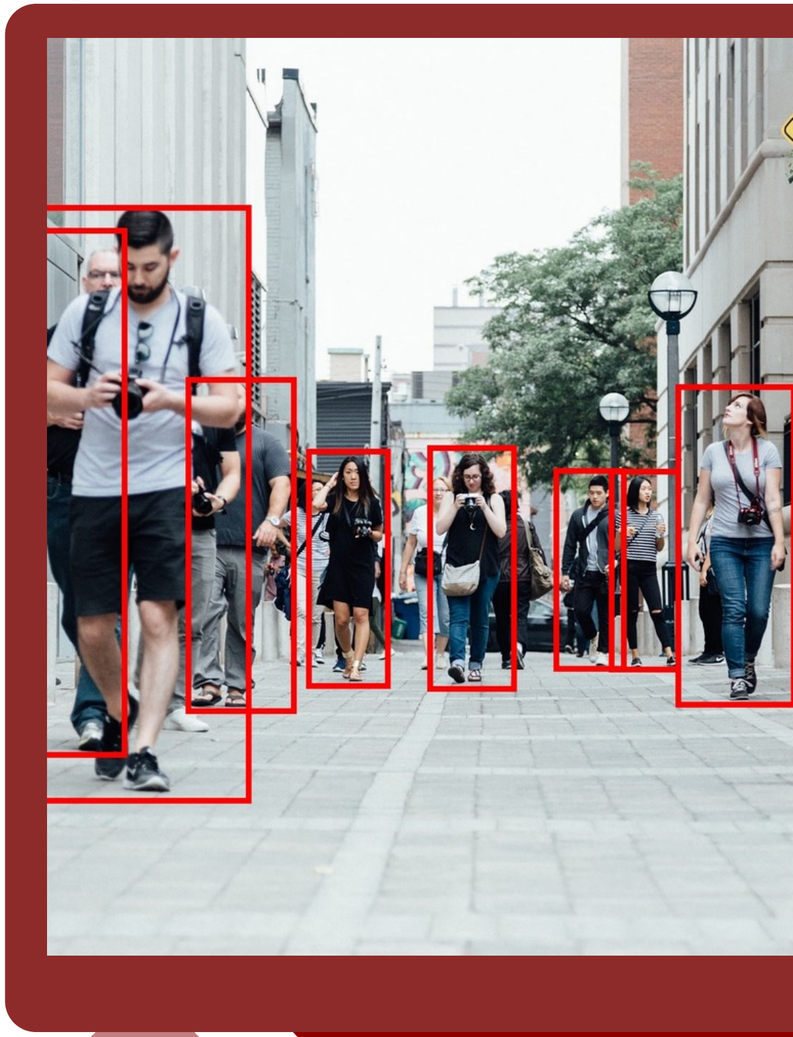
DETECTION AND TRACKING OF HUMAN
USING DEEP LEARNING



By Fei-Fei Li Team

Background

WHY HUMAN-TRACKING ?

