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Emerging Methods for Early Detection of Forest Fires

Team Members :

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EMERGING METHOD FOR EARLY DETECTION OF FOREST FIRE

PROJECT REPORT

1.1INTRODUCTION:

Impact of environment is based by five elements those are land, water, air, sky and fire. Natural disasters are caused by all of these. Earthquake through land and, Tsunami through water, Cyclone through wind, heavy rains are caused by sky and forest destruction is caused by fire. It is up to us as humans to correct the destruction caused by nature. Detection and prevention is more important than thinking about fixing after the event. So, e, we have come together as an engineering team to propose and develop a prototype solution to these issues using our acquired technical knowledge as computer science engineering students for our senior design project this semester. Our project idea entitled, “Forrest Fire Detection System,” will be comprised of multiple systems working in tandem: In summary, we aim to reduce the social, economical, and environmental impacts brought on by forest fires.

1.1 Project Overview:

The importance of forest environment in the perspective of the biodiversity as well as from the economic resources which forests enclose is more than evident. Any threat posed to this critical component of the environment should be identified and attacked through the use of the most efficient available technological means. Early warning and immediate response to a fire event are critical in avoiding great environmental damages. Fire risk assessment, reliable detection and localization of fire as well as motion planning, constitute the most vital ingredients of a fire protection system. Through our prior knowledge Supervised and unsupervised learning, Regression Classification and Clustering Artificial Neural Networks and Convolution Neural Networks our team has an overall idea about Emerging Methods for Early Detection of Forest Fires. The first task is to collect the data because in Convolution Neural Networks, as it deals with images, we need training and testing data sets. After that we pre-process the image and train our deep-learning model. The next step is video analysis to get the prediction for the input frames then we train our Image classification Models on IBM Cloud using IBM Watson Studio Service.

1.2 Purpose:

- Image Processing:
  Image processing is processing of images using mathematical operations by using any form of signal processing for which the input is an image, such as a photograph or video frame the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most image-processing techniques involve treating the image as a two dimensional signal and applying standard signal processing techniques to it.

- Model building:

  This stage is dedicated to training the agent to generate an accurate and flexible model. The same dataset is divided into two parts. One is used for training purpose whereas the other is used for validation of the model. It uses a Decision tree based approach for the classification purpose.
- Video analysis:

  Most important part is video analysis; in this stage we use all the Cnn and Ann models to capture and analysis the fire.

- Final deliverable:

  Deployment is involved in this final deliverable, we can predict in this stage.

These all processes are to achieve our purpose

2. Literature Survey:

1.Early Forest Fire Detection Based on Deep Learning

Authors : Mengna Li; Youmin Zhang; Lingxia Mu; Jing Xin; Ziquan Yu; Han Liu; Guo Xie

Published Month & Year : November 2021

Project Description : Early fire detection is very important for preventing forest fires. In this paper, a new image-based fire detection algorithm, named as h-EfflcientDet, is proposed to complete the task of early forest fire detection. h-EfflcientDet is based on a popular deep learning approach EfficientDet (scalable and efficient object detection) by replacing the nonlinear activation function swish of the EfficientDet with the hard version of swish and combing also with an efficient feature fusion network BIFPN (bidirectional feature pyramid network), which can improve significantly the efficiency of the fire detection model. The experiment results show that the proposed h-EfficientDet can detect the fire in real-time with the detection speed of 21 FPS. The detection accuracy is up to 98.35% with a low miss detection rate. Forest is one of the precious natural resources, which provides great help for human survival and development. However, forest fire is a major problem threatening the world, especially the large-scale and large-area forest fire, which damages the natural ecological environment and wastes a lot of resources in the fire rescue [1]. To reduce the loss of forest resources, it is important to detect the early fire as soon as possible and then put out the fire in time.

2.Forest Fire Detection Using Classifiers and Transfer Learning

Authors : Pranav Agarwal; Gaurav Jha

Published Month & Year : August, 2021.

Project Description : Application of fire detection is gaining a lot of attention due to the increasing threat from global warming that causes a lot of economic distress and threat to public safety. There

are over 200,000 forest fires each year which destroys a total area of about 3.5-4.5 million sq. km [1]. The current detection methods involve the use of sensors whose data usually depends on pressure and temperature of the environment. Often these conditions are met when the fire gets out of control. This paper demonstrates various methods to detect fire from photos of the site using transfer learning and image processing. The methods demonstrated in the paper uses about 3500 images of forest fires and 1900 images of forests with no fire to train the models. These methods can detect fire at initial stages compared to existing methods of fire detection. Using only cameras instead of multiple sensors reduces the cost and makes this system more efficient. In this paper we show the comparison of different convolution neural network (CNN) based pre-trained models used for the feature extraction of the images via transfer learning. The paper shows the comparison of different convolution neural network(CNN) based pre-trained models used for the feature extraction of the images via transfer learning.Transfer Learning transfers knowledge from the source base to the target base.It uses the pre-trained neural network trained on large datasets on small datasets.

