

Region-Based Multiscale Spatial-Temporal Saliency for Object Detection from Video

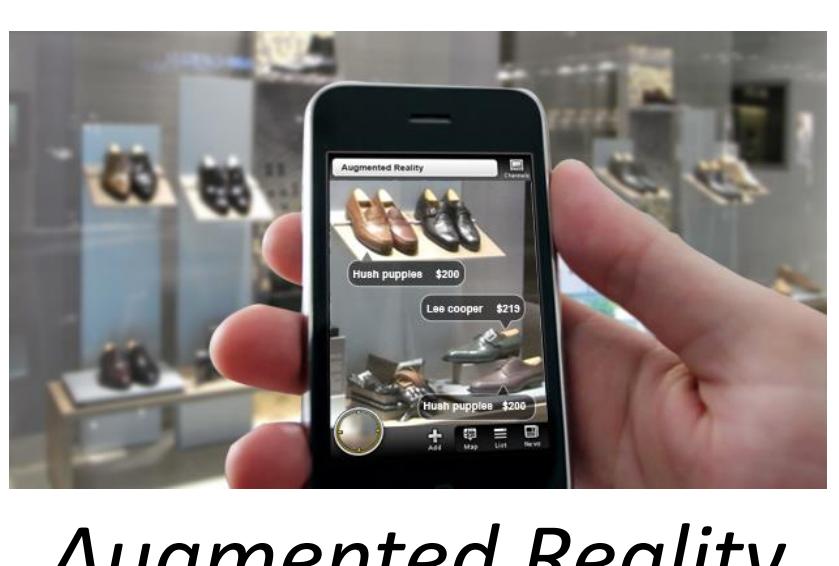
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Motivation

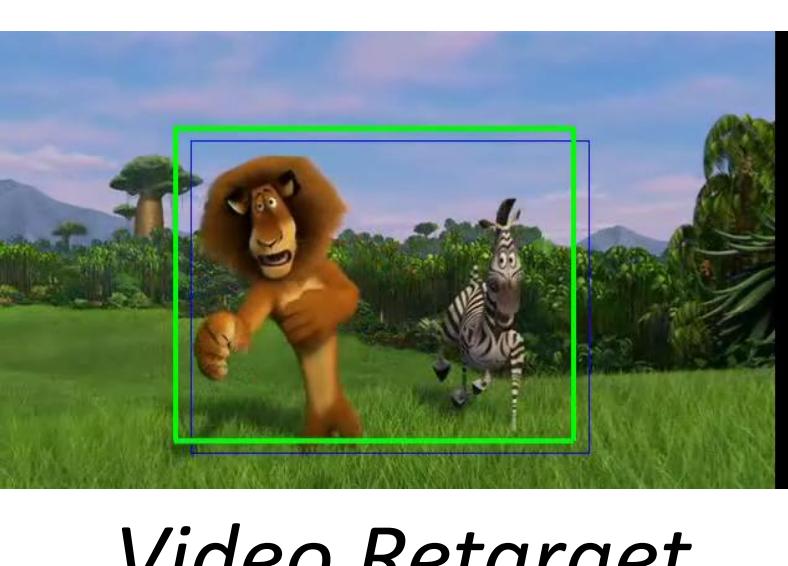
- Detecting salient objects in videos for multimedia and computer vision applications.



Robot Navigation



Augmented Reality



Video Retarget

Approach

- Combining static and dynamic features from the low and middle levels in a segmentation pyramid model.
- Utilizing spatial features of each frame and temporal features across frames.
- Developing adaptive temporal window to keep temporal consistency across frames.

