AE Mega Project

Task 2: Computer Vision

Dataset:

Why did we choose the HKU-UAS-LOCATE dataset?

- The HKU-UAS-LOCATE dataset is specifically designed for aerial object detection, which makes it perfect for the use case.
- The dataset contains images with colored shapes and alphanumeric characters.
- The dataset provides enough training samples for the model to learn robust features.
- It's also pre-annotated, and it comes with bounding box annotations, saving significant time on manual labeling while ensuring annotation quality.

Model:

Why did we choose the YOLOv8m?

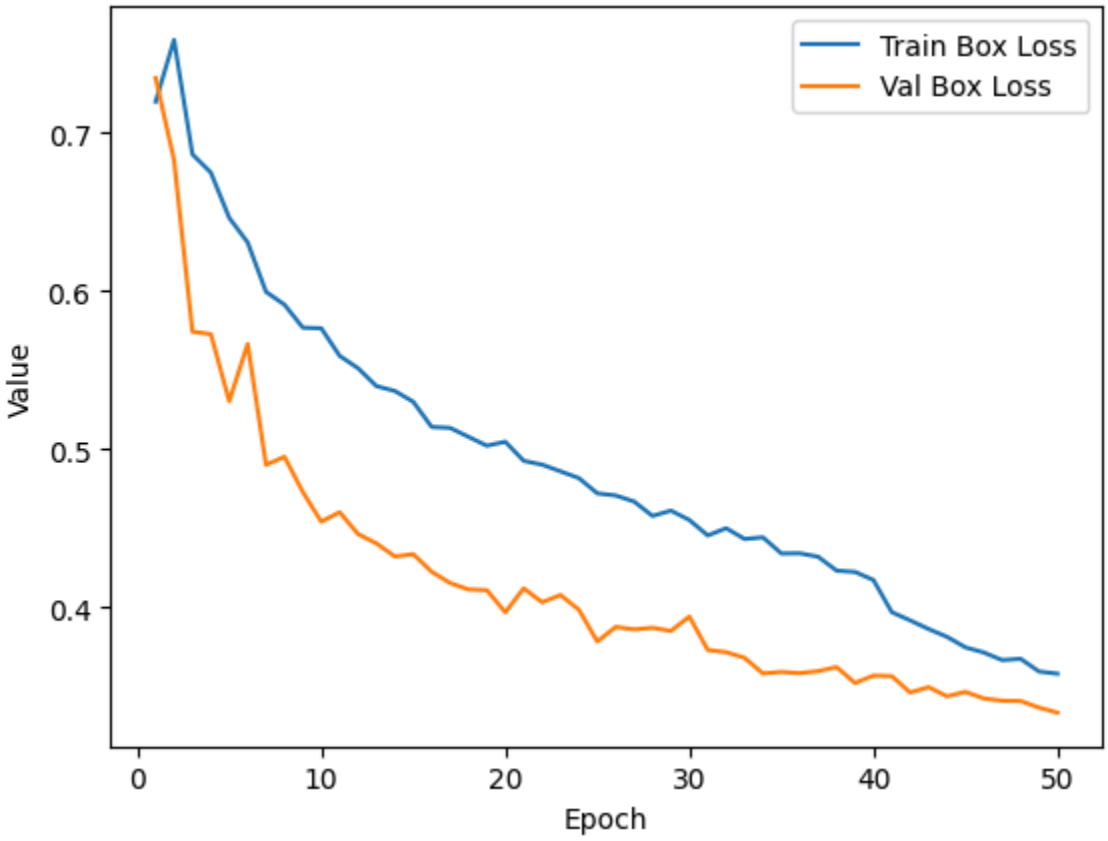
- YOLOv8 is one of the latest and most accurate versions of the YOLO family, providing excellent detection performance with high mAP scores.
- YOLOv8m (medium) is a balanced version of YOLO models between accuracy and speed. It's more accurate than the smaller variants (nano, small) while being faster than the larger variants (large, xlarge).
- It's also superior in small object detection, which is essential for aerial object detection.

Training and validation metrics:

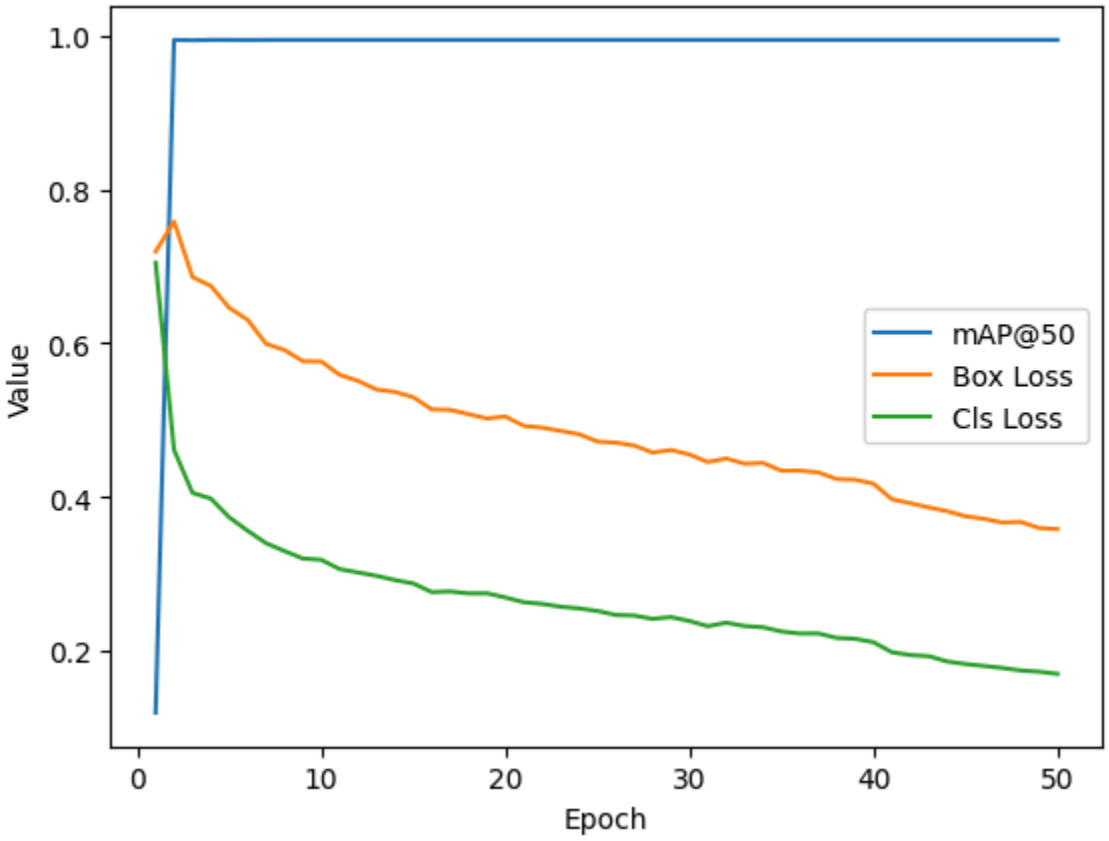
The final model metrics proved the successful training on the selected model. Below is the final data metrics providing the mAps (mean Average Precision).

Metric	Value
Precision	1.0000
Recall	1.0000
mAP@50	0.9950
mAP@50-95	0.9499

Train and val losses:



mAP(50) and losses:



Sample Results:

Test Image:

Localize the object by determining its x and y coordinates (in meters) based on the image details:
Object at (X, Y) = (-9.234079 m, -6.001066 m)
Latitude: 38.31724312 degrees
Longitude: -76.55628263 degrees