Intelligent Fire Detection and Alert System

# Project proposal

Project team: *Abhishek Degadwala, Galvin Fernandes, Romanch Shah*

## **Problem Specification and Motivation**

We are motivated to work on this problem because it can provide multiple benefits.

1. Public Safety: Fire accidents can result in catastrophic loss of life and property. By developing an intelligent fire detection and alarm system, we can attempt to improve public safety. Reducing the risk of fire-related incidents is one of the top benefits.
2. Timely Response: An intelligent system can leverage advanced algorithms and machine learning techniques. Leading to fires detected more quickly and accurately. This can enable timely response measures. Minimizing damage and enhancing evacuations.
3. Analytics: Analysis of the system performance can provide insights into fire patterns. Factors influencing detection accuracy can be noted which can contribute to fire safety research.
4. Scalability: Using Python, a powerful modern programming language, we can create a robust and efficient system to handle fire detection tasks. The code can effectively be used at any desired location once completed.

## **Methodology Used**

We plan to use a Convolutional Neural Network. CNNs are widely used for object detection, recognition, and feature extraction. This method can enable accurate fire detection through images and video streams. Based on the size of the dataset, we may adapt and use a transfer learning-based approach. Pretrained models trained on large-scale image datasets, such as ImageNet, can be fine-tuned for fire detection tasks. By retraining an already existing model, we think it can quickly adapt to fire-related features.

## **Testing and Experimentation**

To evaluate our strategy for fire detection we will use performance metrics (accuracy, precision, recall, F1 score). Cross-validation and hyperparameter tuning should help in optimize models. Testing the model on testing dataset will help assess practical performance.

## **Project Plan and Milestones**

Tasks in the project include research, model selection, training, performance evaluation, and documentation. Responsibilities will be divided based on experience. Members with coding experience will facilitate the learning for other members. All the team members must equally contribute to other aspects of the project to ensure completion.