EMERGING METHODS FOR EARLY DETECTION OF FOREST FIRES

NALAIYA THIRAN PROJECT BASED LEARNING ON PROFESSIONAL READLINESS FOR INNOVATION, EMPLOYNMENT AND ENTERPRENEURSHIP

A PROJECT REPORT

Submitted by

SHARMILA P	B.E(ECE)-[920319106023]
MIRUDHULA N	B.E(ECE)-[920319106014]
MADHUMITHA V	B.E(ECE)-[920319106013]
ISWARYA S	B.E(ECE)-[920319106303]

Team ID:PNT2022TMID48585

INDUSTRY MENTOR : Shanthi

FACULTY MENTOR : Joseph S

BECHELOR OF ENGINEERING

ELECTRONICS & COMMUNICATION ENGINEERING

COLLEGE NAME : CHRISTIAN COLLEGE OF ENGINEERING AND TECHNOLOGY

CONTENTS

CONTENTS

1. INTRODUCTION
   1.1 Project Overview
   1.2 Purpose

2. LITERATURE SURVEY

   2.1 Existing problem References
   2.2 Problem Statement Definition

ABSTRACT

Forest fires are occurring throughout the year with an increasing intensity in the summer and autumn periods. These events are mainly caused by the actions of humans, but different nature and environmental phenomena, likelightning strikes or spontaneous combustion of dried leafs or sawdust, can also be credited for their occurrence. Regardless of the reasons for the ignition of the forest fires, they usually cause devastating damage to both nature and humans. Forest fires are also considered as a main contributor to the air pollution, due to the fact that during every fire huge amounts of gases and particle mater are released in the atmosphere. To fight forest fires, different solutions were employed throughout the years. They ware primary aimedat the early detection of the fires. The simplest of these solutions is the establishment of a network of observation posts – both cheap and easy to accomplish, but also time-consuming for the involved people. The constant evolution of the information and communication technologies has led to the introduction of a new generation of solutions for early detection and even prevention of forest fires. ICT-based networks of cameras and sensors and even satellite based solutions were developed and used in the last decades. These solutions have greatly decreased the direct involvement of humans in the forest fire detection process, but have also proven to be expensive and hard to maintain.

1.INTRODUCTION

1.1 PROJECT OVERVIEW

In this paper we will discuss and present two different emerging solutions for early detection of forest fires. The first of these solutionsinvolves the use of unmanned aerial vehicles(UAVs) with specialized cameras. Several different scenarios for the possible use of the drones for forest fire detection will be presented and analysed, including a solution with the use of a combination between a fixed-wind and a rotary-wing UAVs. In the next chapter of the paper, we will present and discuss the possibilities for development of systems for early forest fire detection using LoRaWAN sensor networks and we will analyse and present some of the hardware and software components for the realisation of such sensor networks. The paper will also provide another point-of-view, which will present the involvement of students in the development and in the use of both systems and we will analyse the advantages and the benefits, which the students will gain from their work on and with these solutions.

1.2 PURPOSE

Detection of forest fire and smoke in wildland areas is done through remote sensing-based methods such as satellites, high-resolution static cameras fixed on the ground, and unmanned aerial vehicles (UAVs). Optical/thermal cameras deployed on the observationtowers together with the other sensors such as smoke, temperature, and humidity sensors might detect the hazards in theclosed environment rather than in the open environment as these sensors need vicinity to the fire or smoke. Information obtained through these sensors is not appropriate. Distance covered by these methods could be limited, and to cover a large area,more sensors have to be deployed that might incur expenses. Through the deployment of UAV, large areascould be covered, and the images with high spatial and temporal resolutions could be captured properly. The operational cost is very low when compared with the other methods.

2. LITERATURE REVIEW

2.1 EXISTING PROBLEM

2.1.1. TITLE: Generic model for fire and smoke detection without the use of sensors, 2007

AUTHOR NAME: Celik

Fuzzy based approach is used in this system. Color models such as YCbCr, HSV are used for fire and smoke detection. The fire is detected using YCbCr color model samples because it distinguishes luminance and chrominance. Y, Cb, Cr color channels are separated from RGB input image. A pixel is more likely a fire pixel if intensity of Y channel is greater than channel Cb and Cr.

2.1.2. TITLE: Fire detection method based on probabilistic method and classification, 2008

AUTHOR NAME: Paulo Vinicius Koerich Borges

Computer vision based approach is used in this approach. Though this approach is used surveillance it is also used to automatic video classification for retrieval of fire catastrophes in databases of newscast content.There are large variations in fire and background characteristics depending on the video instance. The proposed method observes the frame-to-frame changes of low-level features describing potential fire regions. These features include color, area size, surface coarseness, boundary roughness, and skewness within estimated fire regions. Bayes classifier is used for fire recognition. In addition, apriori knowledge of fire events captured in videos is used to significantly improve the results. The fire region is usually located in the center of each frame. This fact is used to model the probability of occurrence of fire.

2.1.3. TITLE: Computer vision approach for fire-flame detection is used to detect fire at an early stage , 2015

AUTHOR NAME: Dimitropoulos

Initially, background subtraction and color analysis is used to define candidate fire regions in a frame and this approach is a non-parametric model. Following this, the fire behavior is modeled by employing various Spatiotemporal features such as color probability, flickering, spatial and spatiotemporal energy. After flame modeling the dynamic texture analysis is applied in each candidate region using Linear Dynamical Systems, Histogram and Mediods. LDS is used to increase the robustness of the algorithm by analyzing temporal evolution of pixel intensities. Preprocessing is done after this to filter non-candidate regions. Spatiotemporal analysis is done to increase the reliability of the algorithm. The consistency of each candidate fire region is estimated to determine the existence of fire in neighboring blocks from the current and previous video frames. Finally, a two-class SVM classifier is used to classify the fire and no fire regions.