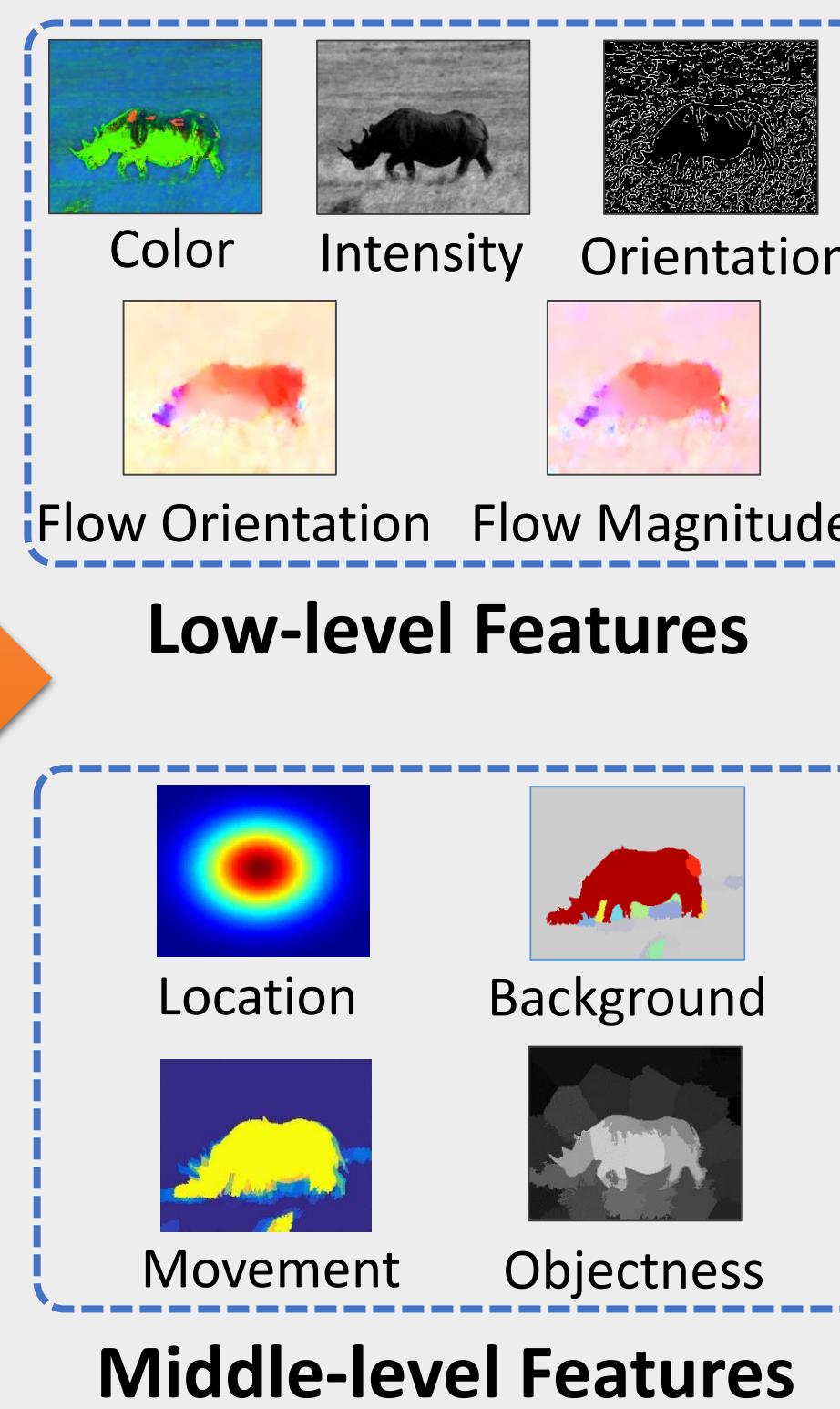
Proposed Method

Multiscale Segmentation Pyramid



J. Chang et al., video representation using temporal superpixels, CVPR, 2013.

Spatial Saliency Entity Construction