3.Detection of Forest Fire using Convolutional Neural Networks

Authors : A. Sheryl Oliver; U. Ashwanthika; R. Aswitha

Published Month & Year : September, 2020.

Project Description : Forest fire is a dangerous condition when an uncontrolled, unexpected fire occurs in forests. It is extremely spontaneous and very difficult to control that damages millions of hectares of land and poses serious dangers not only to the ecosystem but also to humans. Hundreds of fires occur every year due to different reasons: seasonal dry spells, thunderstorms and volcanic ignition. Forest fires pose significant environmental issues, causing economic and environmental destruction and endangering human lives. For several nations a big issue is the occurrence of forest fires coupled with the inability of fire services to contain them effectively. These countries are also developing new strategies for controlling. Timely identification is one essential element to control such a phenomenon. Several classification approaches have been proposed, but there are disadvantages in the proposed models that lead to inefficiency and inability to produce accurate results. A novel Convolution Neural Network algorithm if and when used provides high efficiency, accuracy, and comparatively less data-training stress when compared to the supervised machine learning algorithms that require manual data-training. The results obtained using this technique have been studied and an accuracy of 94.3 percent has been reported.

4.An insight to forest fire detection techniques using wireless sensor networks

Authors :Pradeep Kumar Singh; Amit Sharma

Published Year & Month : January, 2018.

Project Description : Fire is a threat to our forests. Human intervention is one the major cause of forest fires. In addition to destroying wooden areas fire jeopardizes our safety. The risk of forest fires has increased in Hilly around the globe in recent past years due to development and building constructions. In order to detect the forest fire several attempts have been made using different techniques from optical fire sensor, satellite based methods and wireless sensor networks. Early

detection of forest fire is most important and may save the resources and wealth of forest. In this paper, we have analyzed the existing forest fire detection techniques limited to wireless sensor networks only. Numbers of popular wireless sensor network based forest fire detection techniques have been explored and their merits along with the demerits are reported during the findings.Early detection is the primary way for reducing the damages of forest fires hazard. Wireless sensor networks can detect and monitor fires among forest in real time and immediately in comparison to the satellite based techniques. Satellite based detection is more popular method for detection of fire but their long duration of scanning and low resolution limits the efficacy of using satellite based systems. In wireless sensor network, sensors in large amount are deployed in a forest.

5.IoT based forest fire detection system

Authors :Trinath Basu Miriyala,Ragipathi Karthik,J Mahitha,V Lokesh Reddy

Published Month & Year : March, 2018.

Project Description :Forest fire is also called as wild fire or wildland fire is an uncon-trolled fire occurring in forest areas It is essential to distinguish these sorts of flames as ahead of schedule as conceivable in order to keep the harm from it to biological framework. Consistently a large number of sections of land of timberland are burned to the ground. The land were woods is singed it winds up plainly diffi-cult to develop vegetation over yonder. This is on account of soil moves toward becoming water repellent and acknowledges no more water, prompting lessening in ground water level. The Glob-al Warming Report 2008 says rapidly spreading fire as one of the real reason behind increment in an Earth-wide temperature boost. In late year 2016 more than 4000 hectares of timberland were singed in the slopes of Uttarakhand. Common causes of wild fire are lightning, extreme hot and arid weather and human careless-ness. The utilization of wireless sensor in this paper presents one of the methods for early wild fire identification. Another technique is the utilization of satellite framework to dis-tinguish the wild fire. The primary segments of the framework are satellite(s) and the base station that gathers the information send by the satellite(s) and runs the dissecting calculation.

3. IDEATION AND PROPOSED SOLUTION:

3.1 Empathy map canvas:

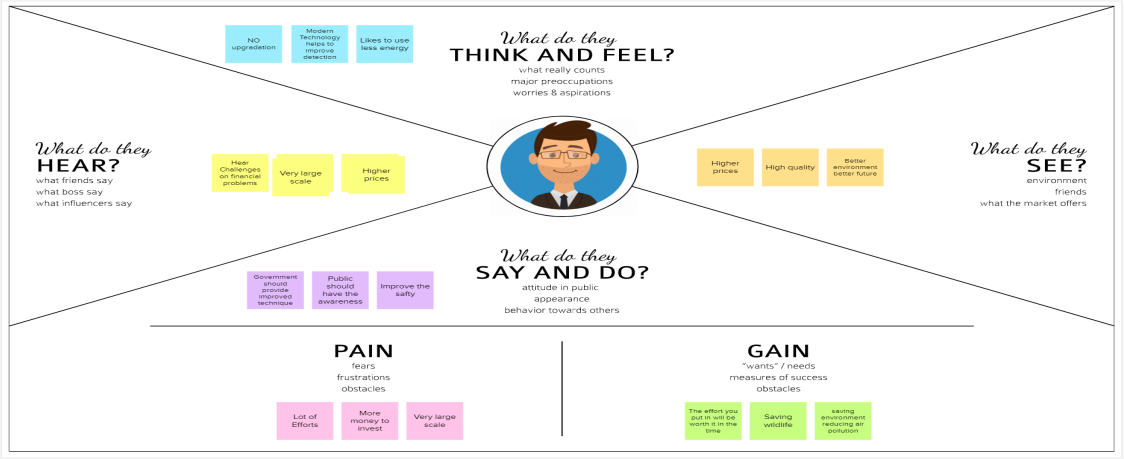
Edit this template
Right-click to unlock

Empathy Map Canvas

Gain insight and understanding on solving customer problems.