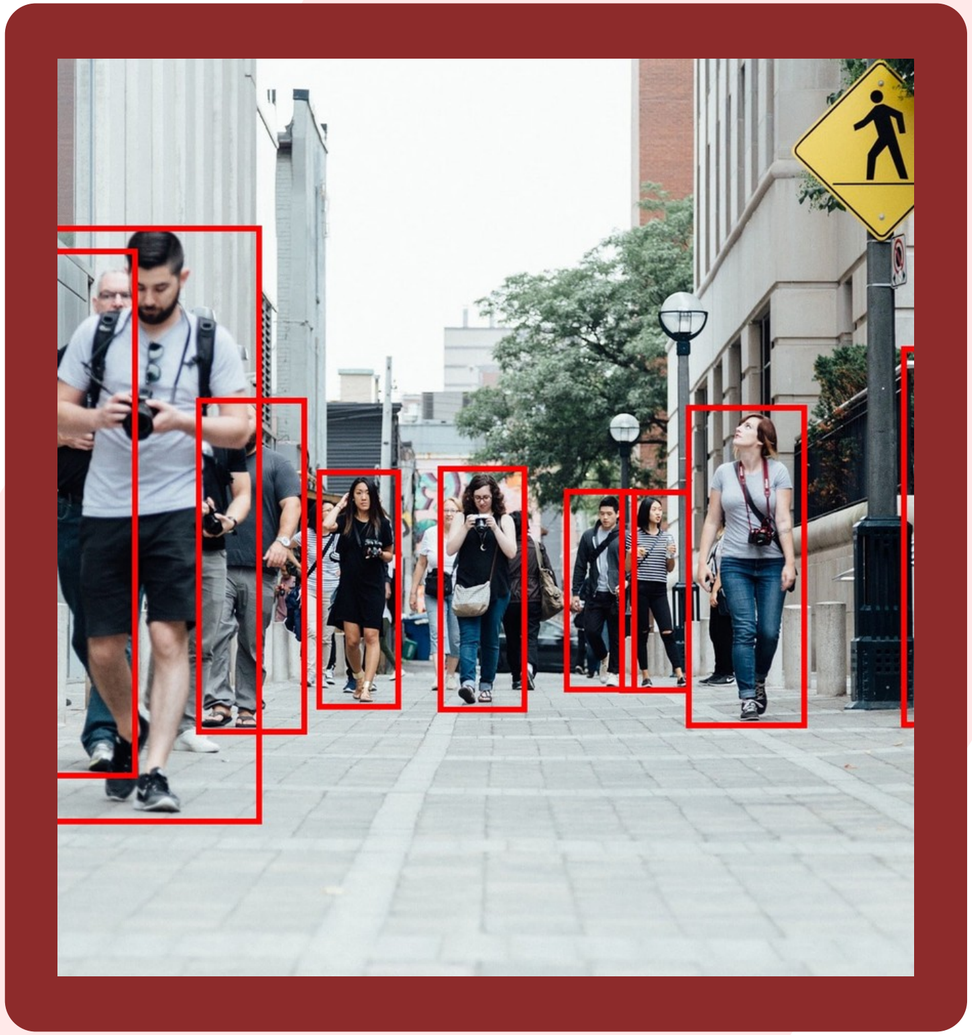
Human tracking is essential in applications such as:

- Surveillance and crowd monitoring
- Smart environments and robotics
- Behavior and activity analysis

Traditional tracking methods often fail in:

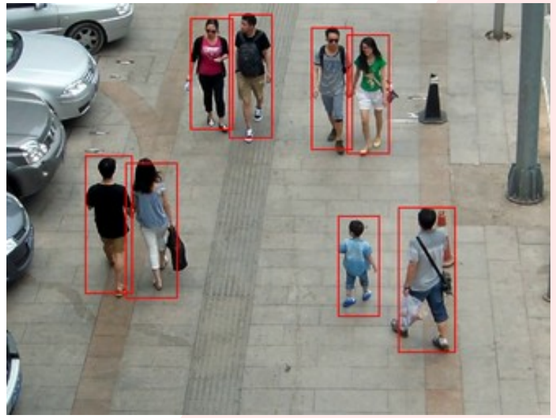
- Complex backgrounds
- Occlusion
- Real-time performance constraints

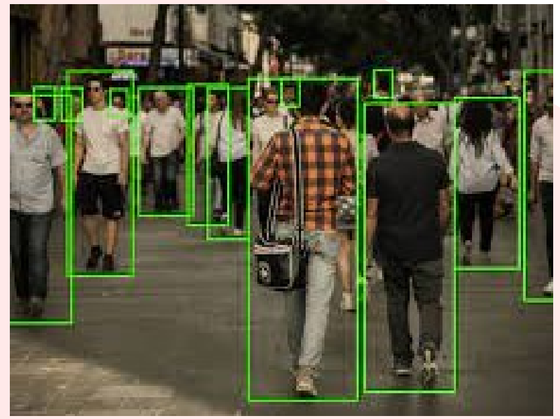
Deep learning models like YOLOv and Faster R-CNN offer fast and accurate object detection suitable for tracking tasks

