# Video Stream Analysis with OpenCV

This document provides a comprehensive guide to video stream analysis using OpenCV. It covers key functions, model loading, object detection, anomaly scoring, baseline establishment, and alert triggering.

Imports

- import cv2
- import numpy as np
- from tensorflow.keras.applications import MobileNetV2
- from tensorflow.keras.applications.mobilenet_v2 import preprocess_input

The imports include the necessary libraries and pre-trained models for video stream analysis using OpenCV.

Loading Pre-trained Model
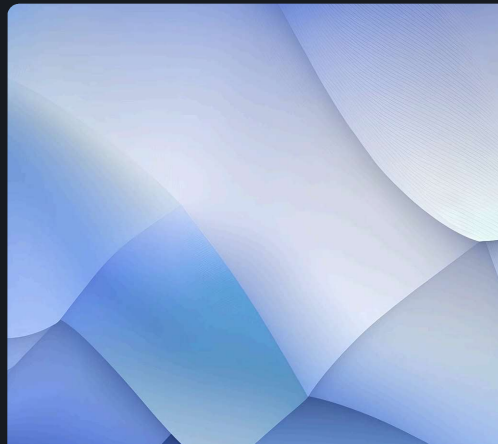
The pre-trained MobileNetV2 model with weights trained on the ImageNet dataset is loaded using the `MobileNetV2` function.

Object Detection Function

The `detect_objects` function preprocesses input frames and passes them through the MobileNetV2 model for object detection, returning the predictions made by the model.

Anomaly Scoring Function

The `calculate_anomaly_score` function calculates an anomaly score based on the detected objects, generating a random score between 0 and 1 for demonstration purposes.

Drawing Bounding Boxes Function

The `draw_boxes` function draws bounding boxes and anomaly indicators on the frame, in this case, printing the anomaly score on the frame for demonstration purposes.

Establishing Baseline Function

The `establish_baseline` function captures the video stream, processes the first few frames, and creates a baseline for normal activity using background subtraction.

Main Function for Video Stream Analysis

The main function for analyzing the video stream captures and processes each frame, calculates the absolute difference between the current frame and the baseline frame, detects objects, calculates anomaly scores, draws bounding boxes, and displays the frame with bounding boxes and anomaly indicators.