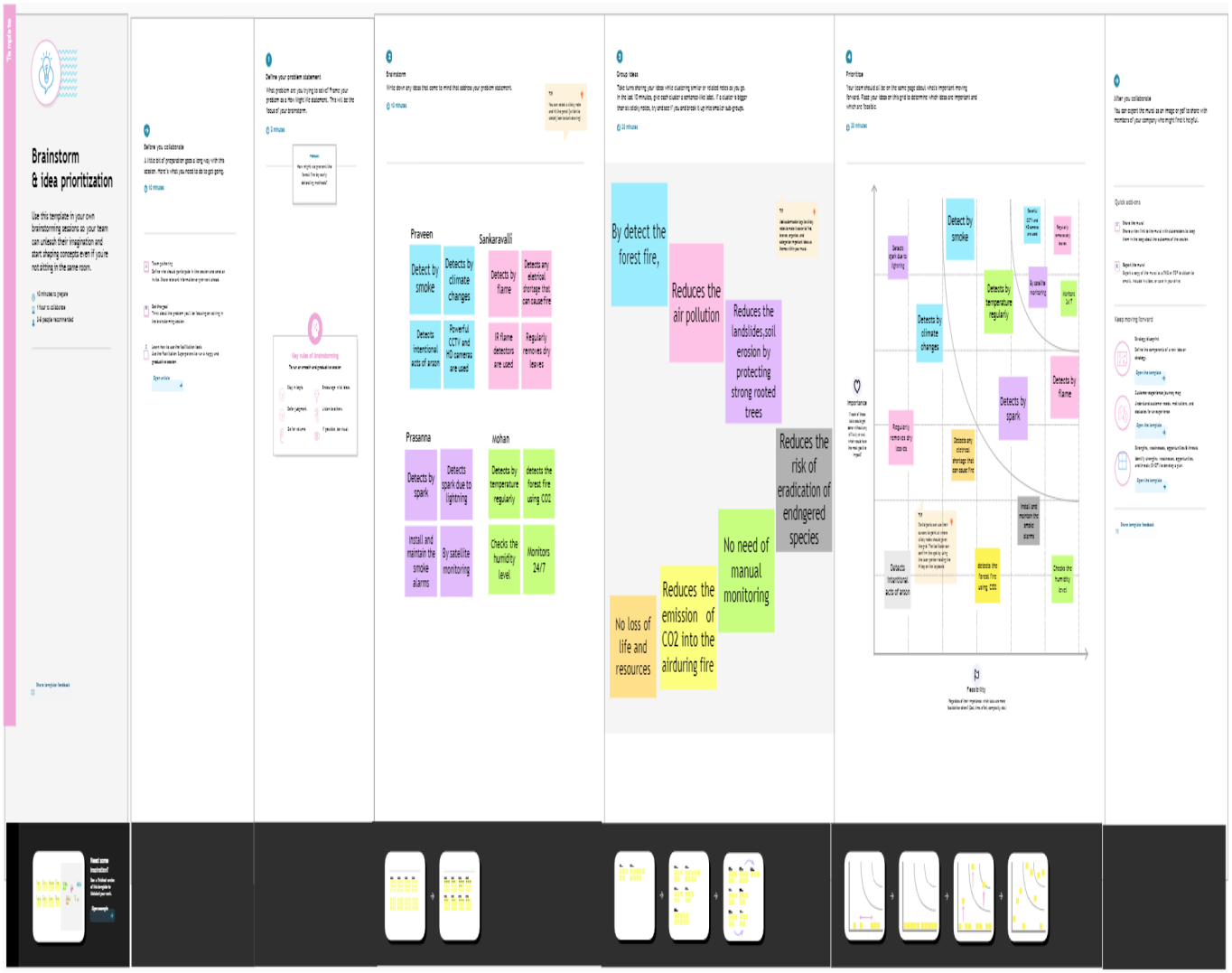
1

Build empathy and keep your focus on the user by putting yourself in their shoes.