Contrast Calculation



Low-level Feature Map

Linear Calculation

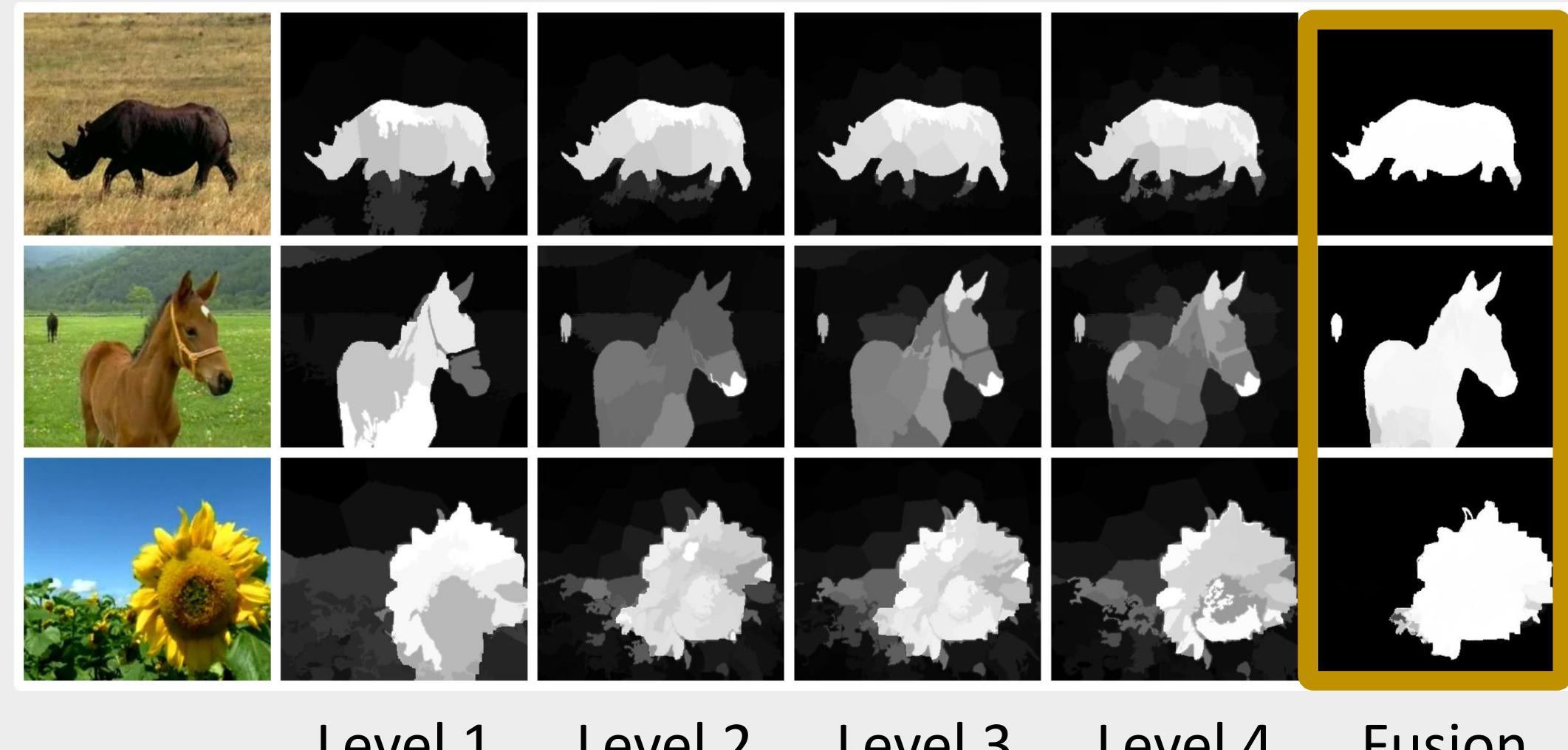


Middle-level Feature Map



Spatial Saliency Entity

Multiscale Fusion