2.1.4. TITLE: Method to detect fire based on Wavelet Transform, 2018

AUTHOR NAME: R.Gonzalez

Stationary Wavelet Transform is used to detect Region of Interest. This method involves three steps preprocessing, SWT, histogram analysis. In preprocessing unwanted distortions are removed and image is resized and transformation of resized image is performed. High frequencies of an image are eliminated using SWT and the reconstruction of image is done by inverse SWT. Image indexation is performed to group the intensity colors that are closed to each other. Histogram analysis is used to determine the various levels of indexation. After analysis a comparison is made with non-smoke frame and non-smoke images are eliminated. These three are combined and fire is detected.

2.1.5. TITLE: Fire detection system based on Neural Network , 2011
AUTHOR NAME: Cheng

Neural network is used in detection information for temperature, CO concentration, and smoke density to determine probability of three representative fire conditions. RBF neuron structure is used, the information regarding temperature, CO concentration, and smoke density are collected and data fusion is used to generate fire signal decision. The detectors have continuous analog outputs, when detection limit is exceeded the hardware circuit sends a local fire indication to fusion center, this force the system detectors to generate final decision. Single-sensor detector is used to generate the final decision.

2.2 REFERENCES

- Kosmas Dimitropoulos, Panagiotis Barmpoutis, and Nikos Grammalidis (2015). Spatio Temporal Flame Modeling and Dynamic Texture Analysis for automatic video-based fire detection, IEEE transactions on circuits and systems for video technology, vol. 25, no. 2.

- Turgay Celik, Huseyin Ozkaramanl, and Hassan Demirel (2007). Fire and Smoke detection without Sensors: Image Processing based approach.15th European signal processing conference (eusipco 2007), Poznan, Poland, September 3-7.

- CHENG Caixia, SUN Fuchun, ZHOU Xinquan (2011). One Fire Detection Method Using Neural Networks, Tsinghua Science and Technology, ISSN 1007-0214 05/17 31-35Volume 16, Number 1.

- Paulo Vinicius Koerich Borges (2010). A Probabilistic Approach for Vision- Based Fire Detection in Videos, IEEE transactions on circuits and systems for video technology, vol. 20, no. 5.

- Rafael C. Gonzalez and Richard E. Woods. Digital Image Processing. Pearson publication, Third Edition

2.3 PROBLEM STATEMENT DEFINITION

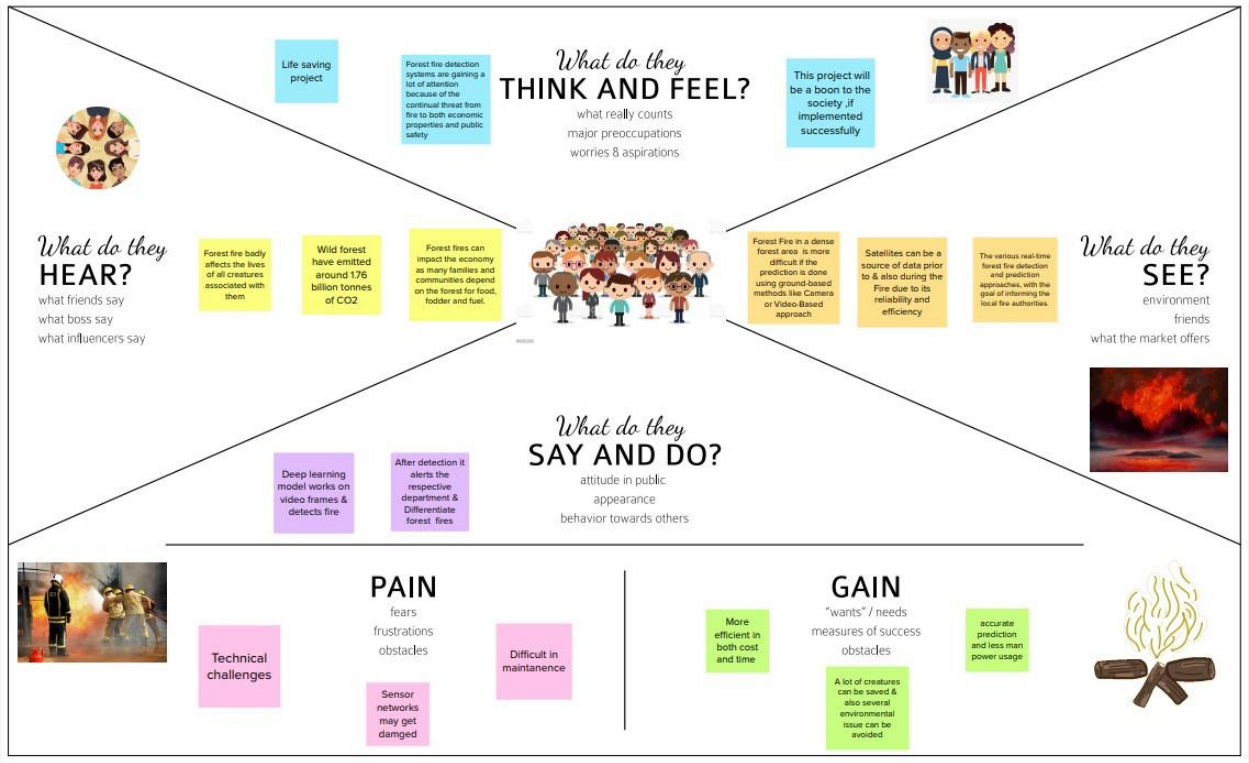
Prevention, prediction, forecasting and post-incident damage assessment are key com ponents of the fight against forest fires; however, this work will focus essentially on detection and ongoing incident damage assessment. In particular, the methods exploit- ing neural networks will be given special attention since these families of algorithms have been known to show state-of-the-art performances at many tasks including detec tion and assessment. To detect and assess forest fires efficiently, multiple methods that leverage machine learning have been suggested in the past few years. They can first be distinguished in terms of the infrastructure that enables them to gather data to their predictions on many of satellite like 98,51,54,60,24,111,104,68,6,95,63,2,62,112 Unmanned
Aerial Vehicle (UAV), 19,57,25 closed-circuit television (CCTV)118,116,4 or Wireless Sensor Net- work (WSN). 1,5,90,79,7,45,46,26,115,85 Each of them has its own strengths and weak nesses which will be reviewed .