Share your feedback

3.2. Ideation & Brainstrome:


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.
10 minutes to prepare
1 hour to collaborate
2-8 people recommended
Before you collaborate
10 minutes
Define your problem statement
5 minutes
Brainstorm
10 minutes
Group ideas
20 minutes
Prioritize
20 minutes
After you collaborate
Quick add-ons
Keep moving forward
Praveen
Sankaravalli
Detect by smoke
Detects by climate changes
Detects by flame
Detects any electrical shortage that can cause fire
Detects intentional acts of arson
Powerful CCTV and HD cameras are used
IR flame detectors are used
Regularly removes dry leaves
Prasanna
Mohan
Detects by spark
Detects spark due to lightning
Detects by temperature regularly
detects the forest fire using CO2
Install and maintain the smoke alarms
By satellite monitoring
Checks the humidity level
Monitors 24/7
By detect the forest fire,
Reduces the air pollution
Reduces the landslides,soil erosion by protecting strong rooted trees
Reduces the risk of eradication of endngered species
No need of manual monitoring
Reduces the emission of CO2 into the airduring fire
No loss of life and resources
Importance
Feasibility

3.3 Proposed solution:

Project Design Phase-I
Proposed Solution Template

Date	17 October 2022
Team ID	PNT2022TMID27371
Project Name	Project - Early forest fire detection System
Maximum Marks	2 Marks

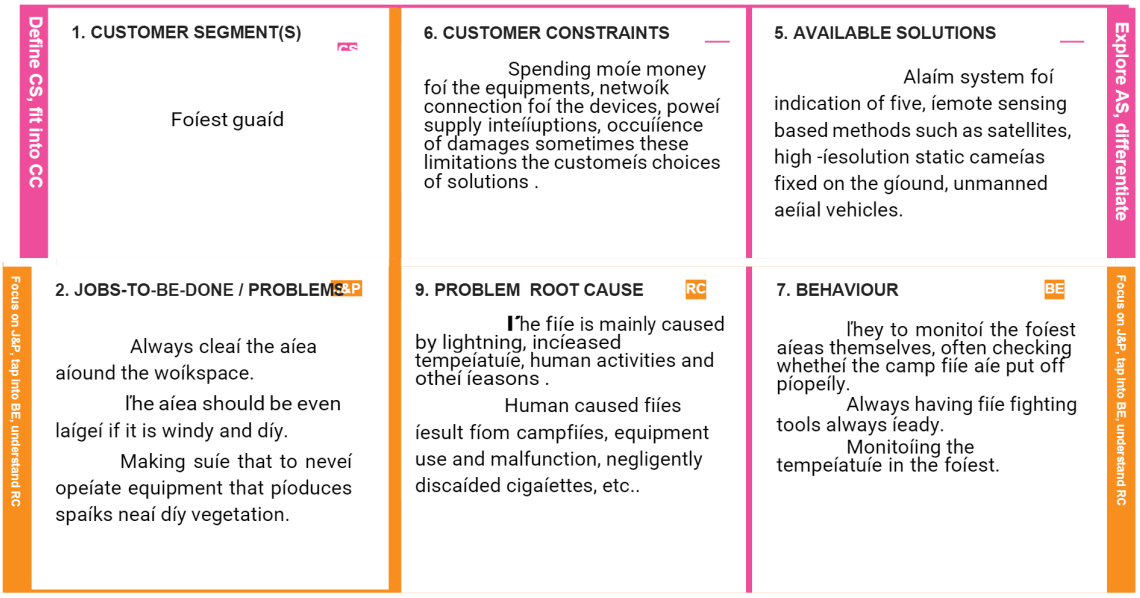
Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S/no	Parameter	Description
•	Problem Statement (Problem to be solved)	A forest fire risk prediction algorithm, based on support vector machines, is presented. The algorithm depends on previous weather conditions in order to predict the fire hazard level of a day.
•	Idea / Solution description	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.
•	Novelty / Uniqueness	Real time computer program detect forest fire in earliest before it spread to larger area.
•	Impact on society	Blocked roads and railway lines, electricity, mobile and land telephone lines cut, destruction of homes and industries.
•	Business Model (Revenue Model)	The proposed method was implemented using the Python programming language on a Core i3 or greater (CPU and 4GB RAM.)
•	Scalability of the Solution	Computer vision models enable land cover classification and smoke detection from satellite and ground cameras

3.4 Problem solution fit:

Project Title: Emerging methods for early detection of forest fires
Project Design Phase-I - Solution Fit Template
Team ID: PNT2022TMID27371



Identify strong TR & EM

4. EMOTIONS: BEFORE / AFTER EM

How do customers feel when they face a problem or a job and afterwards?
i.e. lost, insecure > confident, in control - use it in your communication strategy & design.

It is common for people to experience several stages of adjustment including shock, anger, depression, and hopelessness after losing a home. **Residential fires can lead to significant emotional distress in addition to possible physical injuries**.

stop a forest fire from continue burns. The project's objective is to capture infrared image of forest fire detection using the appropriate camera, detect fire with RGB and YCbCr color model to isolate fire pixels from the background and separate luminance and chrominance from the original image, and filter image using MATLAB Analyzer to process images. The method is tested on a selected image, which captured by the camera that contains fire. Next method is used for calculating and analyzing the fire image, which to differentiate between fire detection or false detection. Other method is used to process the fire image, which the image will compute and shown in terminal nodes and graphs by using Wavelet Analyzer 5.0. The results of this system are achieved fire detection and obtain data for the fire images.

whose prime purpose is to locate and report wildfires. A network of five lookout stations is spread throughout the NWT.

