	Displaying the Home Page		Home Page displayed	Pass	-	Gokul raj. R Elangovan. S
Home Page_ TC_OO2	UI	Home Page	Displayed the Prediction ForestFires	Displaying the content of home page		Content of Home page is displayed	Pass	-	Gokul raj. R Elangovan. S
Home Page_ TC_OO3	Functional	Home page	Checks whether the Drop the Image Here! Button is visible	Displays the Button		Drop the Image Here! Button is pops up.	Pass	-	Gokul raj. R Elangovan. S
PredictiedPageTC_OO4	Functional	Predicted page	Display the Prediction Page and Choose Image Button	Displays the Prediction Page and the Choose Image Button		Prediction page displayed. Choose image button was clicked.	Pass	-	Gokul raj. R Elangovan. S
PredictedPage_TC_OO4	Functional	Predicted page	Select the Image and Click the Predict Button	Display the selected Image		Displays the Selected Image	Pass	-	Gokul raj. R Elangovan. S

7.4 Test case analysis

Section	Total Cases	Not Tested	Fail	Pass
Client Application	10	0	0	10
Security	2	0	0	2
Performance	2	0	0	2
Exception Reporting	2	0	0	2
Final Report Output	3	0	0	3

8. ADVANTAGES & DISADVANTAGES

ADVANTAGES:

1. The proposed system detects the forest fire at a faster rate compared to existing system. It hasenhanced data collection feature.
2. The major aspect is that it reduces false alarm and also has accuracy due to various sensorspresent.
3. It minimize the human effort as it works automatically. This is meagre -cost due to whichcan beeasily accessed.
4. The main objective of our project is to receive an alert message through an app to therespectiveuser.

DISADVANTAGES:

5. The electrical interference diminishes the potency of radio receiver.
6. The main drawback is that it has less coverage range areas

CONCULSION

This type of system is the first of its kind to ensure no further damage is then to forests when there is a fire breakout and instantly a message is sent to the user through the App. Immediate response or early warning to a fire breakout is mostly the only way to avoid losses and biology, cultural heritage damages toa great extent. Therefore the most important goals in fire surveillance are quick and authentic detection offire. It is so much easier to suppress fire while it is in its early stages. info about the progress of fire is highly valuable for managing fire during all its stages. Based on this data the firefighting staff can be guided on target to block fire before it reaches cultural heritage sites and to suppress it quickly by utilizing required firefighting equipment and vehicles. With further research and invention, this project can be implemented in various forest areas so that we can save our forests and maintain great environs.

FUTURE SCOPE

This project is far from complete and there is a lot of room for betterment. Some of the betterment that can be made to this project are as follows:

An Additional pump can be added so that it automatically sends water when there is a fire breakout. Also industrial sensors can be used for better ranging and accuracy.

1. This project has endless potential and can always be enhanced to become better.enforcethis concept in the real world will benefit several industries and reduce the workload on many workers, enhancing overall work efficiency.

GitHub :

https://github.com/IBM-EPBL/IBM-Project-39045-1660389860