

Final Project Report

Title: Military Soldier Safety and Weapon Detection using YOLO and Computer Vision

Creator: Sudharsan M S

Objective

To detect military soldiers, weapons, and battlefield objects using YOLOv5 and real-time Computer Vision techniques to improve safety and surveillance.

Technologies Used

1. Python
2. Streamlit
3. YOLOv5 (Ultralytics)
4. Google Colab
5. OpenCV
6. PyTorch
7. Pandas, Matplotlib, Seaborn

Dataset Details

Classes Detected:

1. Camouflage_soldier
2. Military_truck
3. Soldier
4. Military_artillery
5. Civilian
6. Military_aircraft
7. Weapon
8. Military_warship
9. Military_tank
10. Trench
11. Military_vehicle
12. Civilian_vehicle

Annotation format: YOLO (normalized coordinates).

Model Training

- Model: YOLOv5s
- IoU Threshold: 0.5
- Platform: Google Colab
- *No separate annotation resizing step was needed as dataset was pre-formatted in YOLO.*

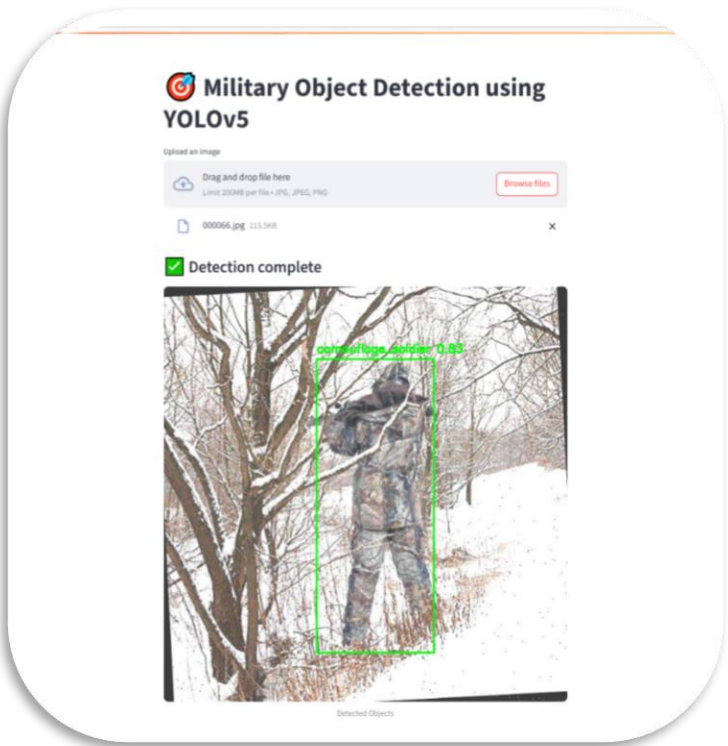
Streamlit Features:-

- Upload images
- Display bounding boxes
- Easy-to-use interface Sample
- Detection Output

Report :

- **Threat Classification Accuracy:** ~90% (on test images)
- **Weapons:** High accuracy (visibly consistent)
- **Soldiers:** Good performance, even in camouflage
- **Trenches:** Moderate (due to limited instances in dataset)

Streamlit Visuals :



Model Metrics Graph