Identify strong TR & EM

4. Requirement Analysis

Project Design Phase-II
Solution Requirements (Functional & Nonfunctional)

Date	17 October 2022
Team ID	**PNT2022TMID27371**
Project Name	Project - Emerging Methods for early detection of forest fire
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Video surveillance start	Start surveillance through remote control
FR-2	Forest monitoring	Continuous monitoring through camera
FR-3	Detect fire	Fire is detected through CNN model
FR-4	Alert	Alert the forest officials through message

Non-functional Requirements:

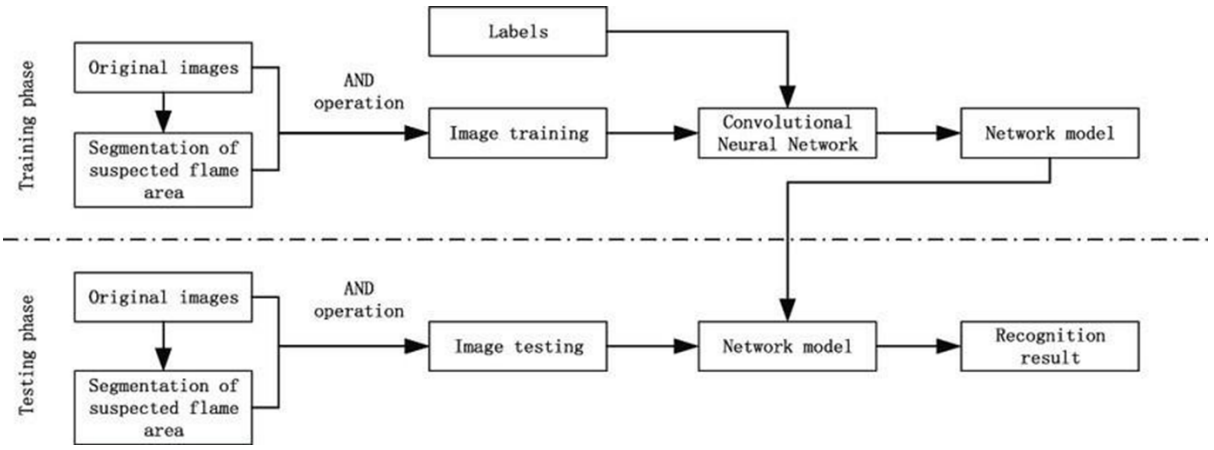
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Reliability**	Model is safe to install
NFR-2	**Security**	More secure environment
NFR-3	**Availability**	Build model is available all the time
NFR-4	**Performance**	Model will achieve high accuracy

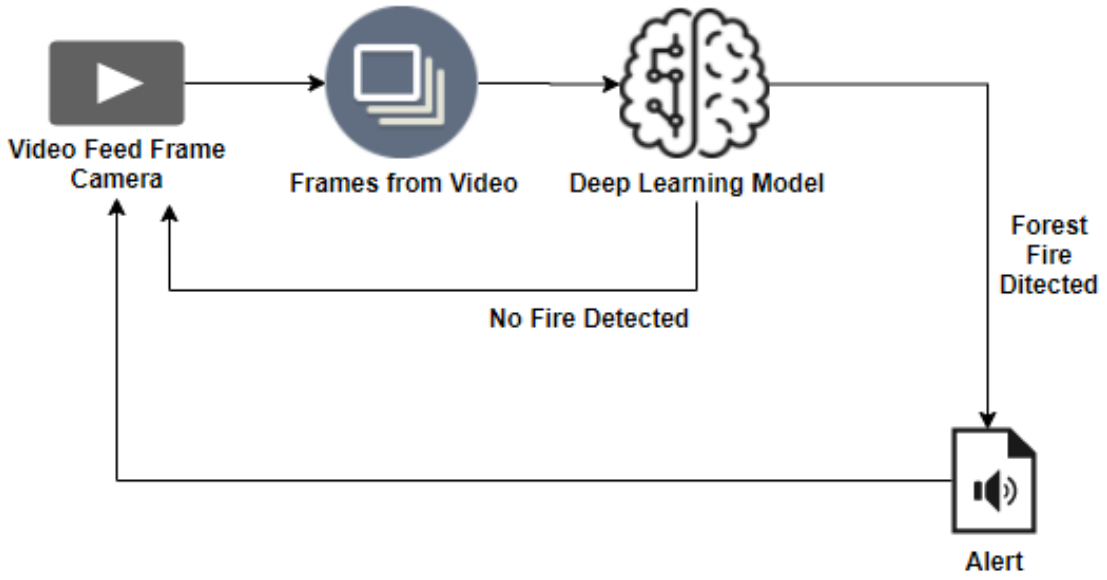
4.2 Data flow diagram

Data Flow Diagrams: A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored. Example: FLOW □ It is difficult to predict and detect Forest Fire in a sparsely populated forestarea. □ 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 data prior to 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. □ If the fire is not detected ,it will send the result to the frame camera.if the forest fire will detected the alert will go to the video feed frame camera.

DFD:



5. Solution & Technical Architecture:



- Forest fires are a major environmental issue, creating economic and ecological damage while endangering 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 data prior to 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.

