FIRE DETECTION SYSTEM USING LIVE CAMERA

Rohit Kale, A.G.Shahapurkar, Nayankumar Dhome, Tejas Girge, Onkar Bhukan

Student, BE computer, Professor, BE computer, Student, BE computer, Student, BE computer, Student, BE computer

Department of Computer Engineering, SAE Kondhwa, Pune, India

Abstract: In this system, we build a system that prevent fire from spreading and detect early. By using this system could reduce almost half the risk of dying from a fire of fire. The fact is that fires can occur at anytime, anywhere and for any number of reasons. That is why it is crucial to have a reliable fire detection system. The trained algorithm detects flames and smoke directly at the source. This system provides early detection of fire on the surveillance camera and monitoring it as soon as possible. The aim of this system is to early detection apart from preventive measures to reduce the losses due hazardous fire. By using YOLO algorithm we create machine learning model to deal with endangerment of fire.

Index Terms - Fire Detection, Camera, YOLO.

I. INTRODUCTION

Fire is a natural disaster or can be in the form of human negligence such as littering cigarette butts, disposing of plastic waste during the dry season and short-circuiting electricity. Fire detection is vital process. Fire detectors sense one or more of the products or phenomena resulting from fire, such as smoke, infrared or gas. Long and dry season causes the sun to emit too hot at certain points / hot-spots so that it can be dangerous to the human environment because it triggers fires for example such as dry plants near housing, forests with dead trees. Technically the appearance of the fire will be recorded by the webcam and then the object and pattern recognition will be carried out in the image of the frame using the YOLO algorithm. This fire detection system will increase surveillance for users so that security in preventing fires can be overcome. By understanding the necessity of controlling and monitoring fire we build Machine Learning algorithm or model. Fire detection system plays an important role in ranging fire in order to monitor it and rescue the people’s life.

II. DETECTING AND MONITORING FIRE-

In the process of fire controlling fire detection and its monitoring both are very principle steps. By performing these two steps we can effectively manage the ranging of fire.

Fire Detection-

This is initial and crucial steps in fire detection system which is used to reorganization of fire with flame or with smoke. For detection of fire we use cameras. With the help of various sensors system can detect substance or gases release from fire, it can be smoke, heat, infrared or ultraviolet light radiations. The different types of gases released from fire. It includes carbon monoxides, sulfur dioxide etc. But instead of these sensors we use cameras to detect smoke and fire flames for real time detection. There are two types of model to detect the fire- Statistical model used to recognized the fire with flames whereas discriminating model to detect fire with smoke. The algorithm can realize the real time fire detection in the following cases: fire with flame, fire with smoke and fire with both smoke and flame.

Fire Monitoring-

This is also important step in fire detection system. It includes notification process. It shows early warning signs to reduce the risk of hazardous fires that may causes various harms. After detection of fire, fire monitoring steps executed.
III. ALGORITHMS-
There are different algorithm used for fire detection system using live camera based on object detection in order to increased accuracy of our model and for better prediction. It includes CNN (Convolution Neural Network) and YOLO (You Only Look Once). But here we used YOLO algorithm to build the model and design the system. This algorithm is a much faster algorithm. Because of its speed and accuracy we choose it.

YOLO ALGORITHM-
YOLO algorithm is designed to use in real time object detection system. This is one of popular algorithm to use and it is based on Neural Network. YOLO is abbreviation for You Only Look Once. This is an algorithm that detects and recognizes various objects in a picture (in real-time). Object detection in YOLO is done as a regression problem and provides the class probabilities of the detected images. YOLO sees the complete image at once as opposed to looking at only a generated region proposals in the previous methods. It used in fire detection system to detect flames and smoke depending on its color. They are implemented in two stages: -They select regions of interest in an image. -They classify these regions using convolutional neural networks. YOLO Algorithm is most effective algorithm in computer vision to build an advantageous fire detection system. The algorithm has excellent learning capabilities that enable it to learn the representations of fire, flames and smoke and apply them in fire detection.

IV. FEATURES OF FIRE DETECTION SYSTEM-
- Speed: This fire detection system improves the speed of detection because it can predict objects in real-time.
- High accuracy: YOLO is a predictive technique used in this system that provides accurate results with minimal background errors.
- Easy to monitor: This system is easy to use and monitoring fire easily.

V. ADVANTAGES OF FIRE DETECTION SYSTEM-
1. Reduction of Cost- By replacing sensors with live camera is reduces the cost of the system.
2. High Accuracy- This system are build using YOLO algorithm which defines accuracy of the system.
3. Early Detection- It detects fire very early, so we can control it quick.

VI. SUMMERY-
So far, this system completed the process of identifying or recognizing the fire flames, fire smoke in real time with the help of camera. After detection of fire system monitor it by sending various signals or signs. By using real camera or live camera we reduce the cost of entire system. Charges required for sensors are expensive. With the help of YOLO algorithm we implement Machine Learning Model to detect fire. YOLO algorithm makes the implementations easier with higher accuracy.

VII. CONCLUSION-
In this paper, the YOLO Algorithm in fire detection system has been explained. Fire detection system is widely used to monitor and control ranging of fire. The objective is capture the smoke and flames of fire using live camera. This paper conclude that YOLO is simple, object detection algorithm that allows you to detect fire to monitor or reduce the risk of endangers of fire in effective manner using live camera for reducing the cost of sensors.

VIII. REFERENCES-