

Learning to Focus and Track Extreme Climate Events

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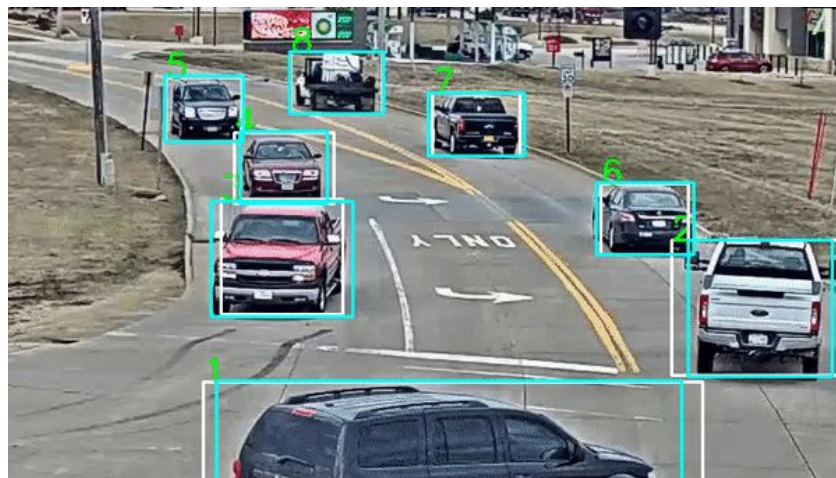
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Object Tracking

- Given a video, locating one or more moving objects over time
- May track object center, bounding box, or segmentation, ...



