

DL Assisted Small Objects Detection

Breif Background

Detecting and tracking small objects in aerial imagery is vital for defense, maritime surveillance, and disaster management. Traditional systems often fail under adverse conditions like fog, haze, or poor lighting, making them unreliable for identifying UAVs, marine vessels, or human activity. This project addresses these challenges through deep learning and computer vision techniques, enabling reliable detection and tracking in degraded scenes, thereby improving response efficiency, safety, and national security operations

Tech/Prod. Summary

An end-to-end computer vision pipeline for real-time detection and tracking of small objects such as drones, even when object visibility is degraded due to poor illumination, small object size, or adverse weather (fog, rain, haze, low light).

Tech/ Product Description

The system uses deep neural networks and vision transformers to detect and track small objects in aerial imagery under challenging conditions. It includes modules for image enhancement, atmospheric correction, and multi-scale target detection using attention-based CNNs. A Kalman filter and optical flow tracker ensure stability during occlusions or motion blur. The system processes real-time data on embedded GPU platforms and fuses multi-sensor inputs for improved accuracy. Its modular design allows deployment on UAVs or ground stations, supporting applications in defense surveillance, maritime safety, and environmental monitoring with high precision and efficiency.

Market Potential

AI-based aerial surveillance and object detection market: USD 12 billion by 2030, at a CAGR of 14-16%.

Value Proposition

Indigenous, AI-enabled surveillance technology in degraded environments

Application Sectors

- Defense and Border Surveillance .
- Maritime and Coastal Monitoring
- Disaster Response and Environmental Monitoring.

TRL



4

Impact - SDG:

SDG 9 – Industry, Innovation & Infrastructure
SDG 11 – Sustainable Cities & Communities

