

Project Design Phase-I
Solution Architecture

Date	7-11-2023
Team ID	591703
Project Name	Project - Arming Against Violence – Yolo Based Weapon Detection
Maximum Marks	4 Marks

Solution Architecture:

The solution aims to enhance public safety by detecting weapons in real-time using YOLOv7, ensuring accurate and efficient threat identification.

Data Gathering:

Acquire a diverse dataset containing images and videos of various weapon types in different environments.

Include scenarios with different lighting conditions, angles, and distances to train the YOLOv7 model effectively.

Model Training:

Utilize the YOLOv7 architecture for training the weapon detection model.

Implement transfer learning to leverage pre-trained weights on a large dataset, improving the model's accuracy.

Real-Time Analysis:

Integrate the trained YOLOv7 model into a real-time analysis pipeline.

Deploy the model on edge devices or a cloud-based infrastructure for efficient processing.

Image Preprocessing:

Implement preprocessing techniques to enhance the quality of input images.

Normalize and resize images to ensure consistency in the input data for the YOLOv7 model.

Waste Material Prediction (Adapted for Weapons):

Modify the output layer of the YOLOv7 model to predict the presence and location of weapons in images.

Integrate post-processing steps to filter and refine detection results for improved accuracy.

Continuous Learning Loop:

Implement a continuous learning loop to adapt the model to evolving weapon types and scenarios.

Regularly update the model based on feedback, emerging threats, and changes in weapon technology.

Example - Solution Architecture Diagram:

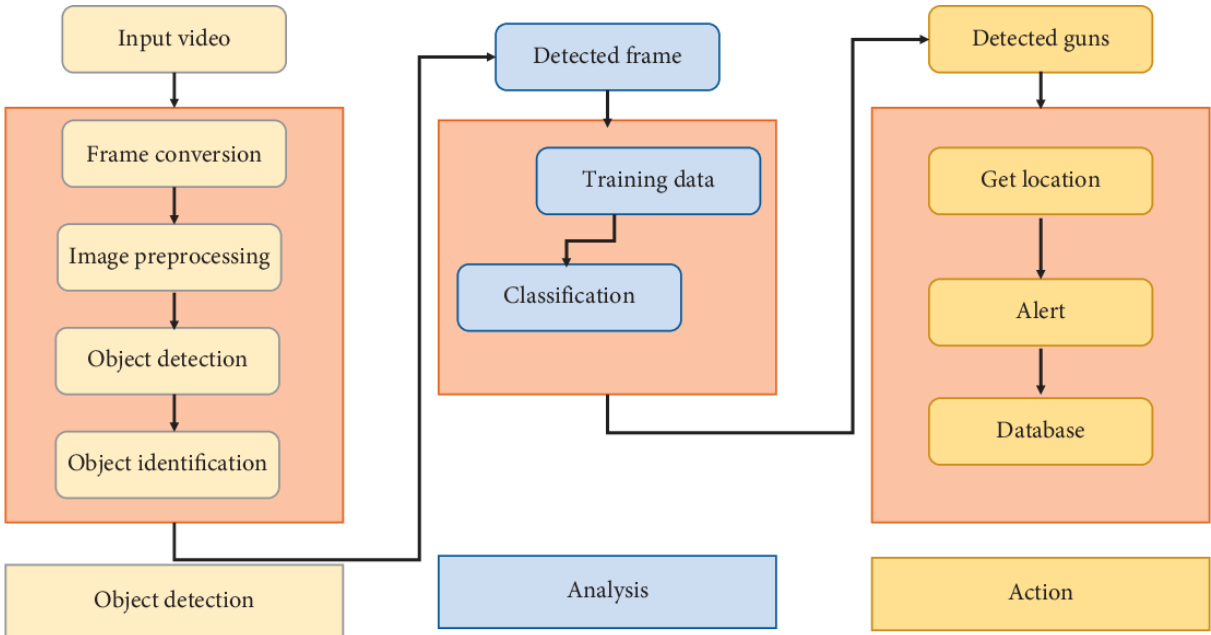


FIGURE 1: The flow of research methodology.