Single object tracking



Multi-object tracking

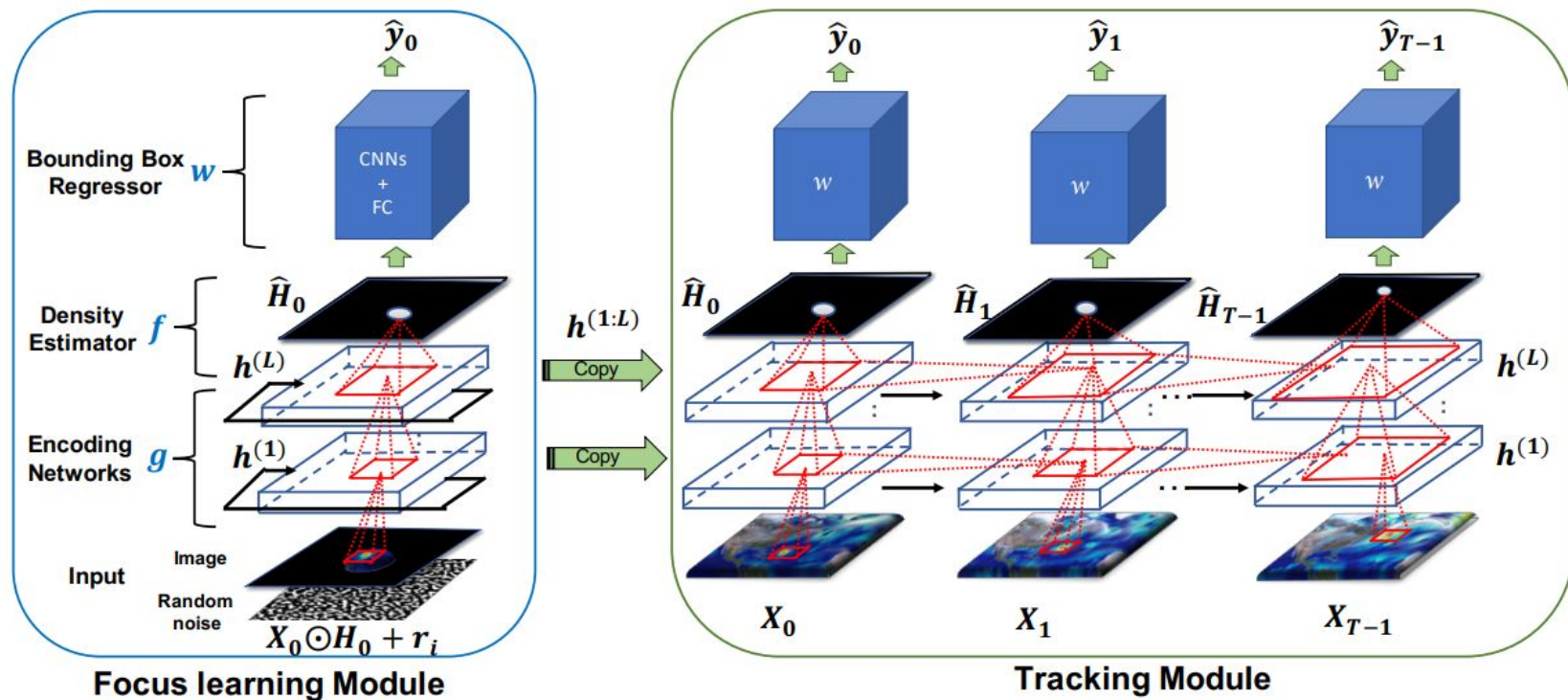
Extreme Climate Event Tracking



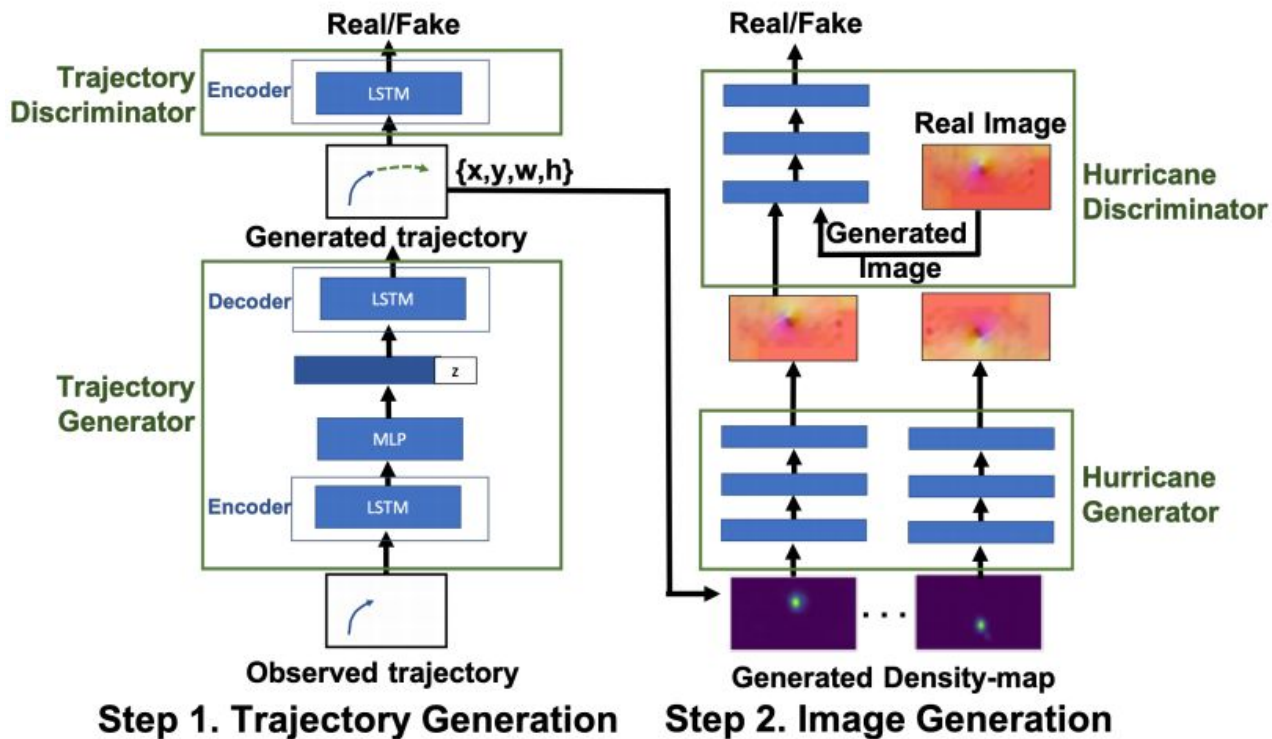
Extreme Climate Event Tracking: Why difficult?

