S R M INSTITUTE OF SCIENCE AND TECHOLOGY

CHENNAI

FACULTY OF ENGIEERING AND TECHNOLOGY

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

**FINAL YEAR STUDENTS MAJOR PROJECT DATA SHEET**

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| **PROJECT BATCH NO** | 7 | | |
| **PROJECT TITLE** | Enhanced Weapon Detection and Classification Using YOLO-Based Object Detection Frameworks and Emergency Alert System | | |
| **GUIDE NAME** | Mr. Sachin Aditiya B , M.Tech | | |
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| **ABSTRACT** | | | |
| Using the YOLOV5 object detection framework, this work proposes a real-time, AIpowered system intended for intelligent surveillance and public safety by identification and classification of firearms. Rising frequency of armed threats in public areas calls for quick, highly accurate threat detection systems automatically. From both still photos and live video streams, the suggested system detects many kinds of weapons including rifles, handguns, knives, and other dangerous objects using YOLOV5. Nine separate weapon categories were created from bespoke data augmentation methods including rotation, scale, and brightness modification. Implementing Python, OpenCV, and the Ultralytics interface for YOLOV5, the system achieves real-time performance at 30 FPS with a mean Average Precision (mAP@0.5) of 0.84. F1-score analysis, precisionrecall curves, and confusion matrix evaluation show great short latency detection power. Built to be lightweight, modular, and scalable, this solution may be installed on mobile security systems, smart CCTV cameras, and edge devices. The technology offers major advances in proactive security measures for important areas such airports, schools, transportation hubs, and public events by merging modern deep learning with effective surveillance systems. | | | |
| **INFERENCE** | | | |
| Public safety concerns about the usage of weapons in crowded surroundings such schools, airports, retail malls, and transit hubs have clearly increased recently. These rising rates of violence draw attention to the vital need of smart and automated surveillance systems able to identify hazards in real time and support prompt reaction. Manual monitoring by security staff is common in traditional surveillance systems, which is prone to human mistake, delayed reaction times, and restricted scalability. As a result, systems driven by artificial intelligence that can highly accurately and minimally delay automate the threat detection process are in increasing demand. | | | |
| **DELIVERABLES** | | | |
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Guide Coordinator HOD