

PROJECT DESIGN PHASE – 1

PROPOSED SOLUTION

Date	22 October 2022
Team ID	PNT2022TMID29475
Project Name	Emerging Methods For Early Detection Of Forest Fires
Maximum marks	2 Marks

Proposed solutions:

SI NO.	Parameter	Description
1.	Problem Statement(Problem to be solved)	Fire detection is crucial task for the safety of people. To prevent damages caused by fire, several fire detection systems were developed. One can find different technical solutions. Most of them are based on sensors, which is also generally limited to indoors. However, those methods have a fatal flaw where they will only work on reaching a certain condition. In the worst-case scenario, the sensors are damaged or not being configured properly can cause heavy casualty in case of real fire. Those sensors detect the particles produced by smoke and fire by ionization, which requires a close proximity to the fire. Consequently, they cannot be used for covering large area. To get over such limitations video fire detection systems are used.
2.	Idea / Solution description	Early detection of fire-accidents can save innumerable lives along with saving properties from permanent infrastructure damage and the consequent financial losses. Due to developments in digital cameras and video processing techniques, there is a significant tendency to switch to traditional fire detection methods with computer based systems. Video-based fire detection

		<p>techniques are well suited for detecting fire in large and open spaces. We aim to develop a classification model using Deep learning to find fires in images/video frames, thus ensuring early detection and save manual work. This model can be used to detect fires by processing the forest fire videos. Unlike existing systems, this not requires special infrastructure for setup like hardware-based solutions, nor does it need domain knowledge and prohibitive computation for development.</p>
3.	Novelty / Uniqueness	<ul style="list-style-type: none"> ➤ Fire detection in its early stages is of a great importance in different environmental related applications. ➤ Among the visual signs of fire, smoke appears earlier than the flames in many cases, and quickly reaches the environment. Thus, it can be used for early detection of fire using machine vision techniques. ➤ Existing approaches have tried to do it either by traditional machine learning methods applying various combinations of color, texture, and motion features, or by deep learning-based methods that can automatically capture the smoke features from images.
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> ➤ The environmental challenges the world faces nowadays have never been greater or more complex. Global areas covered by forests and urban woodlands are threatened by natural disasters that have increased dramatically during the last decades, in terms of both frequency and magnitude. Large-scale forest fires are one of the most harmful natural hazards affecting climate change and life around the world. Thus, to

		<p>minimize their impacts on people and nature, the adoption of well-planned and closely coordinated effective prevention, early warning, and response approaches are necessary.</p> <ul style="list-style-type: none"> ➤ To prevent injuries and property damage, advanced technology requires appropriate methods for detecting fires as quickly as possible. In this study, to reduce the loss of human lives and property damage ➤ It is cost effective technique for the fire detection when compared to existing solution. ➤ Customer can easy to understand by using basic computer knowledge
5.	Business Model (Revenue Model)	<p>This technology is not only for forest also used to detect the fire in farming land and gardening areas. As long as phishing easy to operate, many more people and companies will suffer fire losses. Therefore, the demand for fast and accurate phishing fire detection grows stronger.</p>
6.	Scalability of the Solution	<ul style="list-style-type: none"> ➤ In order to solve this problem, the deep learning technology is applied to learn and extract features of forest fires adaptively. ➤ The limited learning and perception ability of individual learners is not sufficient to make them perform well in complex tasks. ➤ learners tend to focus too much on local information, namely ground truth, but ignore global information, which may lead to false positives. In this paper, a novel ensemble learning method is proposed to detect forest fires in different scenarios.