- **Longer-term** and **wider-range** spatio-temporal dynamics (butterfly effect) between multiple scientific variables
- Target is **not a rigid body**, flexibly changing shape with **no clear boundary**
- **Difficult to distinguish** them visually from each other
- **Data collected sparsely** (both temporally and spatially)
 - Occurs rarely
 - Requires special devices installed in the wild

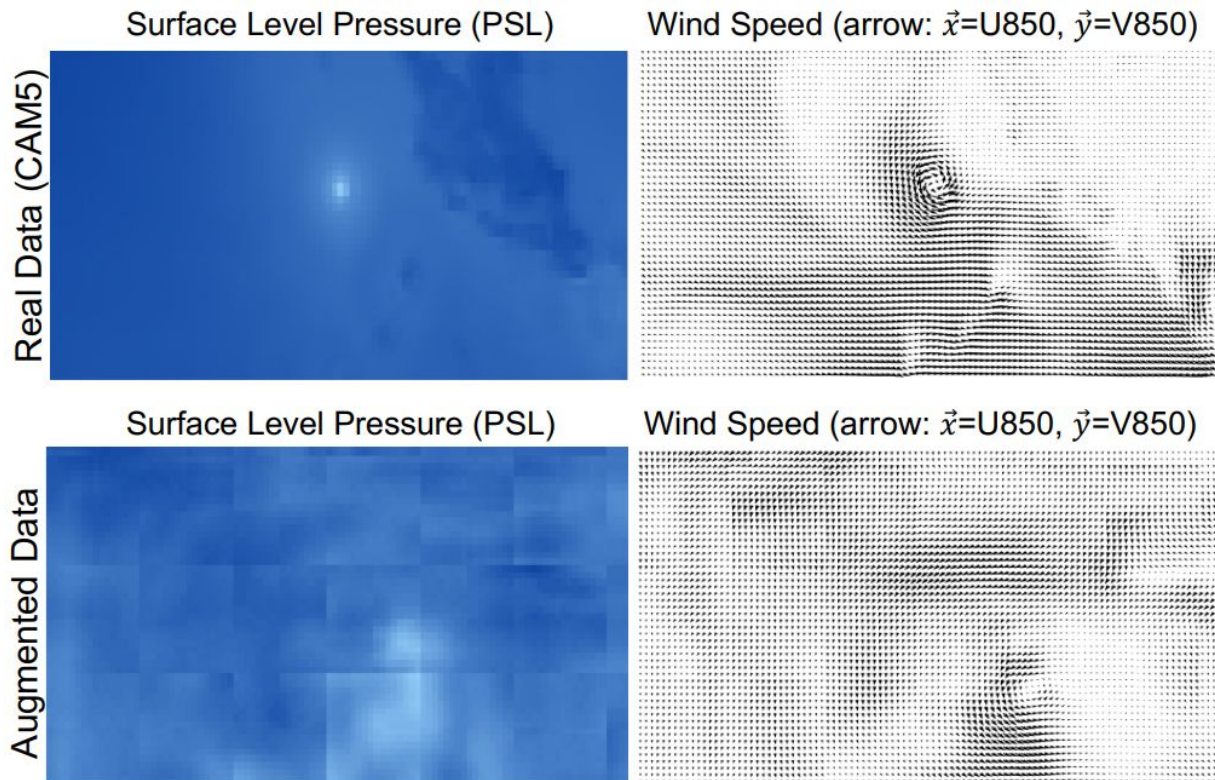
Our Model



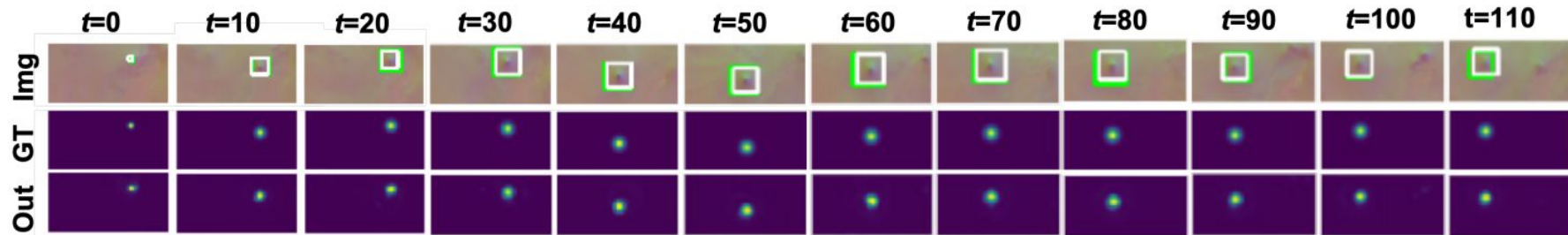