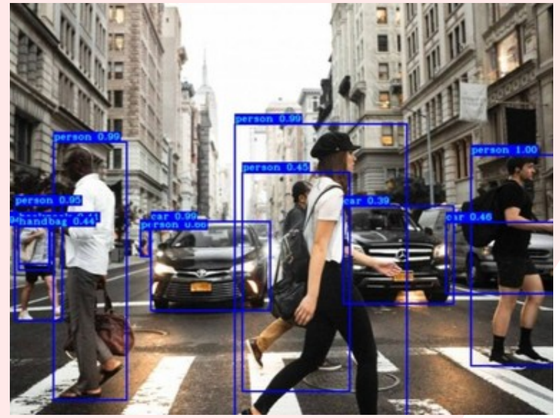


OBJECTIVE

- To detect and track object (human) using YOLO variants and Faster R-CNN
- To evaluate YOLO performance on human tracking tasks







DATA PREPARATION

Dataset	Source	Augmentation	Number of Train Images	Number of validation Images	Number of Test Images
Dataset 1 **(Public dataset)**	https://universe.roboflow.com/leo-ueno/people-detection-o4rdr/dataset/8	Outputs per training example: 3 Flip: Horizontal Crop: 0% Minimum Zoom, 25% Maximum Zoom Grayscale: Apply to 25% of images Hue: Between -25° and +25° Saturation: Between -25% and +25% Brightness: Between -25% and +25% Exposure: Between -25% and +25% Blur: Up to 2.5px Noise: Up to 1% of pixels Mosaic: Applied	15210	1431	760
Dataset 2 **(custom dataset)**	https://app.roboflow.com/person-tracking-undvw/person-tracking-ig9z0/1	Outputs per training example: 3 Flip: Horizontal Crop: 0% Minimum Zoom, 25% Maximum Zoom Grayscale: Apply to 25% of images Hue: Between -25° and +25° Saturation: Between -25% and +25% Brightness: Between -25% and +25% Exposure: Between -25% and +25% Blur: Up to 2.5px Noise: Up to 1% of pixels Mosaic: Applied			

Label verification → ensure there are no duplicates and the YOLO format is consistent.

Path normalization → convert all file paths to absolute paths to ensure cross-OS compatibility.

