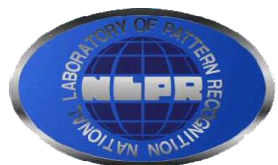


A Twofold Global Model for Anti-UAV Tracking

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● Characteristics of Anti-UAV Dataset

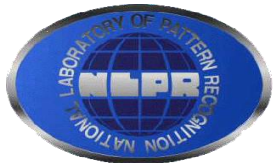
- 1, No distractors of similar objects;
- 2, Slight deformation of target object;
- 3, Fast motion challenge;
- 4, Re-appearing point is not the vanishing point.

● Characteristics of Evaluation

No extra penalty of tracker drift.

● Our Main Strategy

Regard this challenge as a global tracking task.

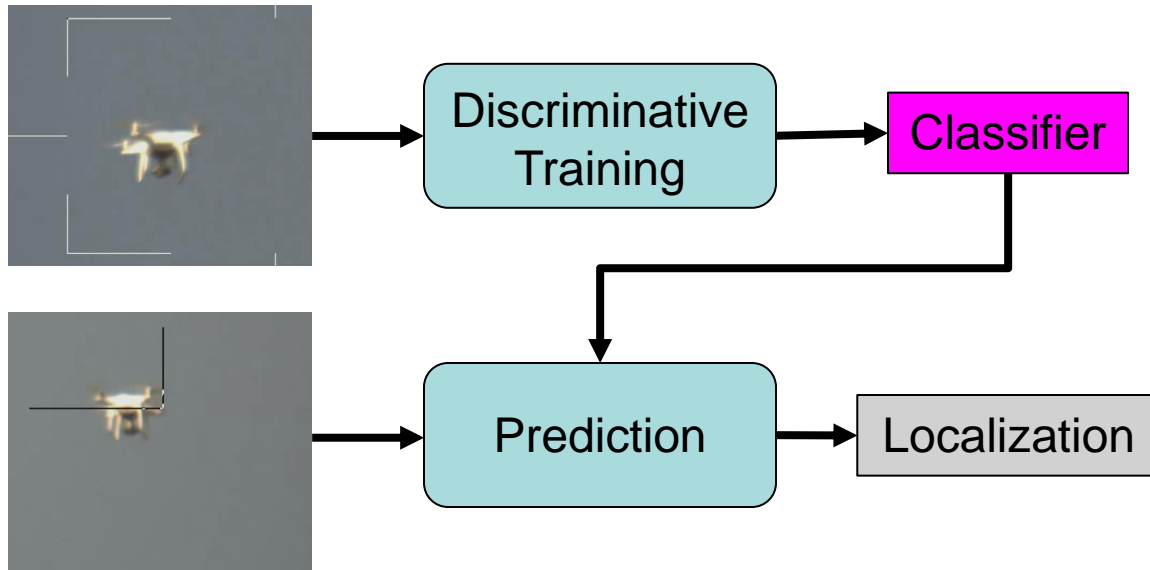


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● GlobalDiMP Branch



DiMP is an end-to-end trainable tracking architecture, capable of fully exploiting both target and background appearance information for target model prediction.

DiMP [1]

Perform discriminative model training and prediction.

Learning and detection
in the local region of target.

Online model update.

ATOM [2] scale.

GlobalDiMP

Learning and detection
in the global input image.

Model update when necessary.

