

Border Surveillance System

Prof. Ashvini Bhosale¹, Mr. Prajwal Bahekar², Ms. Anushka Bandal³, Ms. Chaitrali Kachi⁴, Mr. Shree Shama⁵

¹Assistant Professor .Department of Computer Engineering, Genba Sopanrao Moze College of Engineering, Balewadi, Pune, India

^{2 3 4 5}Department of Computer Engineering, Genba Sopanrao Moze College of Engineering, Balewadi, Pune, India
Department of Computer Engineering, Genba Sopanrao .Moze College of Engineering, Balewadi, Pune-411045, India

ABSTRACT

Accidental fire is a divine act that warns all security in a mammoth form. In the past few age, inadvertent fire has happen very commonly in many places, containing thickets, buying malls and energies, that in proper sequence yields to the giant deficit of human lives and capital. By obey to natural steps and being accustomed to apparent instabilities, individual can help to lower the possibility of unintentional fires and prevent damage led to to the feature or even poor, misfortune of feature. It primarily reduces the risk of potential deficit of lives. Possession of fire weaponry outside a license is an offence and even though dignitary does have a license for it, producing it to sure places is limited. Though skilled is severe registering the entrance of each place, skilled are potential of a accident. Instead of look at all network, the YOLO treasure checks the parts of the figure that has extreme potential of holding the object. You Only Look Once (YOLO) is an object discovery treasure, and it is faster than additional object discovery algorithms.

Keywords — Fire discovery, Gun discovery, YOLO invention

INTRODUCTION

Object detection is a calculating apparition task that includes predicting the ghost of individual or more objects, in addition to their classes and restricting boxes. The object detection has brought an increased amount of consideration in current age on account of allure expansive range of applications. This responsibility is liable to be subjected thorough hearing two together in academic rule and in real-globe requests, in the way that freedom listening, independent driving, conveyance listening, drone setting study, and mechanical fantasy [1]. The main purpose of object detection search out signify, categorize and find the locale and type of object in representations or videos [2]. There are other purpose of object discovery search out discover all states of objects of a popular class, in the way that trucks, people, or faces in an concept [3]. Fires and revolvers hit many family and cause damage to their characteristics in all experience. Thus, for fear that such mislays we need correct arrangements to discover the fires and shotguns early uncommunicative and general places. Forest fires are happen forever indifferent nations and cause overwhelming damages. Crime rates produced by pistols and guns' fire are growing as one of ultimate universal accidents that warn the world at the occasion [5]. The latest enumerations stated apiece United Nations Office on Drugs and Crime (UNODC) disclose that the number of crimes including firearms per 100,000 inmates is very extreme in many nations, for instance, 21.5 in Mexico, 4.7 in the United States and 1.6 in Belgium [6]. It is very authoritative to reduce this type of intensity through early discovery of pieces and pistols' fire. YOLO “You only look previously” is individual of the new and most popular and favorite algorithms for machine intelligence engineers as object indicator that can act actual time for action or event object discovery with good veracity [4]. It has continually happened the first choice real-opportunity object discovery [7] as one of the best and brightest offspring of tell models accompanying start of the creativity. YOLO treasure splits images into a gridiron scheme. Each container in the network arrange finding belongings within itself. The order of YOLO was made acquainted in May 2016 by Joseph Redmon the one announced YOLOv1 [8], all at once of the largest advances in real-period object discovery. In December 2017 joseph made acquainted second story that was famous as YOLO 9000 [9]. After one period in April 2018 new history named YOLOv3 was freed by Joseph and welcome colleague, which was deliberate as the most standard and fixed history [10]. Finally, in April 2020 Alexey Bochkovskiy received YOLOv4 [11] accompanying additional astonishing physiognomy. YOLOv4 outperforms YOLOv3 by a extreme border and too has greatly of average accuracy when distinguished to the EfficientDet kin. After few days on 9 June 2020 Glenn Jocher freed YOLOv5. There are plenty

differences about the choice of the name "YOLOv5" and additional belongings. Glenn introduced a PyTorch-located adaptation of YOLOv5 accompanying irregular betterings.

LITERATURE REVIEW

□ Image fire detection algorithms based on convolutional neural networks Authors: Author: Pu Li, Wangda Zhao Abstract: Fire hazards are becoming more frequent in recent years. Hence, reducing losses caused by fire is a dire necessity. Alarming users before in hand is one of the main things to do, to reduce risks. By spontaneously extracting image features, the comparison becomes easy. CNN algorithm-based fire detection reports that the accuracy of it is higher than all other algorithms. YOLO v3 gives 83.7% precision which is higher than all proposed algorithms. It also has a great detection performance and the detection speed is around 28 FPS. This enables real-time detection in an easier way.[2]

□ An Early Flame Detection Based on Image Block Threshold Selection Using Knowledge of Local and Global feature Analysis.

