Akshaa 1.0 – Asset Detection Report

Introduction

Akshaa 1.0 is an advanced AI-powered road asset detection system designed to analyze high resolution video data and automatically extract structured information about roadside assets. The system uses a hybrid CNN–Vision Transformer deep learning model, enabling high accuracy real time inference for drone and vehicle-mounted cameras.

System Overview

- Input Source: HD/4K Road Video
- Frame Extraction Rate: 1 fps (~13,500 frames per 15-minute video)
- Model Architecture: CNN + Vision Transformer Hybrid
- Inference Speed: 22 FPS
- Training Data: 500,000+ annotated Indian road images

Detection Classes

Akshaa detects a wide range of road assets, including:
Trees, Bushes, Water Bodies, Electric Poles, Signal Poles, Foot Over Bridges, Road Over Bridges, Level Crossings, Railway Tracks, Platforms, Stations, Highways, Farms, Open Fields, Urban Areas, Subways, etc.

Performance Summary

- Validation mAP50: 91%
- Test mAP50: 93%
- Highest Accuracy Classes: Bridges, Trees, Urban areas (97–100%)
- Lowest Accuracy Class: Road Shoulder (75–80%)

Training Metrics

The model was trained for 300 epochs. Training curves show:
• Box Loss: 2.6→ 0.85
• Class Loss: 4.3→ 0.48
• Object Loss: 2.3→ 0.90
• mAP50 increased sharply during first 40 epochs, stabilizing at ~0.85+

Key Observations

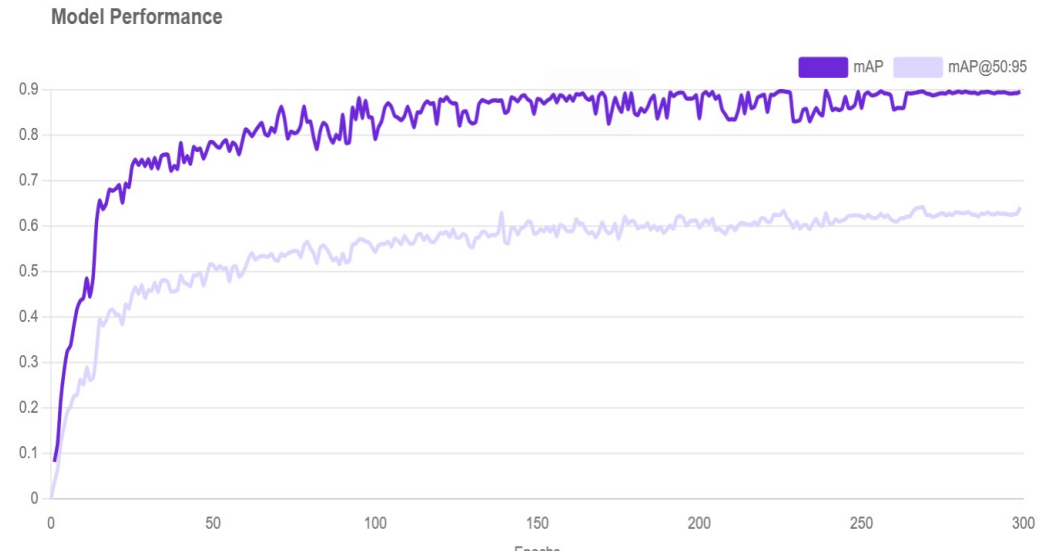
• Dense vegetation mapped across 69% of routes.
•Bridge, Trees, and Urban areas detected with high precision.
•GPS coordinate accuracy maintained within ±2 meters.
• Pothole/crack analysis in development.