data augmentation by Roboflow

Caching ensures efficient loading during training

DATA PRE-PROCESSING

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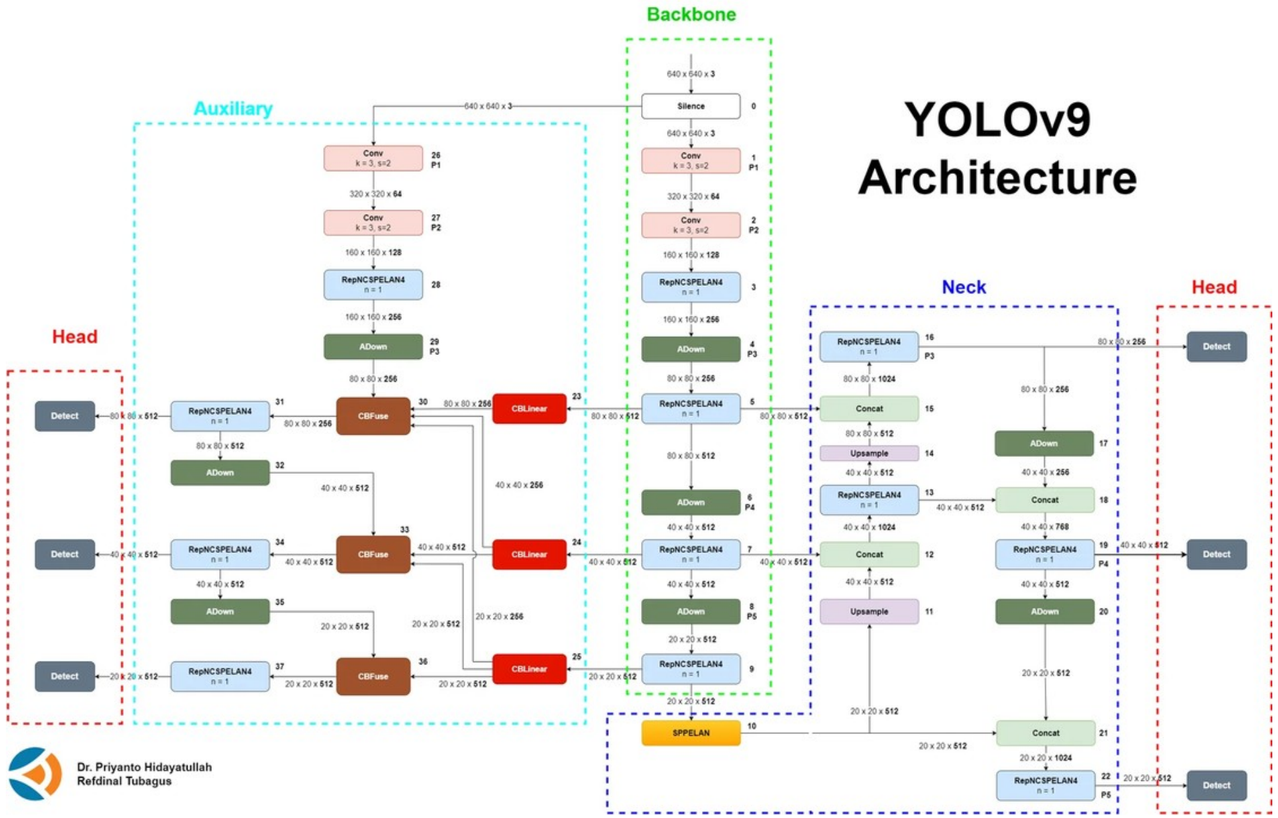
MODEL TRAINING

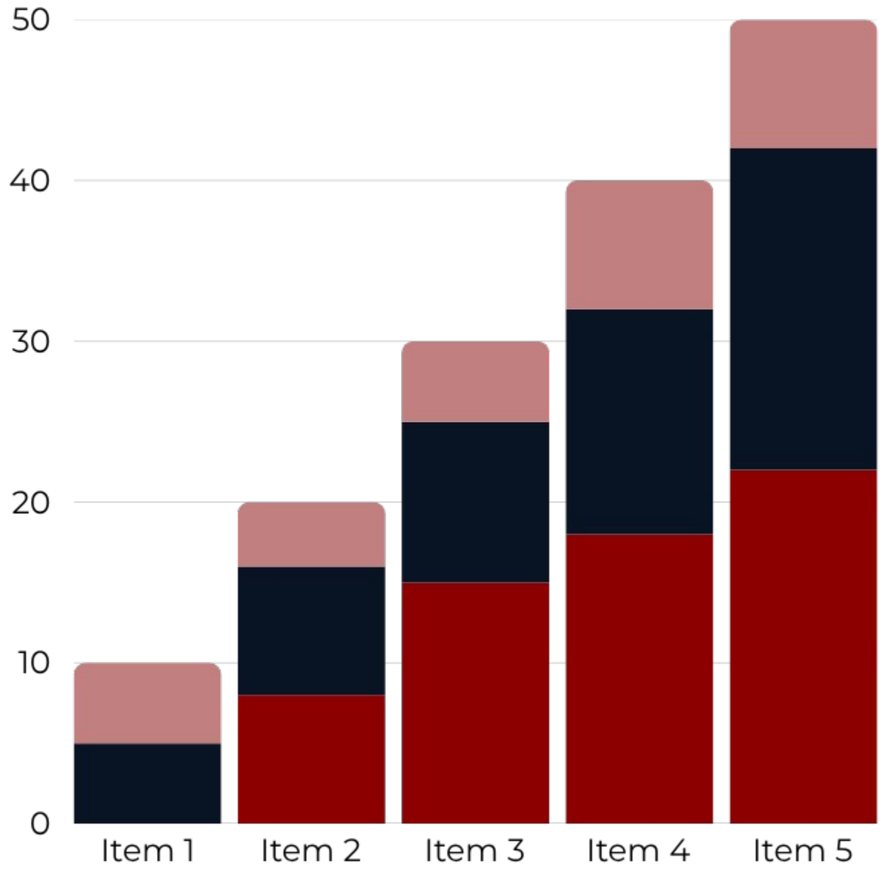
Parameter	Nilai
Epochs	50
Batch size	32
Image size	640x640
Optimizer	AdamW
Dataset	Roboflow Human Detection
Framework	Ultralytics YOLOv8