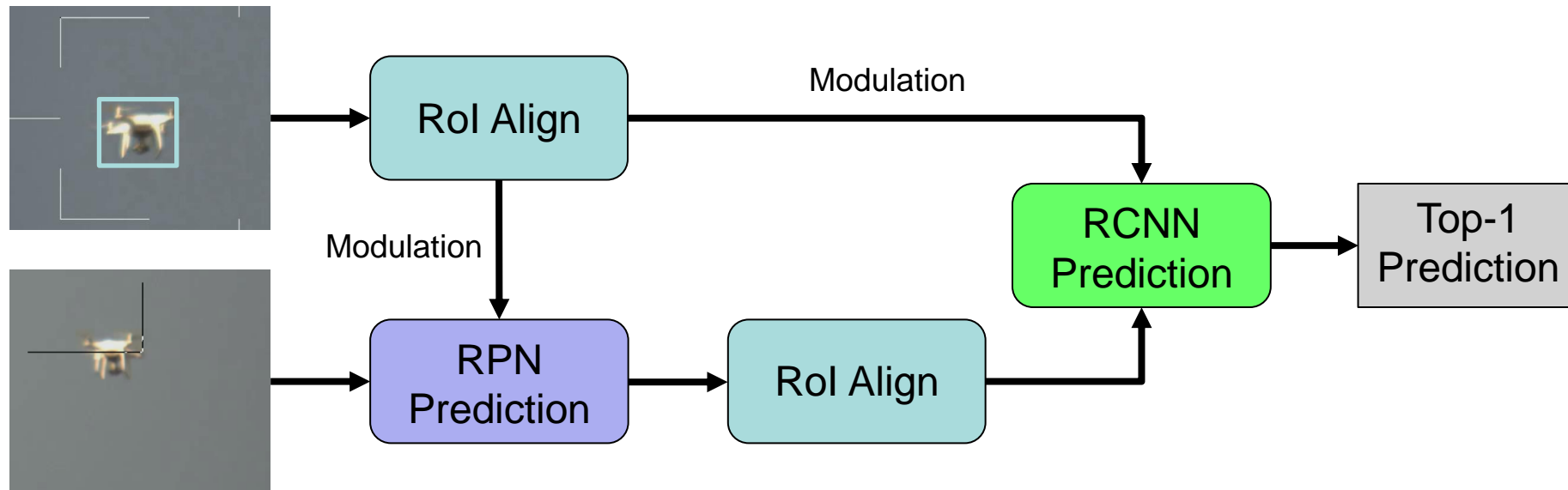
ATOM + SAMF [3] scale.

Our improvement of DiMP, GlobalDiMP, is more suitable to this challenge, where targets will not undergo large deformations and global tracking is indeed needed.

- [1] Bhat, Goutam, et al. "Learning discriminative model prediction for tracking." *IEEE International Conference on Computer Vision*. 2019.
- [2] Martin Danelljan, et al. "ATOM: Accurate Tracking by Overlap Maximization." *IEEE Computer Vision and Pattern Recognition*. 2018.
- [3] Yang Li, et al. "A Scale Adaptive Kernel Correlation Filter Tracker with Feature Integration." *European Conference on Computer Vision*. 2014.

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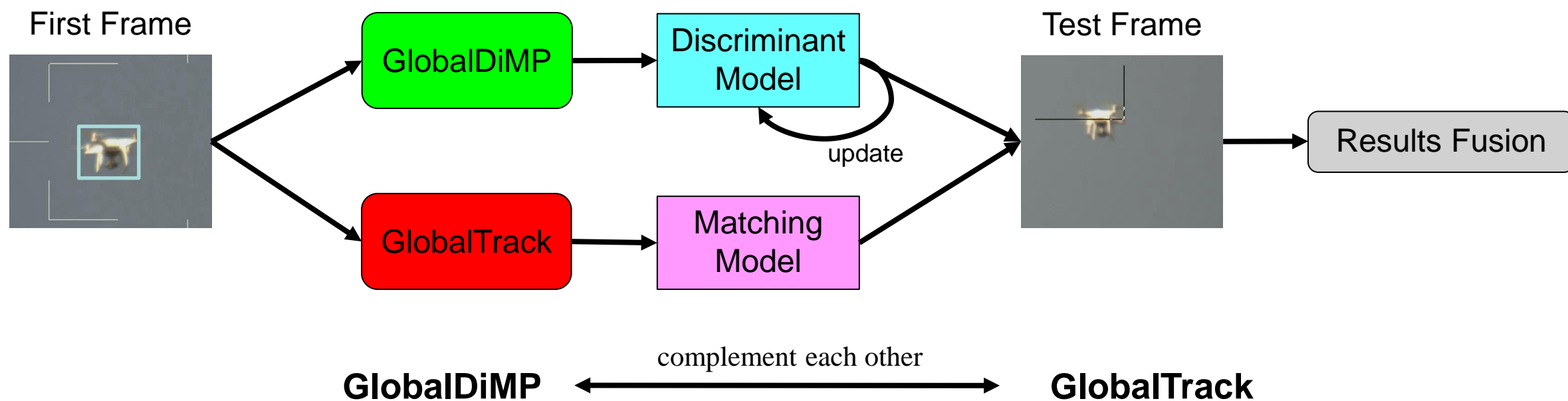
- **GlobalTrack Branch**



GlobalTrack [4] is a pure global instance search based tracker that makes no assumption on the temporal consistency of the target's positions and scales. It is developed based on two-stage object detectors, and it is able to perform full-image and multi-scale search of arbitrary instances with only a single query as the guide.