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

An empathy map is a collaborative visualization used to articulate what we know about a particular type of user. It externalizes knowledge about users in order to 1) create a shared understanding of user needs, and 2) aid in decision making.

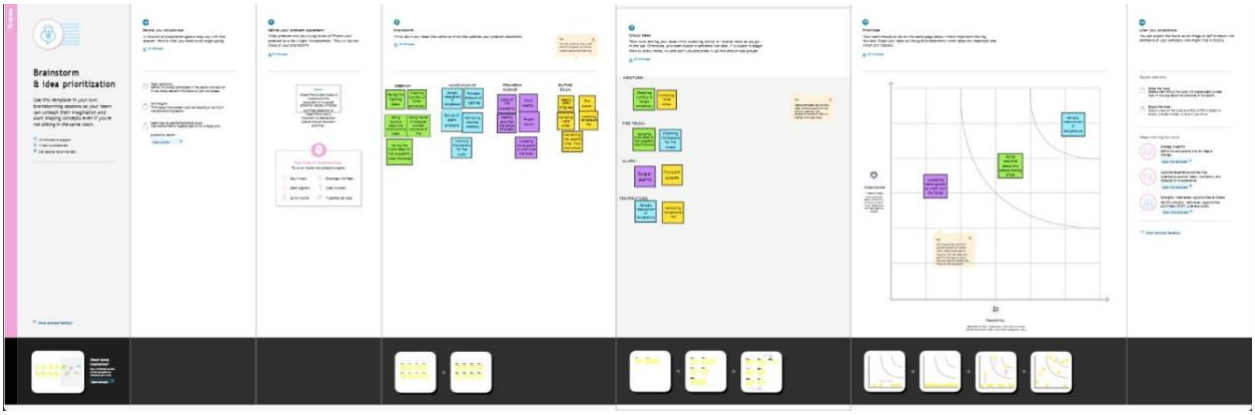
Traditional empathy maps are split into 4 quadrants (Says, Thinks, Does, and Feels), with the user or persona in the middle. Empathy maps provide a glance into who a user is as a whole and are not chronological or sequential.



3.2 Ideation & Brainstorming

Brainstorming is a method design teams use to generate ideas to solve clearly defined design problems. In controlled conditions and a free-thinking environment, teams approach a problem by such means as “How Might We” questions. They produce a vast array of ideas and draw links between them to find potential solutions.

Everyone in a design team should have a clear definition of the target problem. They typically gather for a brainstorming session in a room with a large board/wall for pictures/Post-Its. A good mix of participants will expand the experience pool and therefore broaden the idea space.