Data Augmentation



Qualitative Evaluation: Augmented Data

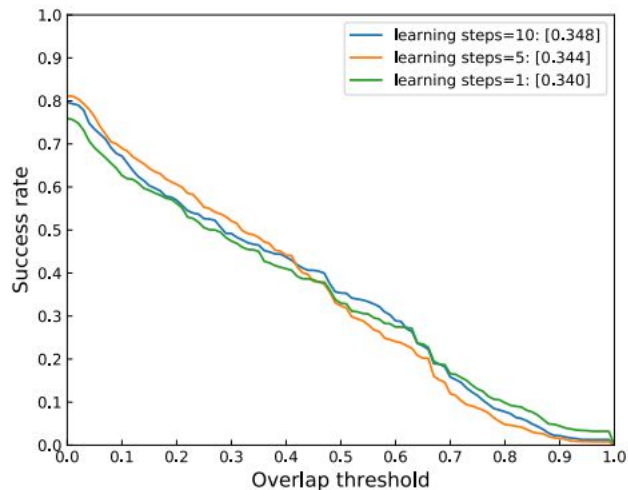


Qualitative Evaluation: Tracking



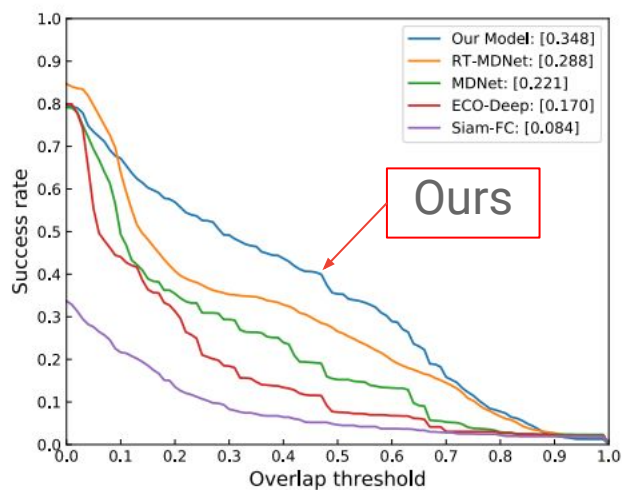
Quantitative Evaluation

(a) Comparison with Different Sizes of Focus Learning Steps



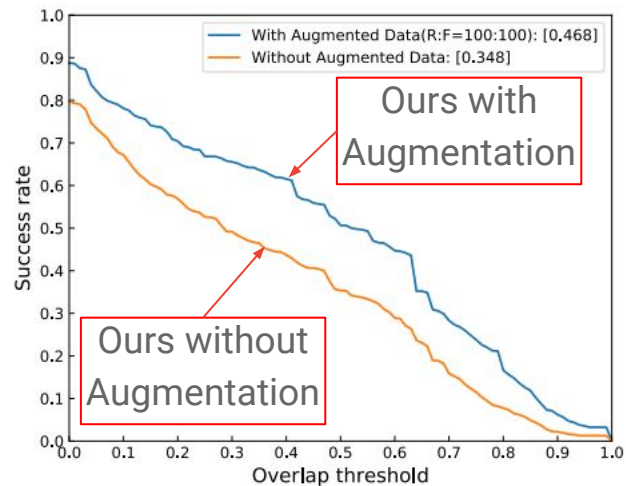
Ablation study

(b) Comparison with Baselines



Comparison to SOTA

(c) Comparison with Augmented Data



Effect of Data Augmentation

Thank you!