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● Fusion of GlobalDiMP Branch and GlobalTrack Branch



Based on discriminative model training.

Refine with maximize IoU.

Strong discriminative power to backgrounds.

Based on template matching.

Refine with bounding box regression.

Strong robustness to target object.

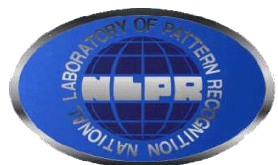
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● Implementation Details

- 1, Backbone Network: Resnet-101;
- 2, Training Datasets:
GlobalDiMP: COCO+LaSOT+TrackingNet+GOT10k,
GlobalTrack: COCO+GOT10k+LaSOT;
- 3, Training with gray images;
- 4, Testing with infrared images only;
- 5, Post-processing:
Expand the fusion output scales of targets slightly.
Smooth the above output scales in an average-moving way.

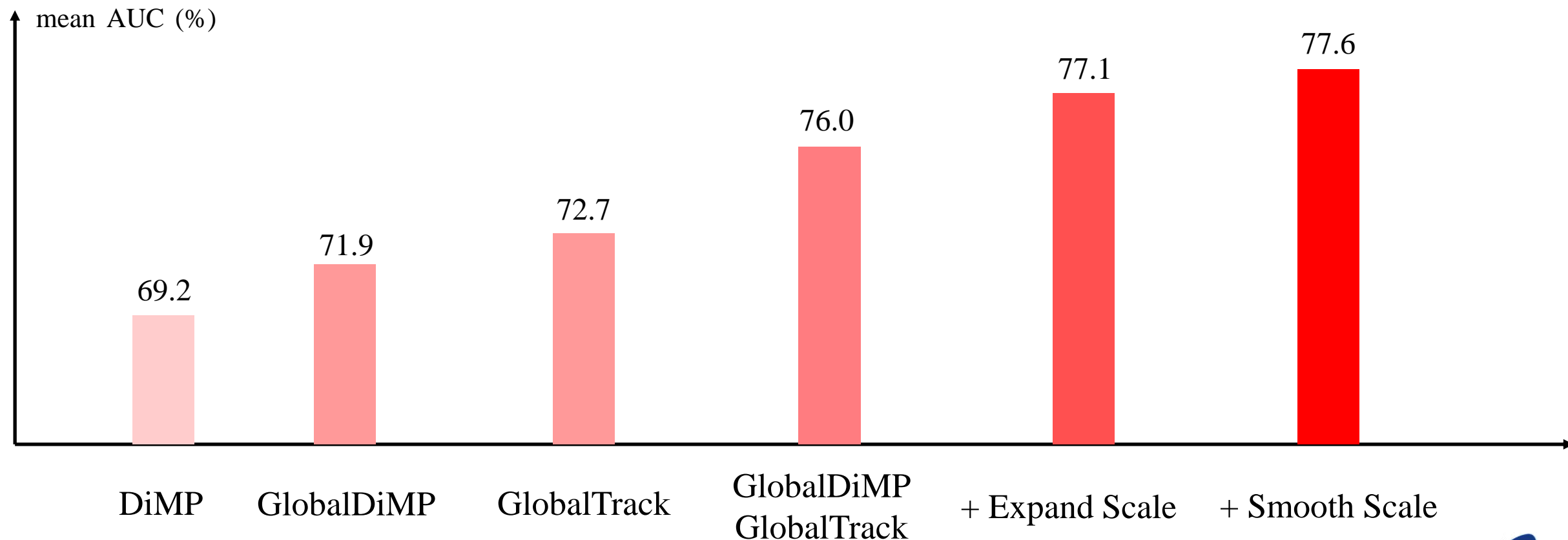
● Result on test-challenge of Anti-UAV

Rank	Team Name	Tracking Accuracy
1	xiaobaibai	0.7381
2	zhaoxingjie	0.7346
3	tominute	0.7338
4	banaani	0.7326
5	yukawa	0.7301
6	xjtuwh	0.7233
7	Midkey	0.7120
8	uavdet20	0.7033
9	antiuav2020	0.6786
10	krislhh	0.6394



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● Ablation Studies on test-dev of Anti-UAV



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Thank you!



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