How to run the Project?

1. Organize the Project Folder

Save all the required Python scripts, configuration files, and training datasets into a single project folder. Ensure the folder contains the object detection model scripts, audio detection files, and labeled data for training.

2. Install Required Dependencies

Install all necessary libraries and dependencies using a suitable package manager like pip. These include packages for machine learning, image processing, and audio analysis.

3. Preprocess the Dataset

Prepare the dataset by converting the labeled data into a format that can be used to train the model. This typically involves converting CSV label files and corresponding images into TFRecord format, which is compatible with TensorFlow object detection APIs.

4. Train the Detection Model

Train the object detection model using the prepared dataset. The training process uses the configuration file to set model parameters, training steps, and paths to data. Upon completion, trained checkpoint files are generated.

5. Run the Detection System

Execute the main script to start the ambulance detection system. On launch, the user is prompted to select the input mode:

- Option 1: CCTV

- Option 2: Audio

-

How the System Works ?

Option 1: CCTV Detection

- The system activates the webcam or connected CCTV camera.

- It continuously monitors the video feed.

- If an ambulance is visually identified in the footage, a detection message is generated and sent to the PIC microcontroller.

- If no ambulance is detected, no message is sent.

Option 2: Audio Detection

- The system activates the microphone module.

- It listens for sounds resembling an ambulance siren.

- If a siren is detected, a detection message is pushed to the PIC microcontroller.

- If no siren is detected, the system remains idle and sends no signal.

Integration with PIC Microcontroller

Once an ambulance is detected through either visual or audio input, the system communicates with a PIC microcontroller. The microcontroller then automatically alters the traffic signal — typically changing it to green — to ensure the ambulance has a clear and quick path through the intersection.

Summary Table

Mode	Input Device	Detection Trigger	Action Taken
CCTV	Camera	Visual identification of ambulance	Sends detection message to PIC
Audio	Microphone	Siren sound recognition	Sends detection message to PIC
No Detection	-	No ambulance in input	No message is sent; traffic stays normal