

# Lightweight Thermal Multi-Object Tracking without Heavy Re-ID

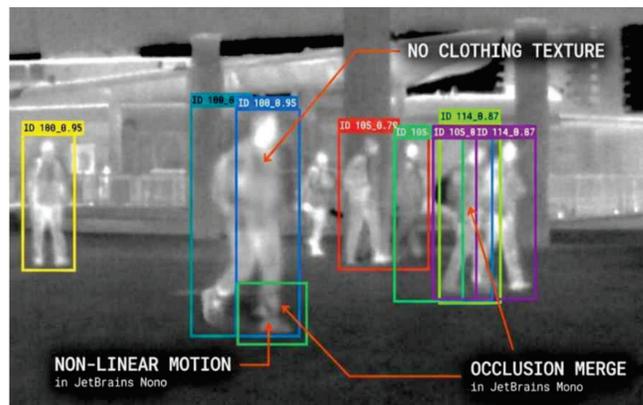


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TL;DR: YOLOv8 + optimized tracking pipeline achieved MOTA 99% & IDF1 5%p higher than SOTA model!

## CHALLENGE FOR TMOT



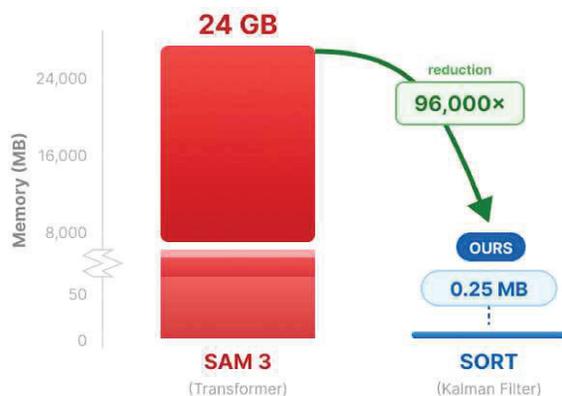
### Most methods:

- Add **complex motion** models
- Use **heavy Re-ID** networks
- **Increase** computational cost

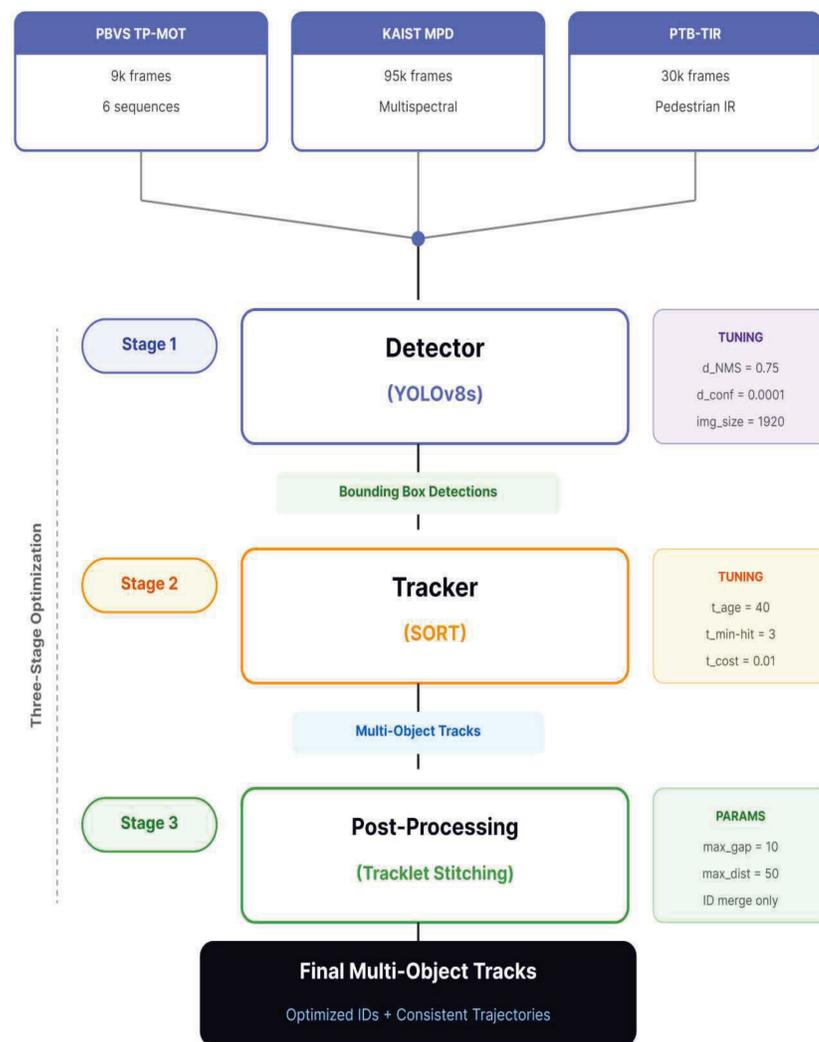
### OUR INSIGHT:

Stage-wise parameter tuning achieves strong identity preservation in thermal MOT — **no heavy Re-ID needed.**

## MEMORY EFFICIENCY



## FRAMEWORK DIAGRAM



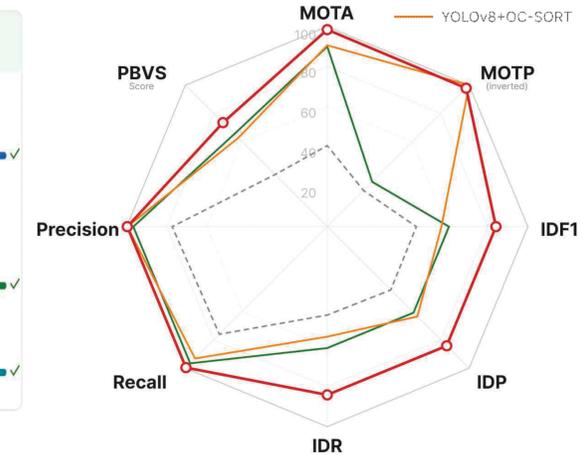
## VIDEO EXAMPLE



## IDF1 VISUAL EXPLANATION



## PERFORMANCE



Rank	Team	Affiliation	MOTA	MOTP	IDF1	Weighted Result
★	UW_IPL Ours	University of Washington	0.99 ▲	0.13	0.86 ▲	0.74
— PBVS 2025 TP-MOT Challenge Official Results —						
1	AutoSKKU	Sungkyunkwan University	0.98	0.13	0.81	0.71
2	Fh-IOSB	Fraunhofer IOSB	0.82	0.14	0.86	0.55
3	HNU-VPAI	Hunan University	0.75	0.19	0.71	0.42

## CONTRIBUTION

- Optimized Sensitivity:** Decoupled detection and tracking tuning for thermal precision.
- High Efficiency:** Eliminated Re-ID computational cost, ideal for real-time applications.
- Thermal Robustness:** Maintained consistent IDs even in texture-scarce environments.

## FUTURE DEPLOYMENT

- Target Device:** Embedded systems: NVIDIA Jetson Orin, Raspberry Pi
- Next Step: RGB-T Fusion Tracking:** Integrating RGB sensors for all-weather, day/night tracking
- Applications:** Drone Surveillance, Search and Rescue (SAR) operations