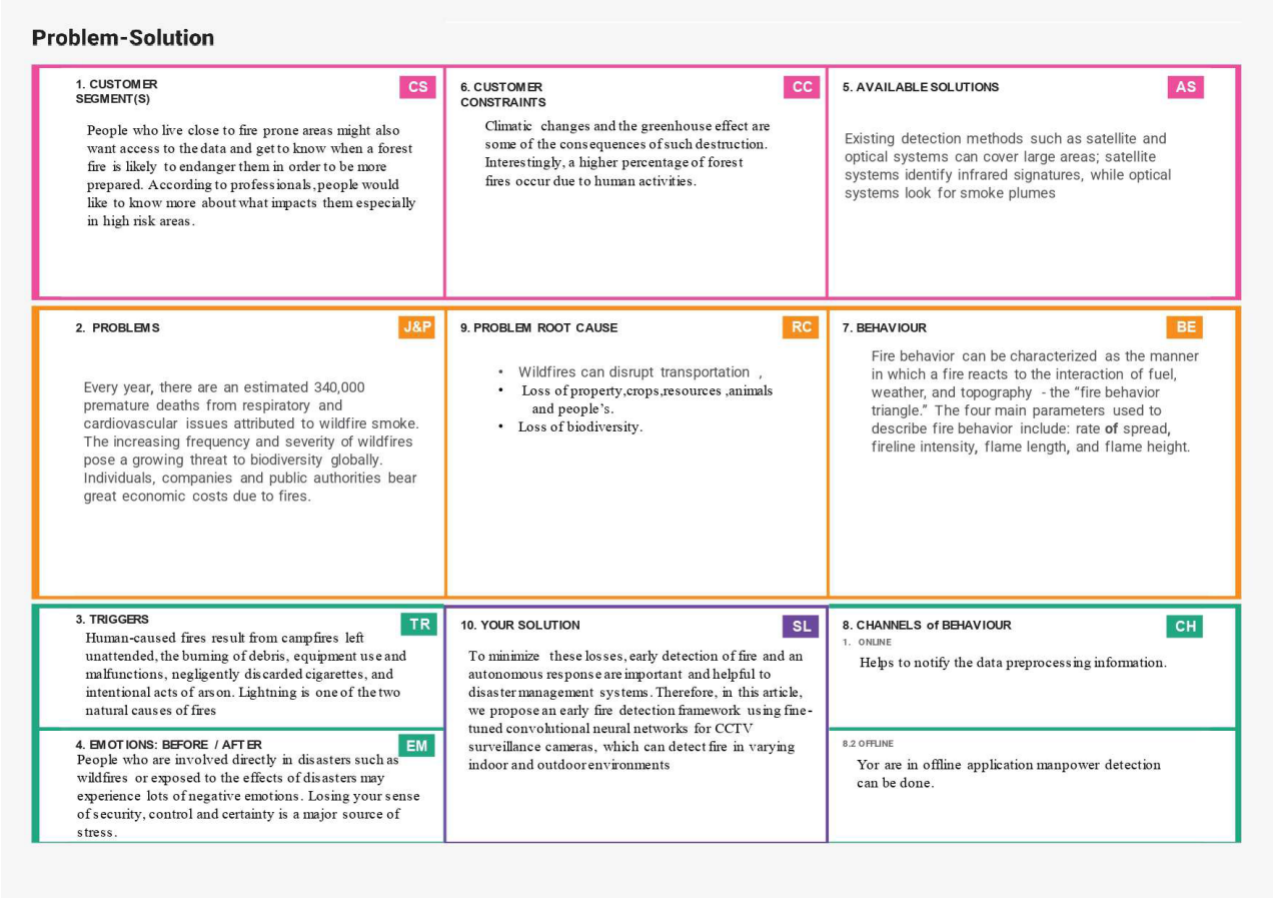
3.3 Proposed solution

Proposed Solution means the technical solution to be provided by the Implementation agency in response to the requirements and the objectives of the Project. Proposed Solution means the Proposed System with modifications that meet the Agency's requirements as set forth in this RFP. Proposed Solution means the combination of software, hardware, other products or equipment, and any and all services (including any installation, implementation, training, maintenance and support services) necessary to implement the solution described by Vendor in its Proposal.

S. No	Parameter	Description
1.	Problem Statement (Problem to be solved)	Forest fires are a major environmental issue, creating economic and ecological damage while endangering human lives.
2.	Idea / Solution description	Detection of forest fire and smoke in wildland areas is done through remote sensing-based methods such as Satellites, high-resolution static cameras fixed on the ground and unmanned aerial vehicles(UAVs).
3.	Novelty / Uniqueness	These events are mainly caused by the actions of humans, but different nature and environmental phenomena, like lightning strikes or spontaneous combustion of dried leaves or sawdust , can also be credited for their occurrence.
4.	Social Impact / Customer Satisfaction	Social and political values at stake. Additional fire impact a wild range. A new generation of tools is needed to support strategic fire management.
5.	Business Model (Revenue Model)	Recent advancements in technology overwhelmingly shaped the environment. With the help of various state of the art technology such as IOT, AI, Geo spatial mapping focus to solve the problems.
6.	Scalability of the Solution	A novel forest fire risk prediction algorithm, based on a support vector mission is presented. The algorithm depends on previous weather conditions in order to predict the fire hazard level of the day.

3.4 Problem Solution Fit

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem.



4. REQUIREMENT ANALYSIS

4.1 Functional requirement

Functional requirements may involve calculations, technical details, data manipulation and processing, and other specific functionality that define what a system is supposed to accomplish. Behavioral requirements describe all the cases where the system uses the functional requirements, these are captured in use cases.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Login	Login using credentials
FR-4	User Search	Search for Info on forest fire occurrence
FR-5	User Profile	User shall be given a live feed of the forest
FR-6	User Application	User is alerted if there is a forest fire occurrence in their surroundings

4.2 Non-Functional requirements

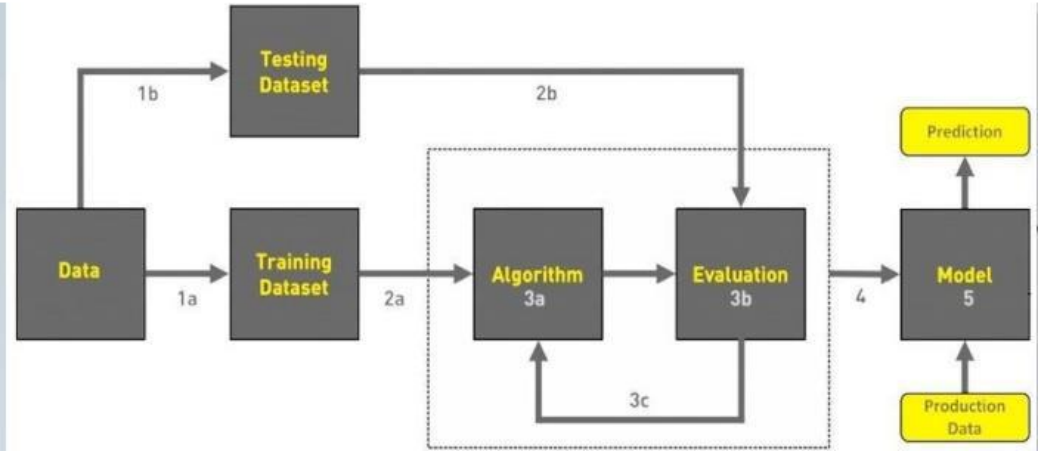
In systems engineering and requirements engineering, a nonfunctional requirement (NFR) is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors.

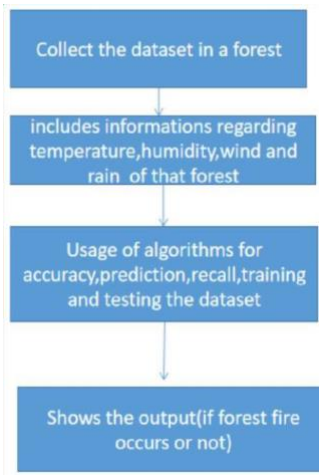
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Alerts according to the user location
NFR-2	**Security**	Instant live feed with alert of the situation
NFR-3	**Reliability**	The prediction of the forest fire is 87% accurate
NFR-4	**Performance**	The feed and the alert message an immediate action without a lag
NFR-5	**Availability**	The application gives alerts and live feeds 24/7
NFR-6	**Scalability**	Early detection and alerting users are done efficiently and in a faster means

5. PROJECT DESIGN

5.1 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.



