

Fire Detection

Group Members:

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Problem or idea description:

Fire outbreaks are a serious risk since they can result in property damage and fatalities. Effective emergency response depends on early discovery of flames. The project's goal is to create a deep learning/machine learning model that can identify fire origins in pictures or videos.

Background Information:

The accuracy and speed of traditional fire detection techniques may be limited. Using computer vision and machine learning techniques can improve the effectiveness of fire detection systems. The goal of the research is to investigate and put into practice a method that combines image processing and deep learning for reliable fire detection.

Available Solutions:

Several fire detection solutions exist, such as traditional smoke detectors and computer vision-based approaches. Notable deep learning models like YOLO (You Only Look Once) have been successful in object detection tasks and can be adapted for fire detection.

https://github.com/mcdominik/machine_learning/blob/master/yolov8-on-fire-colab/yolo8_on_fire.ipynb

How to Get the Data:

We want to train the fire detection model with publicly available datasets from platforms such as Roboflow. These datasets are tagged with bounding boxes around fire sources, giving us a solid basis for training our machine learning model.

Brief Description of Our Solution:

Our solution involves developing a fire detection model by combining deep learning and image processing techniques. The model will be trained on a set of images with annotated fire sources. We want to detect fire incidents in real time and accurately by using the YOLO architecture.

Tech Stack:

TensorFlow: Deep learning framework for model development

OpenCV: Computer vision library for image processing

Matplotlib: Data visualization library for displaying images and results

NumPy: Scientific computing library for array manipulation in Python

Python: Programming language for implementation

Additional Information:

Ensuring the model's robustness in diverse scenarios.

Optimizing the model for deployment on edge devices.