

**Project Design Phase-II**  
**Solution Requirements (Functional & Non-functional)**

Date	08 November 2022
Team ID	PNT2022TMID21021
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	<b>Classification</b>	There are four classifications of fire cause: accidental, natural, incendiary, and undetermined
FR-2	<b>Tagging</b>	It is a classification task with a higher degree of precision. It helps to identify several objects within an image. It tags and tracks animals and forest situations
FR-3	<b>Localization</b>	The localisation of the node would be done using satellite communication to reduce coverage holes and ensure maximum range with the least latency. This node would communicate data to a monitoring station with its location and send alerts according to the sensed thresholds breached based on the novel logic algorithm.
FR-4	<b>Detection</b>	The system, using Moderate Resolution Imaging Spectro-Radiometer (MODIS), Advanced Very High Resolution Radiometer (AVHRR), and Spinning Enhanced Visible and Infra Red Imager (SEVIRI) data, provides near real-time integrated information about both the fire presence and danger over the affected area
FR-5	<b>Semantic Segmentation</b>	Semantic segmentation describes the process of associating each pixel of an image with a class label. It includes Sentinel-1, Sentinel-2, Sentinel-3 and MODIS.
FR-6	<b>Instance Segmentation</b>	In Instance Segmentation, bounding boxes are generated for each instance of multiple categories present along with the object segmentation masks. It includes Hydrology, Rivers, Lakes and Audio weather conditions.

### Non-functional Requirements:

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

FR No.	Non-Functional Requirement	Description
NFR-1	<b>Usability</b>	Many methods have been proposed to detect forest fires, such as camera-based systems, WSN-based systems, and machine learning application-based systems, with both positive and negative aspects and performance figures of detection.
NFR-2	<b>Security</b>	As this process is designed with a minimum delay, the fire can be detected within the initial stage, and the responsible parties can take necessary actions in a shorter period, which will minimize the damage. This ensures security of well beings.
NFR-3	<b>Reliability</b>	The system shall be supervised either electrically or with satellite or even by software-directed polling of field. The panel, detectors and modules shall preferably used.
NFR-4	<b>Performance</b>	In the event of a fire, the primary objective of using drones is to gather situational awareness, 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. Model will achieve high accuracy
NFR-5	<b>Availability</b>	By making field testing ,Threshold ratio analysis it ensures minimum up time and performance
NFR-6	<b>Scalability</b>	A widely used measure of fire intensity is fireline intensity, which is the rate of heat transfer per unit length of the fire line (measured in kW m <sup>-1</sup> ) and represents the radiant energy release in the flaming front,