Model Training using Yolov9, Yolov8m, and Yolov8n

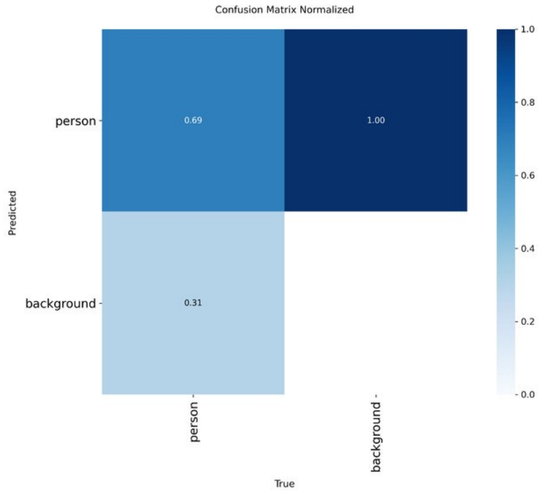
COMPARISON

Model	Presisi	Recall	mAP50	mAP50-95
YOLOv8m	8.177	6.624	7.424	4.682
YOLOv8n	8.579	7.539	8.330	6.015
YOLOv9				



YOLOV8M RESULTS

1



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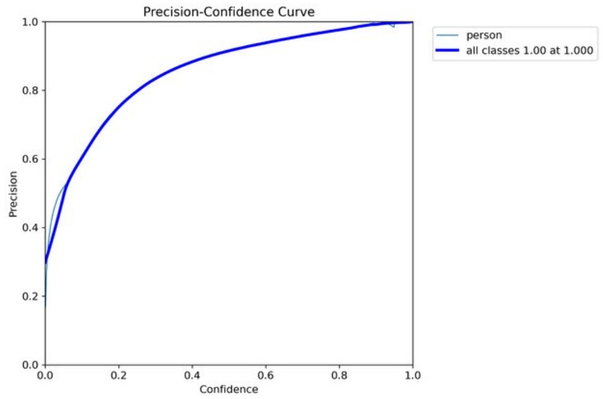

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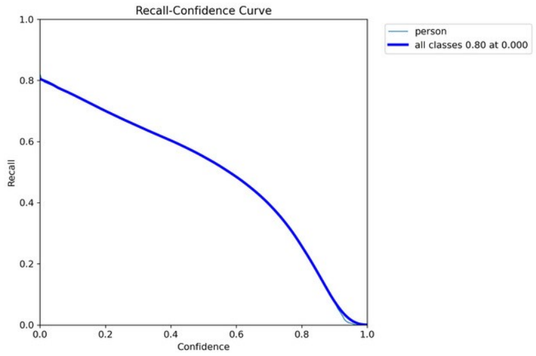