Authors: Ting Hsu, Shreya Pare, Dong Lin Li. Abstract: Fire is one among the uncontrollable events that occur in our day-to-day life. Every year, it is responsible for innumerable human life, flora and fauna. Hence, many researchers have associated themselves with early warning systems to minimize the fire damage and the resulting consequences. In this paper, the occurrence of fire is classified into four periods, namely, inception, fire growth period, fully developed period and decay period. The flame detection is done by considering four categories, namely, shape, color, motion and texture. The system has 97% detection rate and about 3.5% false alarm rate. The processing time is 5 ms per frame. [3]

□ Batik Image Classification Using SIFT Feature Extraction, Bag of Features and Support Vector Machine Authors: RyfialAzhar, Desmin T uwohingide, Dasrit Kamudi Abstract: Batik is an Indonesian traditional fabric which is also its cultural heritage since 2009 [4]. Batik image sorting and grouping is required to protect the resources of traditional art of Indonesia. Hence, a feasible technique is important to extract the distinctive characteristics of batik image. Bag of Features (BOF) is used in the image classification along with Scale-Invariant Feature Transform (SIFT) and Support Vector Machine (SVM) classifier [5][6]. The observation results show that the mean accuracy of this reaches 97.67% for normal image, 95.47% for rotated image and 79% in scaled image. [7]

PROPOSED METHODOLOGY

A. Fire and gun detection Fire and gun detection basically means detecting dangers before they occur. Tools are a great necessity to predict danger before it occurs. Currently, tools like fire alarms and smoke detectors are used by people to detect fire.

B. YOLO Algorithm You Only Look Once (YOLO) is an object detection algorithm, and it is faster than other object detection algorithms. In the initial detection systems, localizers or classifiers were used to perform detection. The algorithm applies a single neural network to the complete image. The algorithm looks into particular parts of the image and not the complete image. Hence, this algorithm is fast and more effective.

C. Prediction and forecasting Predicting the cause of fire and possession of guns help in decreasing the loss of life and property. Prediction is based on the previous data and the features extracted from them. The new data captured from the video is compared to the preexisting data. Later, the danger is predicted based on that fire detection by using live camera feed, plays an important role in reducing losses caused by fire, as it alarms the user before in hand, and in turn reduces the risks caused by fire. Image based fire detection is established by analysis of the images algorithmically. The live video is passed through the algorithm and then the YOLO algorithm processes the input data. The system searches for the presence of gun or fire and then detects the same. If fire or gun is present in the particular video, it will alert the supervisor through EMAIL. You Only Look Once (YOLO) algorithm is an object detection algorithm which helps to detect fire and gun more efficiently and also in a faster way.

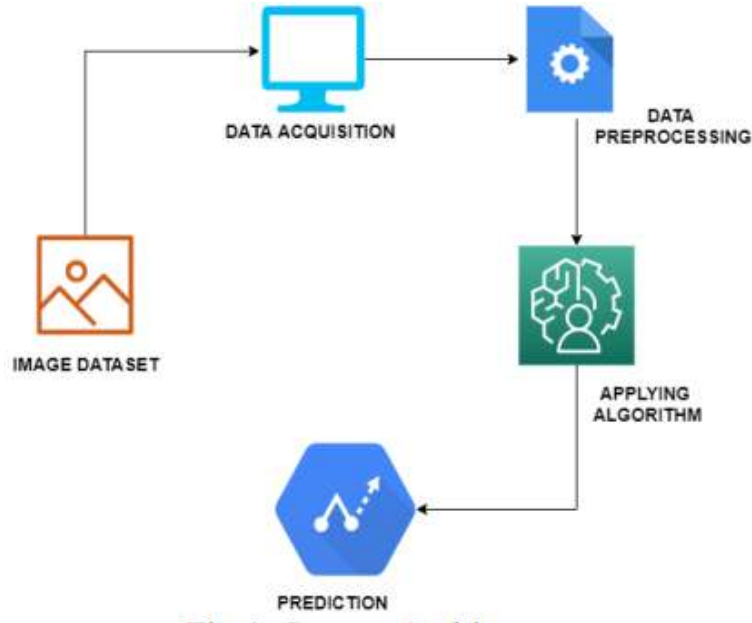


Fig 1. System Architecture



Fig 2. Detection of fire and gun

CONCLUSIONS

Fire hazards are very common in our day-to-day life and the losses caused by them are quite high. Smoke detectors and fire alarms are some of the methods used to notify people of the disasters that are yet to occur. But, one drawback of these things is, they sense danger only after it has spread to some extent. By paying attention to simple steps and being familiar with obvious dangers, one can help to lower the likelihood of accidental fires and hinder damage caused to the property or even worse, loss of property. It mainly reduces the risk of potential loss of life. Possession of fire arms is an offence and this method helps us to detect it by minimizing the consequences. Using this system will help us detect danger in the early stages, which in turn reduces the loss of lives and property.

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