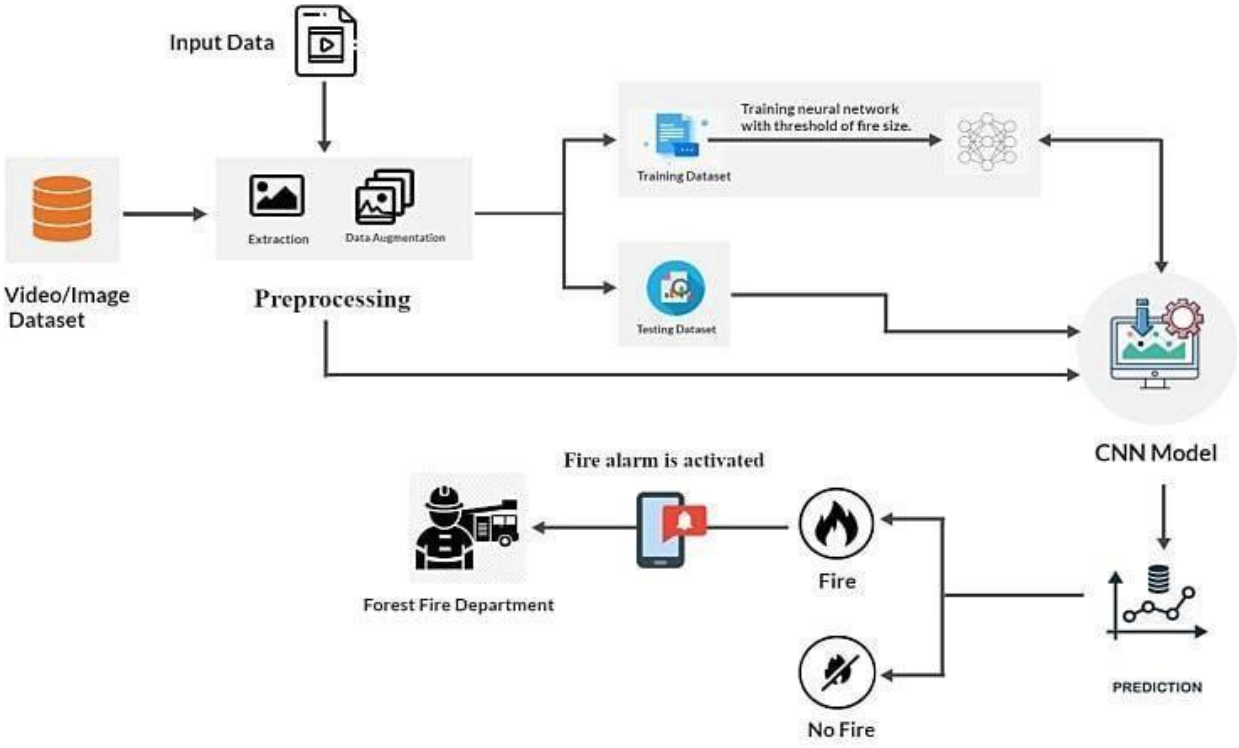


1. COLLECT DATA
2. EVALUATE DATA SET
3. IMPLEMENT ALGORITHMS
4. EVALUATE THE ACCURACY OF EACH ALGORITHMS
5. DISPLAY RESULTS

5.2 Solution & Technical Architecture

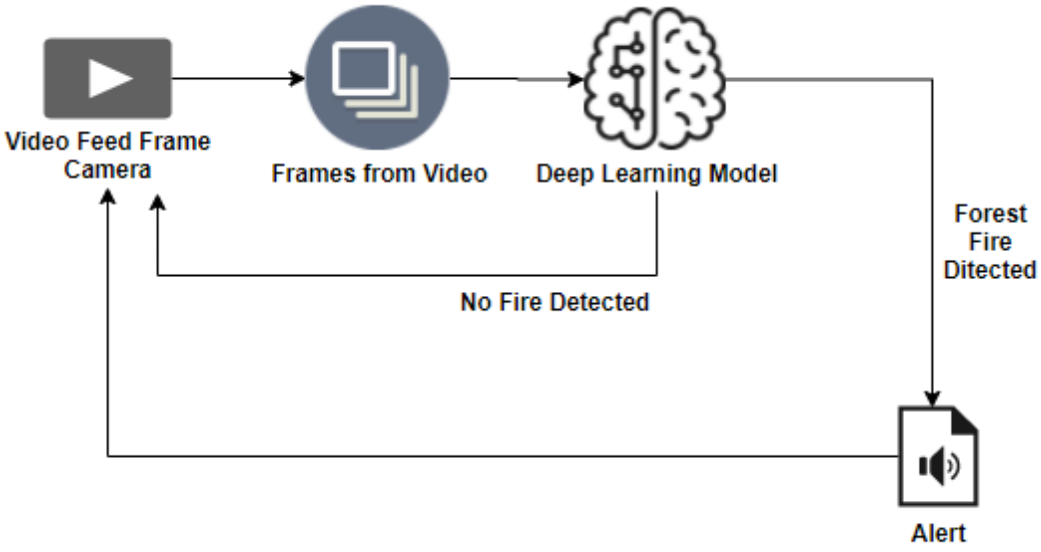
Solution Architecture:

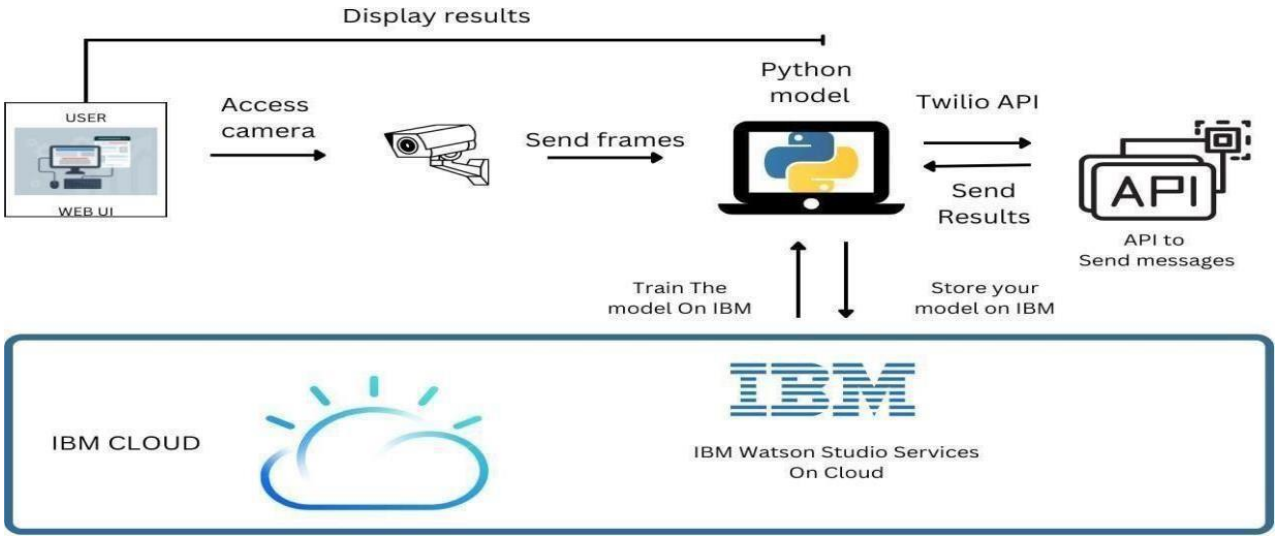
A solution architecture (SA) is an architectural description of a specific solution. SAs combine guidance from different enterprise architecture viewpoints (business, information and technical), as well as from the enterprise solution architecture (ESA).



Technical Architecture:

Technical Architecture (TA) is a form of IT architecture that is used to design computer systems. It involves the development of a technical blueprint with regard to the arrangement, interaction, and interdependence of all elements so that system relevant requirements are met.





5.3 User Stories

A user story is an informal, general explanation of a software feature written from the perspective of the end user or customer. The purpose of a user story is to articulate how a piece of work will deliver a particular value back to the customer.

User Type	Functional Requirement (Epic)	User Story Number	User Story / 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 wrong	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
		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
		USN-5	Identify accuracy, precision, recall of each algorithms	These values are important for obtaining the right output	High	Sprint-3
		USN-6	Outputs from each algorithm are obtained	It is highly used to predict the effect and to take precautionary measures.	High	Sprint-4

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

In Scrum Projects, Estimation is done by the entire team during Sprint Planning Meeting. The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the sprint.

Sprint	Functional Requirement (Epic)	User Story Number	User Story I Task	Story Points	Priority	Team Members
Sprint-I	Registration	USN-I	As a user, I can register for the application by entering my email, password, and confirming my password.	20	High	SHARMILA P MADHUMITHA V MIRUDHULA N ISWARYA S
Sprint-I		USN-2	As a user, I will receive confirmation email once I have registered for the application usage.	20	High	SHARMILA P MADHUMITHA V MIRUDHULA N ISWARYA S
Sprint-2	Input	USN-3	Whenever the fire is detected, the information is given to the database.	20	High	SHARMILA P MADHUMITHA V MIRUDHULA N ISWARYA S
Sprint-2		USN-4	When it is the wildfire then the alarming system is activated.	20	High	SHARMILA P MADHUMITHA V MIRUDHULA N ISWARYA S
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	SHARMILA P MADHUMITHA V MIRUDHULA N ISWARYA S
Sprint-4	Action	USN-6	Required actions will be taken in order to controlled erupted wildfire by reaching as early as possible to the destination with the help of detecting systems.	20	High	SHARMILA P MADHUMITHA V MIRUDHULA N ISWARYA S

6.2 Sprint Delivery Schedule

A sprint schedule is a document that outlines sprint planning from end to end. It's one of the first steps in the agile sprint planning process—and something that requires adequate research, planning, and communication.

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-I	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

6.3 Reports From JIRA

JIRA Has Categorized report in four levels, Which are

1. Agile
2. Issue Analysis
3. Forecast & Management
4. Others

7. CODING & SOLUTIONING

```
import cv2
import numpy as np
from tensorflow.keras.preprocessing import image
from tensorflow.keras.models import load_model
from twilio.rest import Client
from playsound import playsound
from decouple import config


message_sent = False

model = load_model("./model.h5")

video = cv2.VideoCapture("fire.mp4")

name = ["No fire", "Fire Detected"]


def send_message():
    account_sid = config("ACCOUNT_SID")
    auth_token = config("AUTH_TOKEN")

    client = Client(account_sid, auth_token)
    message = client.messages.create(
        body="Forest Fire detected , Stay safe!!!",
        from_=config("FROM"),
        to=config("TO")
    )
    print(message.sid)
    print("Fire Detected")
    print("SMS Sent!")

playsound("./beep.mp3")
```

```
while True:
    success, frame = video.read()
    cv2.imwrite("image.jpg", frame)
    img = image.load_img("image.jpg", target_size=(128, 128))
    x = image.img_to_array(img)
    x = np.expand_dims(x, axis=0)
    pred = model.predict(x)
    p = int(pred[0][0])
    cv2.putText(frame, str(name[p]), (100, 100), cv2.FONT_HERSHEY_SIMPLEX, 1, (0, 0, 0), 1)

    if p == 1:
        if not message_sent:
            send_message()
            message_sent = True
        print("Fire Detected , stay safe!!!")
    else:
        print("No Fire Detected")

    cv2.imshow("Image", frame)

    if cv2.waitKey(1) & 0xFF == ord('x'):
        break

video.release()
cv2.destroyAllWindows()
```

8. TESTING

8.1 Test Cases

A test case includes information such as test steps, expected results and data while a test scenario only includes the functionality to be tested.