5.3 User stories:

User Type	Functional Requirement (Epic)	User Story Number	User Story I Task	Acceptance criteria	Priority	Release
Environmentalist	Collect the data	USN-1	As an Environmentalist.it is necessary to collect the data of the forest which includes temperature,humidity,wind and rain of the forest	It is necessary to collect the right data else the prediction may become wrona	High	Sprint-1
		USN-2	Identify algorithms that can be used for prediction	To collect the algorithm to identify the accuracy level of each algorithms	Medium	Sprint-2
	Implement Algorithm	USN-3	Identify the accuracy of each algorithms	Accuracy of each algorithm-calculated so that it is easy to obtain the most accurate output	High	Sprint-2
		USN-4	Evaluate the Dataset	Data is evaluated before processing	Medium	Sprint-1
	Evaluate Accuracy of Algorithm	USN-5	Identify accuracy,precision,recall of each algorithms	These values are important for obtaining the riaht output	High	Sprint-3

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	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	20	High	Praveen Jeevanantham Prasanna Venkatesh G Sankaravalli S Mohan raj J
			As a user, I will receive confirmation email			Praveen Jeevanantham Prasanna Venkatesh G

Sprint-2		USN-4	When it is the wildfire then the alarming system is activated.	20	High	Praveen Jeevanantham Prasanna Venkatesh G Sankaravalli S Mohan raj J
Sprint-3	Output	USN-5	And the alarm also sent to the corresponding departments and made them know that the wildfire is erupted.	20	High	Praveen Jeevanantham Prasanna Venkatesh G Sankaravalli S Mohan raj J
Sprint-4	Action	USN-6	Required actions will be taken in order to control erupted wildfire by reaching as early as possible to the destination with the help ofdetecting systems.	20	High	Praveen Jeevanantham Prasanna Venkatesh G Sankaravalli S Mohan raj J

6.2 Sprint Delivery Schedule:

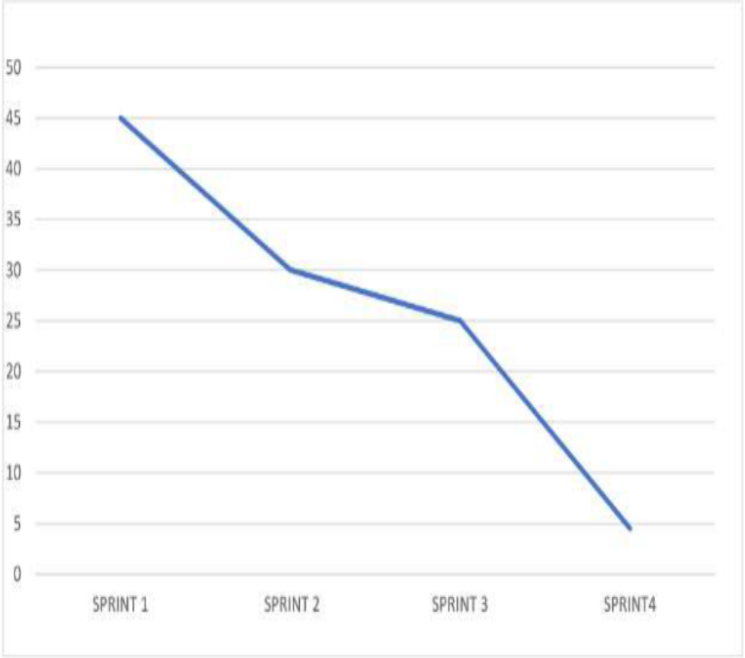
Project Tracker, Velocity & Burn down Chart: (4 Marks)

Project Tracker:

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	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Burn down chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as scrum. However, burn down charts can be applied to any project containing measurable progress over time.



7. Coding & Solution:

```
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
```

```
train=ImageDataGenerator(rescale=1./255,
                                 shear_range=0.2,
                                 rotation_range=180,
                                 zoom_range=0.2,
                                 horizontal_flip=True)
train = ImageDataGenerator(rescale=1/255)
test = ImageDataGenerator(rescale=1/255)
```

```
train_dataset = train.flow_from_directory('/content/drive/MyDrive/Dataset/train_set',
                                          target_size=(128,128),
                                          batch_size = 32,
                                          class_mode = 'binary' )
```

```
Found 436 images belonging to 2 classes.
```

```
test_dataset = test.flow_from_directory('/content/drive/MyDrive/Dataset/test_set',
                                          target_size=(128,128),
                                          batch_size = 32,
                                          class_mode = 'binary' )
```