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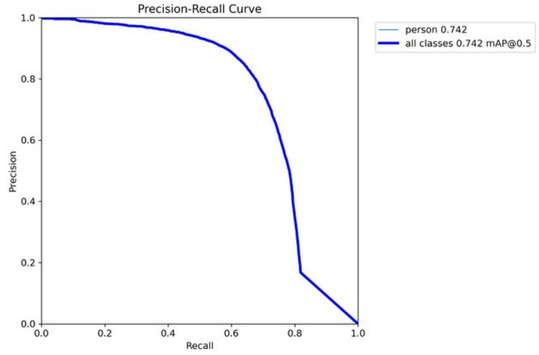
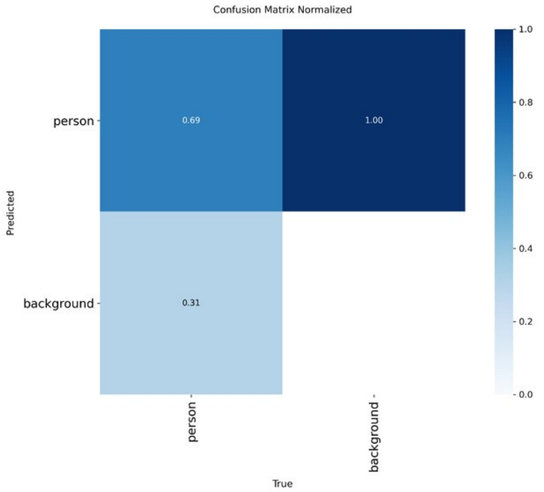
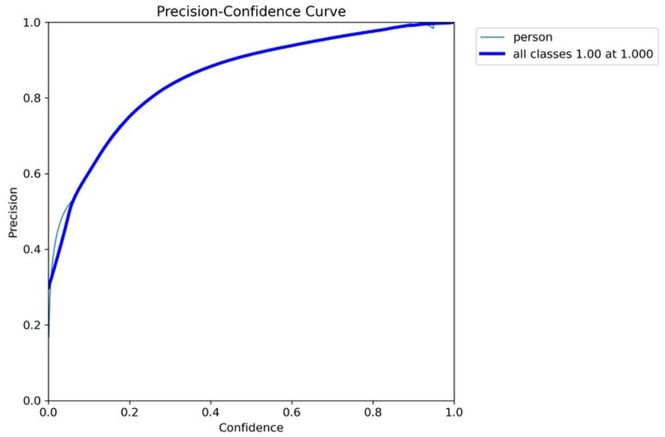


YOLOV8N RESULTS

1





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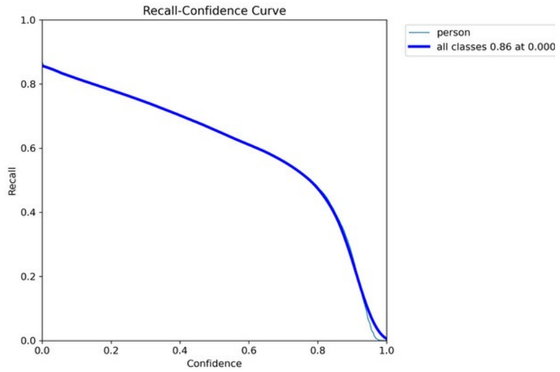

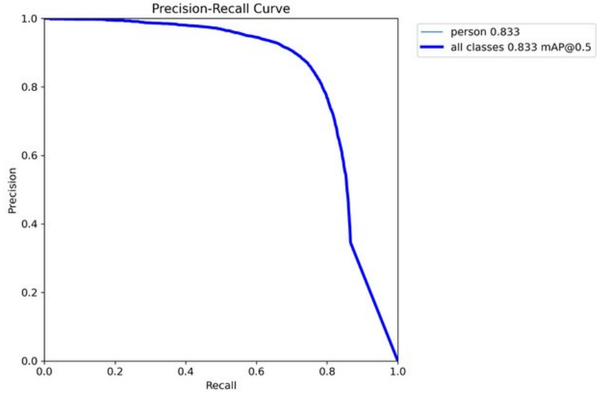

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Conclusion and Future Work

- YOLOv provides accurate and efficient human detection and tracking.

Future Work:
Using various images for powerful performance

THANK YOU