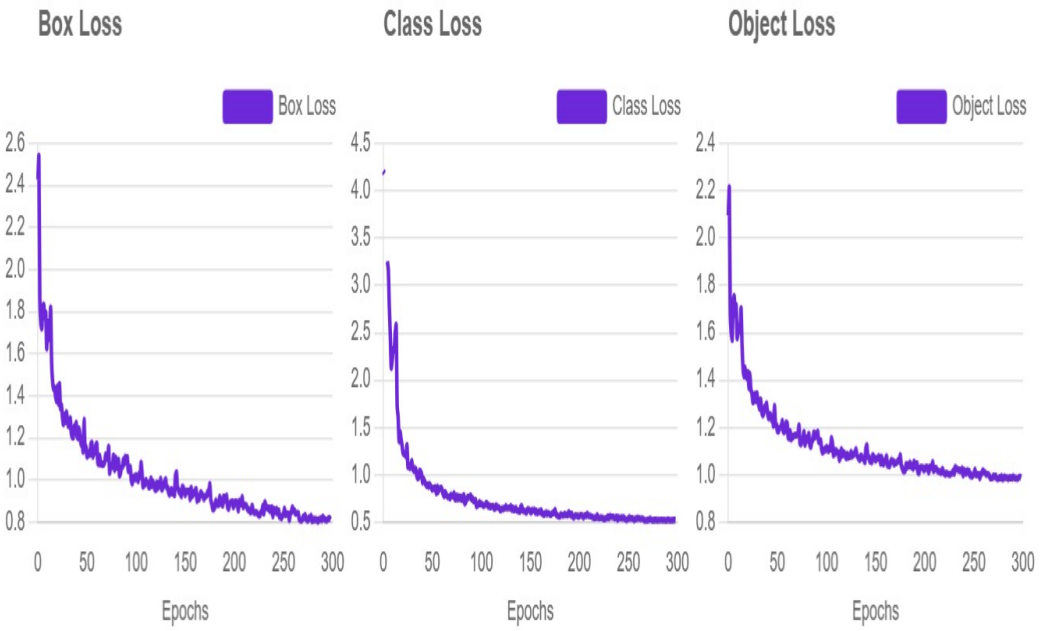
Report Export Features

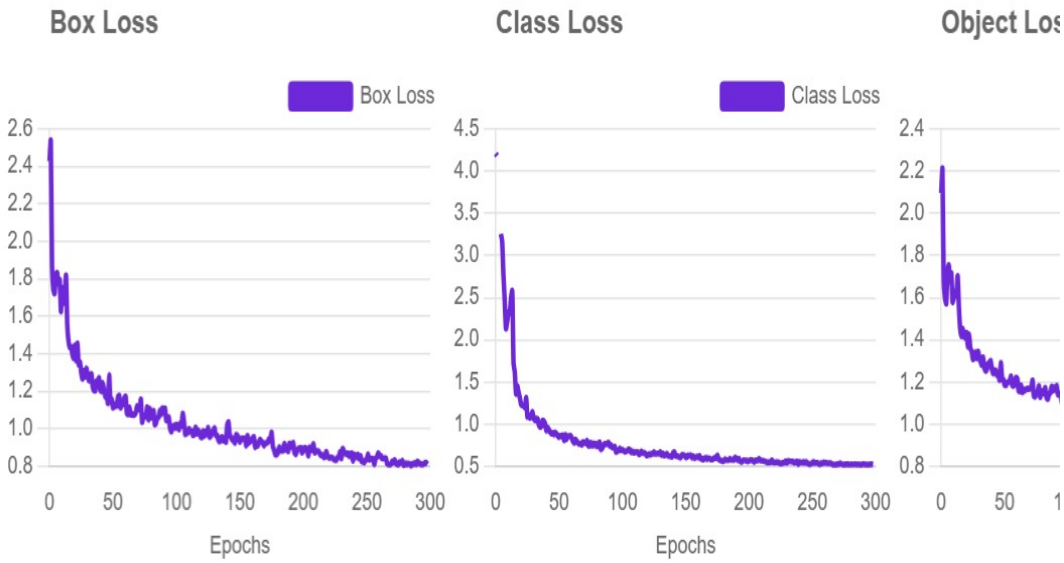
Akshaa automatically exports structured data in PDF, CSV, and JSON formats including:
• Asset summary
• Geocoordinates
• Confidence scores
• Classified images
• Meta analytics