1	Date	12-Nov-22
2	Team ID	PNT2022TMID48585
3	Project Name	EMERGING METHODS FOR EARLY DETECTION
4	Maximum Marks	4 marks

	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
6		1. Gathers the images with fire		Forest images are gathered	Working as expected	Pass				
7		1.sensor detects the place where fire occurs		Detects the places that are actively filled with fire	Working as expected	Pass			BUG-1234	
8		1.During a fire event, active fires can be detected by detecting the heat, light and smoke plumes emitted from the fires.		It detects the fire using the heat,light and smoke that are emitted while the fire is started spreading		Pass				
9		1.we can able to find the fire at the early stage and stop spreading fire in the forest.		Early stage for detecting it using the symptoms is easy to safe more places from forest fire		Pass				
10		1.This model is mainly build by using CNN and machine learning and deep learning		It plays a vital role using these technique and utilized in a efficient way to protect the forest from fire		Pass				

8.2 User Acceptance Testing

User Acceptance Testing (UAT), which is performed on most UIT projects, sometimes called beta testing or end-user testing, is a phase of software development in which the software is tested in the "real world" by the intended audience or business representative.

1.Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the Emerging Methods for Early Detection of Forest Fires project at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	5	2	1	8
Totals	24	14	13	26	77

3.Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	8	0	0	8
Client Application	24	0	0	24
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	1	8
Final Report Output	5	0	0	5
Version Control	2	0	0	2

9. RESULTS

9.1 PERFORMANCE METRICS

Performance testing is the practice of evaluating how a system performs in terms of responsiveness and stability under a particular workload. Performance tests are typically executed to examine speed, robustness, reliability, and application size.

10. ADVANTAGES & DISADVANTAGES

10.1 ADVANTAGES

The proposed system detects the forest fire at a faster rate compared to existing system. It has enhanced data collection feature. The major aspect is that it reduces false alarm and also has accuracy due to various sensors present. It minimizes the human effort as it works automatically.
This is very affordable due to which can be easilyaccessed. The main objective of our project is to receive an alert message throughan app to the respective user.

10.2 DISADVANTAGES

The electrical interference diminishes the effectiveness of radio receiver. The main drawback is that it has less coverage rangeareas.

11. APPLICATIONS

An application for forest fire detection has been developed as apart of ther research work.the application and its components are described as Proposed Environment, Component Overview and Discussions.

12. CONCLUSION

This type of system is the first of its kind to ensure no further damage is then to forests when there is fire breakout and immediately a message is sent to the user through the App. Immediate response or early warningto a fire breakout is mostly the only ways to avoid losses and environmental, cultural heritage damages to a great extent. Therefore the most important goals in fire surveillance are quick and reliable detection of fire. It is so much easier to suppress fire while it is in its early stages. Information about progress of fire is highly valuable for managing fire during all its stages. Based on this information the firefighting staff can be guidedon 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 innovation, thisproject can be implemented in various forest areas so that we can save our forests and maintaingreat environment.

13. FUTURE SCOPE

This project is far from completeand there is a lot of room for imp rovement. Some of the improvements that can be made to this project are as follows:

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.

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

14. APPENDIX

SOURCE CODE

Login.html

```
<!DOCTYPE html>
<html>
  <head>  <style>  body{  background:
url(429865.jpg);
    background-repeat: no-repeat;  background-size: 100% 200%;
   }
  #fp{
   text-decoration: none;  padding-left: 1rem;
  }  #lgn{  text-
decoration: none;

  }
  .wholeform{  height: 20rem;  width: 16rem;
border: 2.5px solid rgb(246, 60, 199);  border-radius: 1.5rem;
   box-shadow: 1px 3px 5px 2px rgba(13,12,13,1);  transform:
translateX(40rem);  margin-top: 10rem;
  }
 .subform{  transform: translateX(3rem);
margin-top: 2rem;
 }
  .bn{

   padding-left: 3rem;
 }
 .hd{
    transform: translateX(1.5rem);  font-family: Verdana, Geneva, Tahoma,
sans-serif;
 }
 </style>
```

```
        <title>
            IBM Demo
        </title>

    </head>
    <body>
        <div class="wholeform">
            <div class="subform">
                <div class="hd"> <h1>LOGIN</h1></div>
        <label for="">Email <br> <br>
         <input type="text" placeholder="Enter you Email"> <br><br>         </label>
       <label for="">Password <br> <br>
        <input type="text" placeholder="Enter you Password">
       </label> <br> <br>
        <a href="" id="fp">Forgot Password?</a> <br> <br>           <div class="bn"><button><a
href="./Home page.html" id="lgn">Login</a></button></div>
    </div>

    </div>
    </body>
 </html>
```

Home.html

```
 <!DOCTYPE html>
 <html>
 <head>      <style>
body{

            background: url(28090120_web1_FOREST.jpg);              background-repeat:
no-repeat;              background-size: 100% 200%;
    }

   a{         text-decoration: none;
padding-right: 3rem;           padding-top:
1.5rem;
```

```
    }
    .ma{          display: flex;          justify-content: space-
between;
    }       h1{           font-size: 30px;           transform:
translateX(20rem);
    }
    .center{           display: flex;           justify-content: center;
align-items: center;           height: 200px;           width: 300px;
border: 3px solid rgb(214, 26, 26);         border-radius: 1.5rem;
        box-shadow: 1px 3px 5px 2px rgba(13,12,13,1);          transform:
translateX(40rem);          margin-top: 10rem;
   }    </style>


 </head>
 <body>
    <div class="ma">
    <h1>
        EMERGING METHODS FOR DETECTION OF FOREST FIRES
    </h1>

    <div class="Pre"><button><a href="Predict.html" id="lgn">Predict</a></button></div>
 </div>

 <div class="center"> <p>Fire Destruction is one man's job<br>Fire prevention is everybody's job.</div>


 </body>
 </html>
```