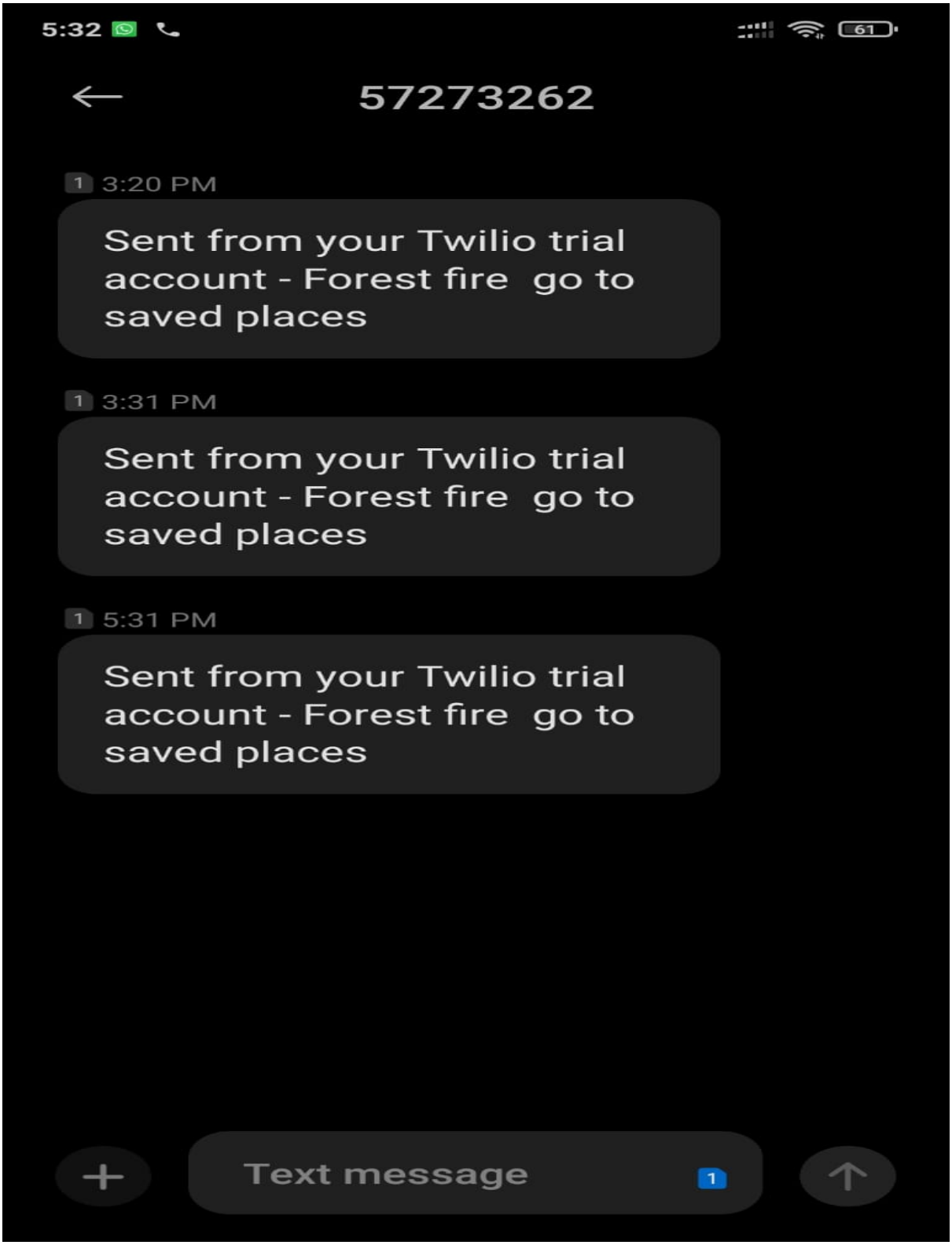
```
Found 121 images belonging to 2 classes.
```

```
train_dataset.class_indices
```

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

```
#to define linear initialisation import sequential
from keras.models import Sequential
#to add layer import Dense
from keras.layers import Dense
#to create convolution kernel import convolution2D
from keras.layers import Convolution2D
#import Maxpooling layer
from keras.layers import MaxPooling2D
#import flatten layer
```

Output:


5:32
57273262
3:20 PM
Sent from your Twilio trial account - Forest fire go to saved places
3:31 PM
Sent from your Twilio trial account - Forest fire go to saved places
5:31 PM
Sent from your Twilio trial account - Forest fire go to saved places
Text message

8. Testing:

8.1 Test cases

Comparison	**Human based observation**	**Satellite System**	**Optical cameras**	**Wireless sensor network**
Efficiency and Practically	Low	Low	Medium	High
Fire behavior	-	**Yes**	-	**Yes**
Detection delay	Long	Very long	Long	Small
Fire detecting accuracy	Low	Medium	Medium	High
Alarm capacity	Low	Low	Medium	Medium
Cost	Low	High	High	Medium

8.2 User Acceptance Testing:

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By design	10	4	2	2	9
Duplicate	1	1	3	0	5
External	2	3	1	1	7
Fixed	11	2	4	20	38
Not reproduced	0	0	0	0	0
Skipped	0	0	1	1	2
Won't fixed	0	5	2	1	8
Total	24	14	13	26	77

Testing analysis:

Section	Total cases	Not tested	Fail	Pass
Print Engine	7	0	0	7
Client application	52	0	0	52
Security	2	0	0	2
Outsource shipping	3	0	0	3
Exception reporting	9	0	0	9
Final report output	5	0	0	5
Version control	2	0	0	2

