PROJECT: MULTI-OBJECT TRACKING

DESCRIPTION:

This project implements a complete end-to-end Multi-Object Tracking (MOT) pipeline using the SORT algorithm and evaluates tracking accuracy with the MOT metrics library.

The system reads an image sequence, detects and tracks multiple moving objects, generates a bounding-box video output, saves tracking results, and computes key metrics such

PROJECT STRUCTURE:

img1/ → Folder containing all input image frames

(.jpg) gt.txt → Ground truth data file moto_track.py →

Main Python file (tracking + evaluation)

tracking_results.txt → Auto-generated tracking output

output_video.mp4 → Video with bounding boxes

drawn on tracked objects mot_metrics_summary.txt

→ Evaluation summary of tracking results

README.txt → This documentation file

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SETUP & EXECUTION STEPS:

1■■ INSTALL REQUIRED LIBRARIES

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pip install numpy opencv-python motmetrics

2■■ PREPARE THE DATASET

Place all image frames in a folder named img1 (as provided by your professor).

Ensure gt.txt (ground truth file) is in the same project directory.

3■■ RUN THE MAIN SCRIPT

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python moto_track.py

This will:

- Read frames from img1/
- Perform object detection and tracking using SORT
- Draw bounding boxes and object IDs on each frame
- Save tracking results to tracking_results.txt
- Generate an output video output_video.mp4
- Evaluate performance using gt.txt
- Save evaluation summary to mot_metrics_summary.txt

4■■ VIEW RESULTS

Processing 145 frames...

Video saved to: output_video.mp4

Tracking results saved to:

tracking_results.txt Evaluating tracking

performance...

MOTA (Multiple Object Tracking Accuracy): 62.53%

MOTP (Multiple Object Tracking Precision): 0.7784

OUTPUT FILES EXPLAINED:

output_video.mp4 → Video showing object tracking

with bounding boxes tracking_results.txt → Contains

[frame, id, x, y, w, h] for each detection

mot_metrics_summary.txt → Contains computed MOT

metrics summary gt.txt → Ground truth for evaluation

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FINAL PERFORMANCE:

Frames Processed: 145

MOTA (Accuracy): 62.53%

MOTP (Precision): 0.7784

False Positives: 0

Misses: 284

Switches: 9

NOTES:

Ensure that the image filenames are continuous (000001.jpg, 000002.jpg, …)

- Both tracking and evaluation are performed automatically by moto_track.py- You can improve tracking accuracy by adjusting SORT parameters such as: max_age, min_hits, and iou_threshold