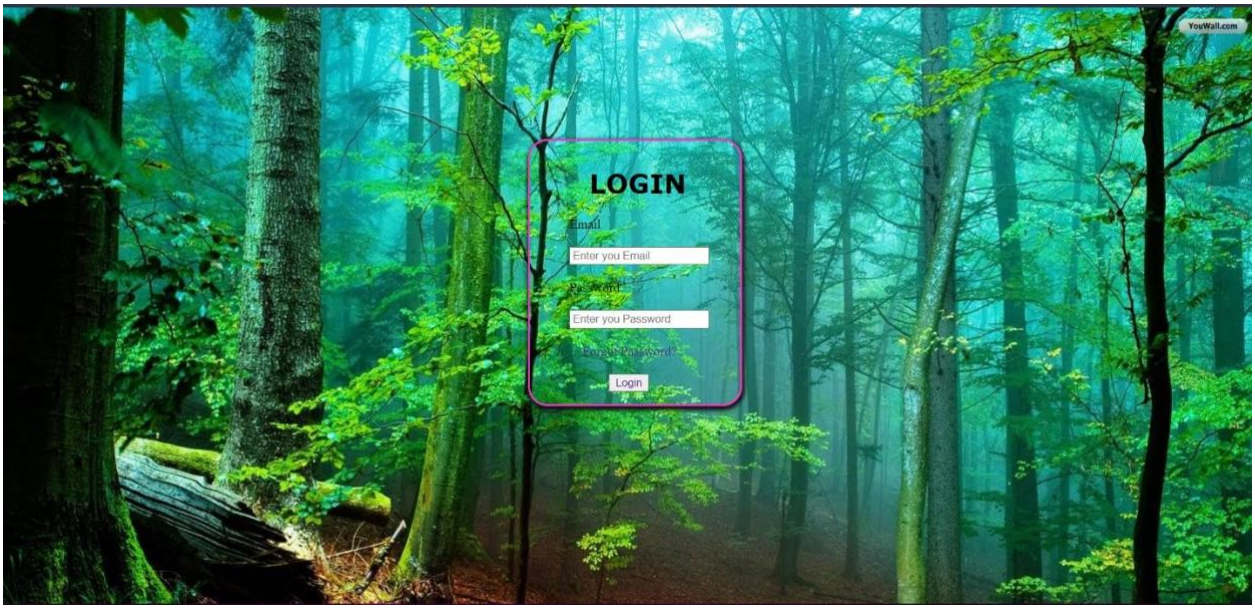
Predict.html

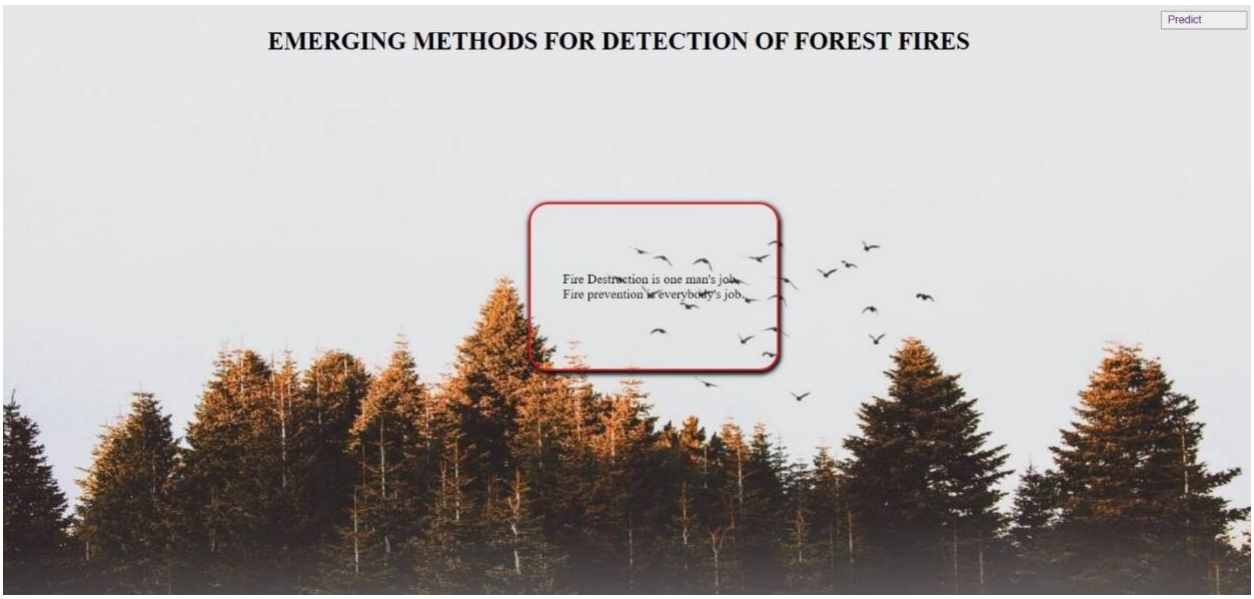
```
 <!DOCTYPE html>
 <html >
 <head>
```

```
    <style>       body{
background: url(forest-
fire-4k-yf-1920x1080.jpg);
        background-repeat: no-repeat;          background-size: 100% 150%;


 }




    #lgn{          text-decoration: none;
    }


    .center1{          display: flex;          justify-content: center;
align-items: center;          height: 200px;          width: 300px;
border: 3px solid rgb(0, 225, 60);          border-radius: 1.5rem;
        box-shadow: 1px 3px 5px 2px rgb(6, 6, 6);          transform:
translateX(40rem);          margin-top: 8rem;
    }
   .center2{          display: flex;
        justify-content: center;          align-
items: center;          height: 200px;
width: 300px;
        border: 3px solid rgb(4, 241, 52);          border-radius: 1.5rem;
        box-shadow: 1px 3px 5px 2px rgb(0, 0, 0);          transform:
translateX(40rem);          margin-top: 5rem;
    }




 </style>


 </head>
 <body>
```

```
    <div class="ba">
        </div>

        <div class="center1"><p>Cemara</p></div>
        <div class="center2"><p>Video</p></div>   </body>
</html>
```

OUTPUT SCREENSHOTS





GITHUB LINK: https://github.com/IBM-EPBL/IBM-Project-41363-1660641565