

EMERGING METHODS FOR EARLY DETECTION OF FOREST FIRE FUNCTIONAL REQUIREMENTS

Date	10 October 2022
Team ID	PNT2022TMID07050
Project Name	Emerging Methods for Early Detection of Forest Fires

Introduction

1.1 Purpose of Document

This is a Requirements Specification document for Emerging methods for the early detection of the forest fire. This project is used to detect forest fires early so that it could reduce the susceptibility to upcoming disasters. This document describes the scope, objectives and goals of the new system. In addition to describing non-functional requirements, this document models the functional requirements with use cases, interaction diagrams, and class models.

1.2 Project Concise

Project Name : Emerging methods for early detection of forest fire

Project Leader : Devi Sravanti Gubbala

Project Members : Akshara Yuvaraj, Divya Sri P, Esther Janet

1.3 Background

Trees are valuable carbon repositories and play an important role in the climate. It takes decades for forest areas ravaged by wildfires. Much of this ground lies fallow

for a very long time, which takes a further toll on the climate forest fire.

Though forest fire is often seen as harmful, several forests are specifically fire-adapted: the species of plants and animals native to those ecosystems are enhanced by or dependent on the occurrence of fire to persist and reproduce. Lightning strikes in a dry forest occur naturally, and fire can improve ecosystem health by reducing competition, fertilizing the soil with ash, and decreasing diseases and pests. Some plant species even require fire for their seeds to germinate. In many regions that have historically experienced forest fires, such as forested areas of the western United States, years of fire exclusion and suppression in the 19th and 20th centuries allowed fuels to accumulate, altering the vegetation communities present and leading to more extreme conflagrations when fires do occur. The use of prescribed fire, in which areas are burned intentionally and under controlled conditions, can restore those ecosystems and promote the conditions that were present historically before the removal of wildfire. There are many detection and monitoring systems used by authorities. These include observers in the form of patrols or monitoring towers, aerial and satellite monitoring, and increasingly promoted detection and monitoring systems based on optical camera sensors, and different types of detection sensors or their combination. The most frequently used fire detection and suppression techniques employed by authorities can be summarised as follows:

- (i) controlled burning,
- (ii) fire weather forecasts and estimates of fuel and moisture,
- (iii) lightning detectors which detect the coordinates of the strike
- (iv) infrared and spotter planes

1.4 Project Scope

The scope of this project is to provide the customer an early warning system of forest fire and it delivers the alert message to customer about the fire detected using CCTV or drones.

Customer login or sign up the website and connect webcam links , it gives view of webcam. Eventlog details are stored in database and customer details are also stored in database.

1.3 System Purpose

1.3.1 Users

Those who will primarily benefit from the new system and those who will be affected by the new system include

Customers:

Those who will use this system to detect forest fire.

1.3.2 Location

The system will be available to any potential customer using the Internet. Customers may also use the system from any location.

1.3.3 Responsibilities

The primary responsibilities of the system:

- allow customers to connect webcam through the website
- allow access to use camera
- send alert messages to customer
- provide services to customer

1.3.4 Need

This system is needed in order to real-time forest fire detection and prediction approaches, with the goal of informing the local fire authorities.

1.4 Overview of Document

The rest of this document gives the detailed specifications for the new sales system. It is organized as follows:

- Section 2: Functional Objectives

Each objective gives a desired behavior for the system, a business justification, and a measure to determine if the final system has successfully met the objective. These

objectives are organized by priority. In order for the new system to be considered successful, all high priority objectives must be met.

- **Section 3: Non-Functional Objectives**

This section is organized by category. Each objective specifies a technical requirement or constraint on the overall characteristics of the system. Each objective is measurable.

- **Section 4: Context Model**

This section gives a text description of the goal of the system, and a pictorial description of the scope of the system in a context diagram. Those entities outside the system that interact with the system are described.

- **Section 5: Use Case Model**

The specific behavioral requirements of the system are detailed in a series of use cases. Each use case accomplishes a business task and shows the interaction between the system and some outside actor. Each use case is described with both text and an interaction diagram. An interface prototype is also shown. The system use case diagram depicts the interactions between all use cases and system actors.

- **Section 6: An appendix containing a glossary that defines terms specific to this project**

2. Functional Objectives

2.1 High Priority

1. The system shall take training sets of fire images and recognize whether there is a fire or the beginning of a fire (smoke) or if there is no fire
2. The system shall send a notification to the admin when it recognizes a fire in the image given
3. The system shall take real inputs of camera images and determine whether the image contains a fire or not

4. The system shall be able to take images with a variety of sizes and convert it to one fixed image to be used throughout the application.
5. The system shall run as a service on either a Windows or Linux operating system.
6. In the event that the computer on which the system is running shuts down, the system service should start automatically when the computer restarts

2.2 Medium Priority

1. The system shall provide following facility that will allow web pages that the user is permitted to access. The system must support the following facility:
 - a. Send alert message
 - b. Customer data management

2.3 Low Priority

1. The system shall allow the user's status to be stored for the next time he returns to the web site. This will save the user x minutes per visit by not having to reenter already supplied data.
2. The system shall provide information about event log of forest.

3. Non-Functional Objectives

3.1 Reliability

- The system shall be completely operational at least x% of the time.
- Down time after a failure shall not exceed x hours.

3.2 Usability

- Customer should be able to use the system in his job for x days .
- A user who already knows what camera he is using should be able to connect and view that page in x seconds.

3.3 Performance

- The system should be able to support x simultaneous users.
- The mean time to view a web page over a 56Kbps modem connection shall not exceed xseconds..

3.4 Security

- The system shall provide password protected access to web pages that are to be viewed only by users.

3.5 Supportability

- The system should be able to accommodate many camera links.
- The system web site shall be viewable from chrome or any browser.

3.6 Interfaces

- The cloudant db for customer and customer log information
- The acquired web site search engine

