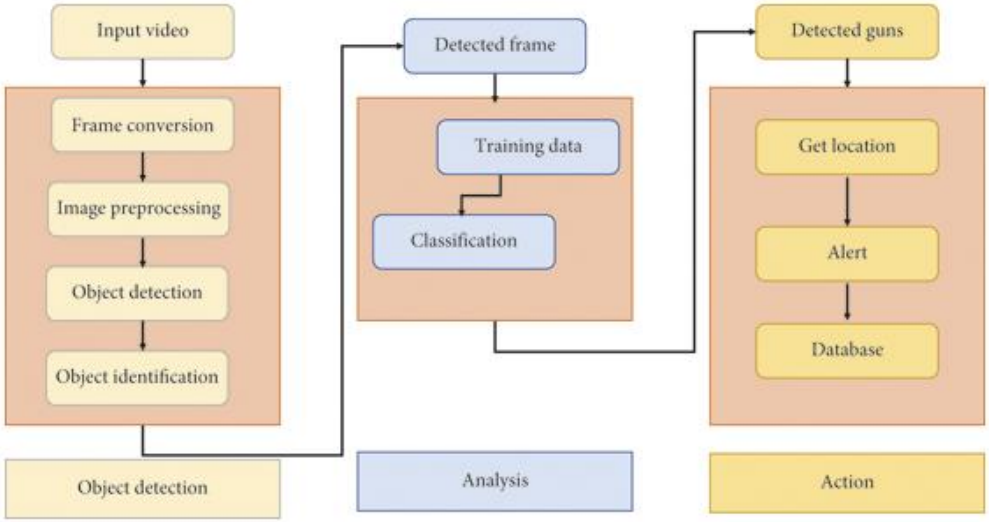
Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	9-11-2023
Team ID	591703
Project Name	Project – Arming Against Violence – Yolo Based Weapon Detection
Maximum Marks	4 Marks

Technical Architecture:
The system employs YOLO (You Only Look Once) as an open-source object detection framework. It integrates various technologies, including IBM Watson services for speech-to-text and chatbot functionalities, a mix of local and cloud-based databases, and YOLO-based machine learning models for object recognition, ensuring scalability, security, and high performance.
Reference: https://www.hindawi.com/journals/mpe/2021/9975700/fig1/



Guidelines :

1) Ensure the architectural diagram includes all processes, technology blocks, infrastructural demarcation (local/cloud), external interfaces, data storage components, and connections to machine learning models.
2) Provide detailed information using tables, including components, technologies, application characteristics, open-source frameworks, security implementations, scalability justifications, availability measures, and performance considerations.
3)

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web UI for interacting with the weapon detection system	HTML, CSS, JavaScript.
2.	Application Logic-1	Core application logic for real-time weapon detection	Python
3.	Database	Main database for storing weapon detection data	MySQL, NoSQL, etc.
4.	Cloud Database	Cloud-based database service for scalability and accessibility	IBM DB2, IBM Cloudant etc.
5.	File Storage	Storage for files and data related to weapon detection	IBM Block Storage or Other Storage Service or Local Filesystem
6.	External API-1	API for obtaining contextual data, e.g., location-based insights	Custom Location Data API
7.	External API-2	API for verifying identity, e.g., weapon owner details	Custom Identity Verification AP

8.	Machine Learning Model	YOLO-based Object Recognition Model for detecting weapons	YOLO (You Only Look Once)
9.	Infrastructure (Server / Cloud)	Application Deployment for YOLO-based Weapon Detection	Local Server Configuration / Cloud

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	YOLO being an open-source framework for real-time object detection	YOLO
2.	Security Implementations	Encryption, Access Controls, and IAM for securing weapon detection data	SHA-256, Encryptions, IAM Controls, OWASP etc.
3.	Scalable Architecture	Microservices for scalability of weapon detection	Microservices Architecture

S.No	Characteristics	Description	Technology
4.	Availability	Load balancing and distributed servers for uninterrupted weapon detection	Load Balancers, Distributed Servers
5.	Performance	Caching, CDN usage, and optimization for real-time processing of weapon detection	Caching, CDN (Content Delivery Network)

References:

https://pjreddie.com/darknet/yolo/

https://www.mysql.com/

https://stripe.com/docs/connect/identity-verification

https://www.ibm.com/cloud/architecture

https://aws.amazon.com/architecture

https://github.com/AlexeyAB/darknet