Project Design Phase-I
Solution Architecture

Date	27/09/ 2022
Team ID	PNT2022TMID52907
Project Name	Emerging methods for early detection of Forest Fire

Solution Architecture Diagram:

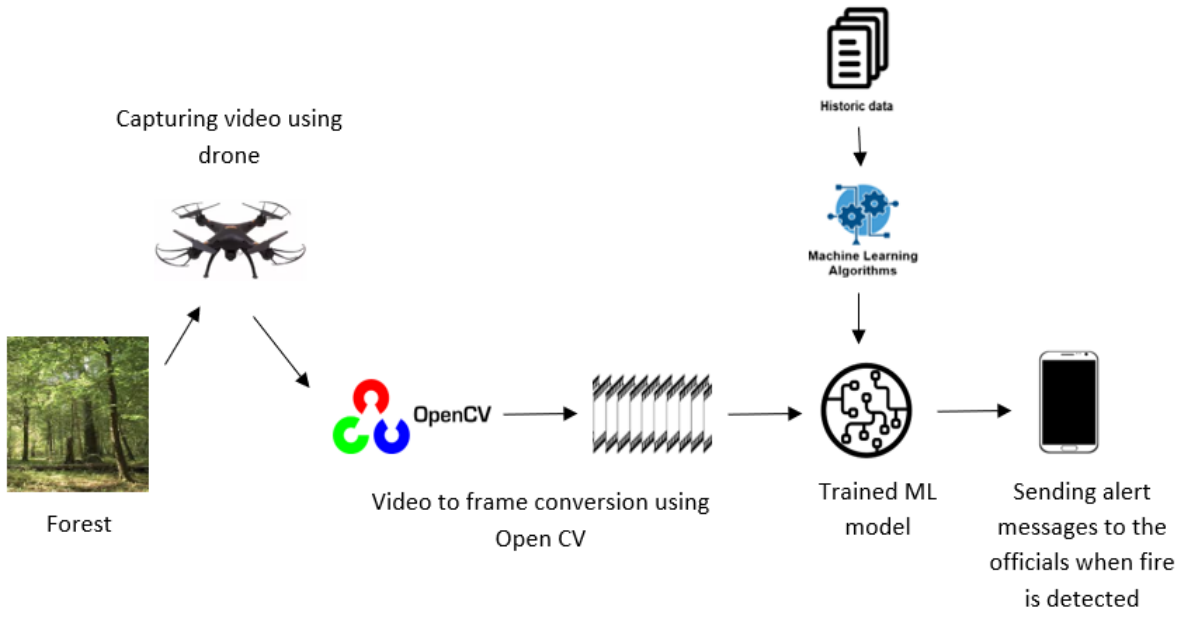

Figure 1: Architecture and data flow of the forest fire detection system

Solution Architecture:

Solution architecture describes the method for early forest fire detection using drones and Machine learning algorithm.

- Early detection and high accuracy of the localization of forest fire are necessary for a rapid intervention of firefighting personnel at the correct place. Fires can differ in size and shape and the differentiation between smoke and fog is important. These constraints can influence the possibility to detect fire. Therefore, it is necessary to find the optimum size of target area coverage.
- The drone captures video and then the video is converted to frames using open CV. The image consists of a number of pixels, where the processing unit tracks the motion in images and checks how many pixels contain smoke or fire glow and then the processing unit sends the results for another algorithm to decide whether or not to produce an alarm for the operator.

- The fire detection can be categorized into two phases, offline and online shown The offline process produces predefined patterns (the model) from the forest environment for the two cases that fire is present or not, using classification technique and learning from historical data. The model obtained from learning needs to be known before the detection. The second phase (online process) consists in finding the correspondence between the predefined model from previous processes and image prediction instances. This process provides a fast detection and reduces the response time. The output from this process is a possibility to detect fire or not.
- Once the fire is detected , alarm is sent to the forest officials using Twilio alert API Keys.