Fire and Smoke Detection Using YOLOv5

This project aims to detect fire and smoke using a YOLOv5 model fine-tuned on a custom dataset. The trained model is saved as a .tflite file for easy deployment on various devices.

Project Overview

This repository contains code for training and deploying a YOLOv5-based fire and smoke detection system. We use a custom dataset obtained from Roboflow and fine-tune the YOLOv5 model to detect fire and smoke in real-time.

Key Steps

1- Clone YOLOv5 Repository: We clone the YOLOv5 pre-trained model from the official repository.

2- Load Dataset: A custom fire and smoke dataset is downloaded from Roboflow using the Roboflow API.

3- Train Model: We fine-tune the YOLOv5 model on the fire and smoke dataset.

4- Save Model: The trained model is converted and saved as a .tflite file for deployment.

5- Visualization: We visualize the training results and labeled data to verify accuracy.

6- Inference: We use the trained model to perform inference on test images, detecting fire and smoke with high precision.

Setup and Installation

1- Clone the YOLOv5 repository:

git clone https://github.com/ultralytics/yolov5

2- Install necessary dependencies:

pip install -q roboflow torch matplotlib opencv-python

3- Navigate to YOLOv5 directory:

cd yolov5

4- Download dataset from Roboflow: Replace Your Api with your Roboflow API key and download the fire and smoke dataset:

from roboflow import Roboflow

rf = Roboflow(api\_key="Your Api")

project = rf.workspace("firegassmoke").project("dataset-for-fire-and-smoke-detection")

dataset = project.version(1).download("yolov5")