Training Graphs

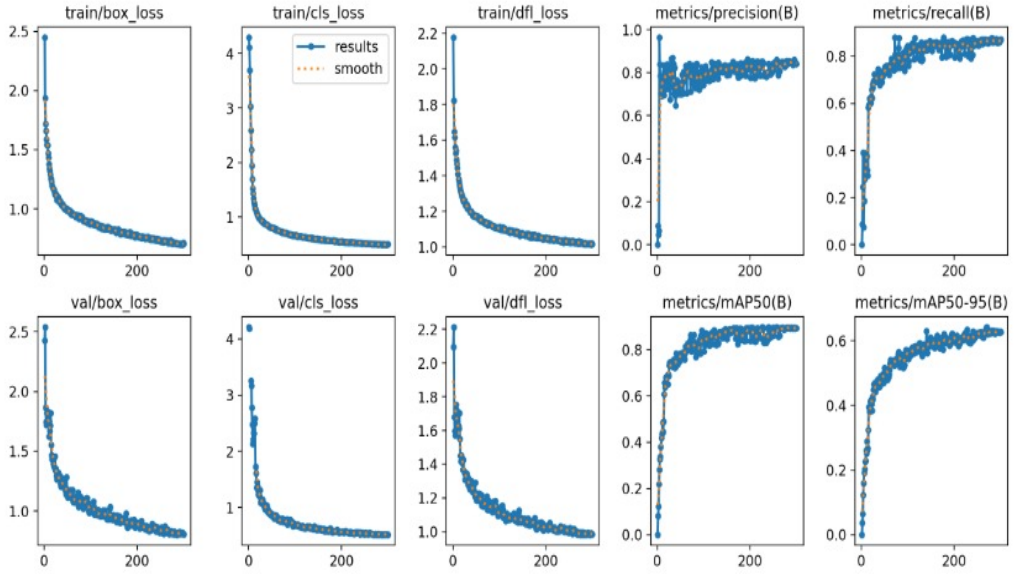
Advanced Graphs







Advanced Training Graphs



Summary of Asset Detection

Asset Type	Detectable by AI Model	Approx. Accuracy Range
Road Surface (Bituminous/Concrete)	Yes	92–96%
Lane / Road Markings	Yes	92–95%
Trees / Vegetation	Yes	95–97%
Signboards	No	–
Street Lights / Electric Poles	Yes	88–92%
Bridges / Flyovers / ROB	Yes	96–98%
Buildings / Structures	Yes	89–94%
Median / Divider	Yes	87–93%
Guard Rails / Crash Barriers	Yes	88–94%
Traffic Signals	No	–
Vehicles	Yes	96%+
Hoardings / Billboards	No	–
Milestones / KM Stones	No	–
Road Shoulder	Partial	75–80%
Drains / Culverts	No	–
Footpath / Sidewalk	No	–
Speed Breakers / Rumble Strips	No	–
Pedestrian Crossings	No	–
Underground Utilities	No	–
Drainage Inlets / Catchpits	No	–
Bushes	Yes	90–95%
Water Bodies	No	–
Railway Tracks	No	–
Railway Platforms	No	–
Railway Stations	No	–
Level Crossings	No	–
Open Fields	Yes	92–97%
Urban Areas	Yes	92–97%
Subways	No	–

Asset Type	Count Detected
Trees	659
Structures	23
Bridges	1
ROB	0
Signboards	0
Electric Poles	43
Water Bodies	0
Railway Tracks	0
Railway Platforms	0
Railway Stations	0
Level Crossings	0
Open Fields	39
Urban Areas	2
Subways	0
Speed Breakers / Rumble Strips	0
Pedestrian Crossings	0