9. Result:

9.1 Performance matrices:

SI.NO	Characteristics	Description	Technoloy
1.	Open-source frame work	Python flask frame work is used	Technology of open-source frame work
2.	Security implementation	MAC and preventive control security is used	Eg: SHA 256 encryption

3.	Scalable architecture	High scalability with 3-tire architecture	Web server, CSS, Java script application python, Anaconda database server-IBM DB2
4.	Availability	Use of load balancing to distribute traffic across server	IBM load balancer
5.	Performance	Enhance the performance by using IBM CDN	IBM content delivery network

10. Advantages:

- ✔ This system effectively detects and verifies the presence of fire in forest regions.
- ✔ The addition of Region proposals in CNN layers can result in better accuracy as well as faster execution.
- ✔ Our system can verify the presence of fire in the forest with an accuracy of 97.29% from the RCNN model.
- ✔ This will help in the beginning phases of fire identification and assist with restricting the fire to restricted regions to prevent large-scale damage.
- ✔ This system focuses on observing the forests without steady human supervision.

Disadvantages:

- ✔ Does not have global market penetration like other competitors
- ✔ Limited battery capabilities.
- ✔ Limited data transfer and communications capabilities
- ✔ Will only be available on the west coast at product

11. Conclusion:

Wildfires emit billions of tones of carbon dioxide into the atmosphere which causes harm to climate and living organisms. This can also impact the carbon cycle due to excess CO2 and loss of vegetation. High-intensity forest fires destroy flora and fauna. Forest fires have an immediate effect on mortality, not associated with accidental deaths, which is a significant public health problem, especially if the fire occurs near a densely populated area. So, forest fire detection system help to minimize the effect of all living beings.

12. Future Scope:

- Development of micro electrical system (MIES), wireless network system is expected to be widely in use.
- MEMS are the combination of electrical devices and mechanical structure at an extremely small scale. Many researcher need to be done so as to implement MEMS in WSN
- Moreover IoT is expected to have dramatic impact in our lives in nature. WSN's will be integrated into IoT and innumerable sensor nodes will join the internet. They will cooperate with other nodes to sense and to monitor the environment E.g. Smart driver system

- Change In The Micro Climate Of The Area Resulting In Healthy Living Conditions
- Soil erosion disaffecting productivity of soils and agricultural production;
- Avoid Ozone Layer Depletion

13. APPENDIX:

- Source Code

In [86]:
```
pip install twilio
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: twilio in /usr/local/lib/python3.7/dist-packages (7.15.2)
Requirement already satisfied: requests>=2.0.0 in /usr/local/lib/python3.7/dist-packages (from twilio) (2.28.1)
Requirement already satisfied: pytz in /usr/local/lib/python3.7/dist-packages (from twilio) (2022.6)
Requirement already satisfied: PyJWT<3.0.0,>=2.0.0 in /usr/local/lib/python3.7/dist-packages (from twilio) (2.6.0)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.7/dist-packages (from requests>=2.0.0->twilio) (2022.9.24)
Requirement already satisfied: charset-normalizer<3,>=2 in /usr/local/lib/python3.7/dist-packages (from requests>=2.0.0->twilio) (2.1.1)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.7/dist-packages (from requests>=2.0.0->twilio) (1.26.12)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.7/dist-packages (from requests>=2.0.0->twilio) (2.10)
```

In [87]:
```
pip install playsound
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: playsound in /usr/local/lib/python3.7/dist-packages (1.2.2)
```

In [88]:
```
#import opencv librariy
import cv2
#import numpy
import numpy as np
#import image function from keras
from keras.preprocessing import image
#import load_model from keras
from keras.models import load_model
#import client from twilio API
from twilio.rest import Client
#imort playsound package
from playsound import playsound
```

```
#import opencv librariy
import cv2
#import numpy
import numpy as np
#import image function from keras
from keras.preprocessing import image
#import load_model from keras
from keras.models import load_model
#import client from twilio API
from twilio.rest import Client
#imort playsound package
from playsound import playsound

#load the saved model
model = load_model(r'/content/drive/MyDrive/Dataset/forest1.h5')
#define video
video = cv2.VideoCapture('/content/drive/MyDrive/Dataset/Final Deliverable_Fine Code_music
#define the features
name = ['forest','with forest']
```

```
account_sid = 'ACbc86a73b3cf8520cdca62cee9a3637a7'
auth_token = '3eae9e7197db63030cfe1036578e93c7'
client = Client(account_sid, auth_token)

message = client.messages \
    .create(
         body='Forest fire  go to saved places',
         from_='+19136755290',
         to='+918925298523'
     )

print(message.sid)
```

```
SM55ed3beda8fa537da8b529dd8164dbb3
```

- GitHub & Project Demo Link

GitHub Link:

https://github.com/IBM-EPBL/IBM-Project-22268-1659844675

Project Demo Link:
https://drive.google.com/file/d/1H9OpT3yTFTYzcypM9Jdp9omAFjEvHWTr/view?usp=sharing

Submitted by, (project Id: ***PNT2022TMID27371*** *)*

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