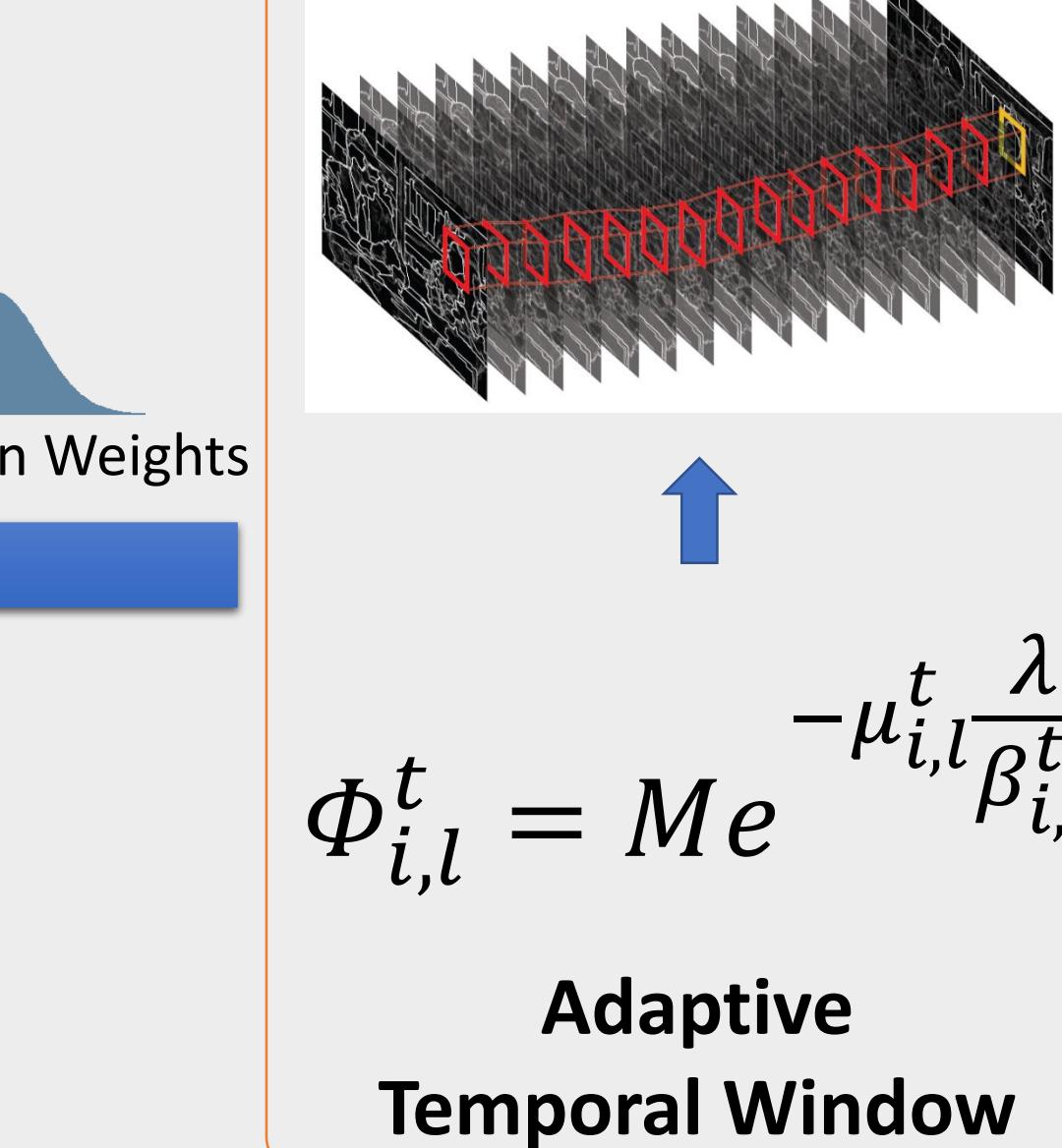


Y. Qin et al., Saliency detection via cellular automata, CVPR, 2015.

Incorporating temporal consistency

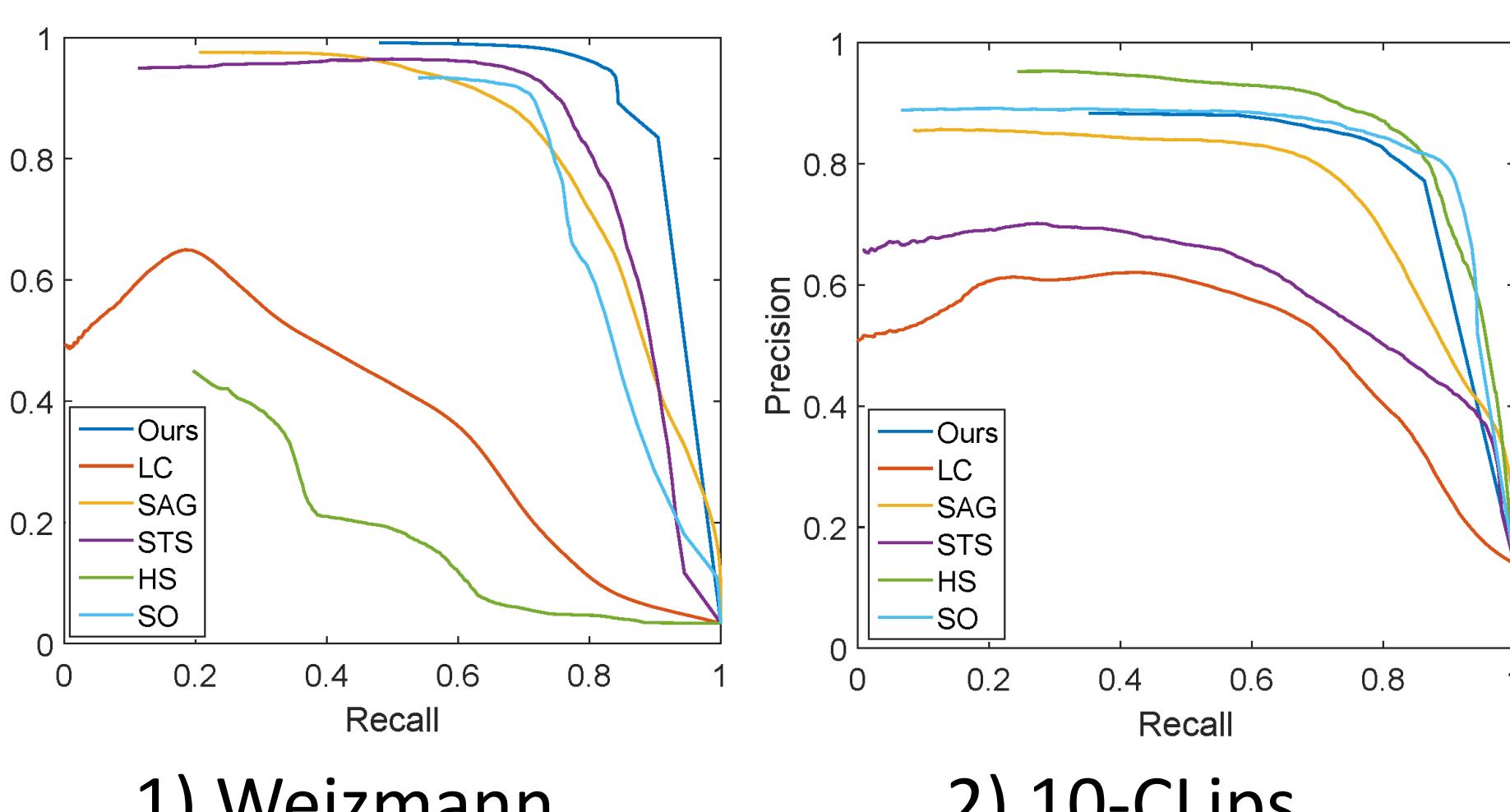


$$\Phi_{i,l}^t = Me^{-\mu_{i,l}^t \frac{\lambda}{\beta_{i,l}^t}}$$



Evaluation and Results

Evaluation on 4 public datasets (Weizmann, 10-Clips, JHMDB, MCL) by comparing with several state-of-arts (LC[1], SAG[2], STS[3], HS[4], SO[5]).

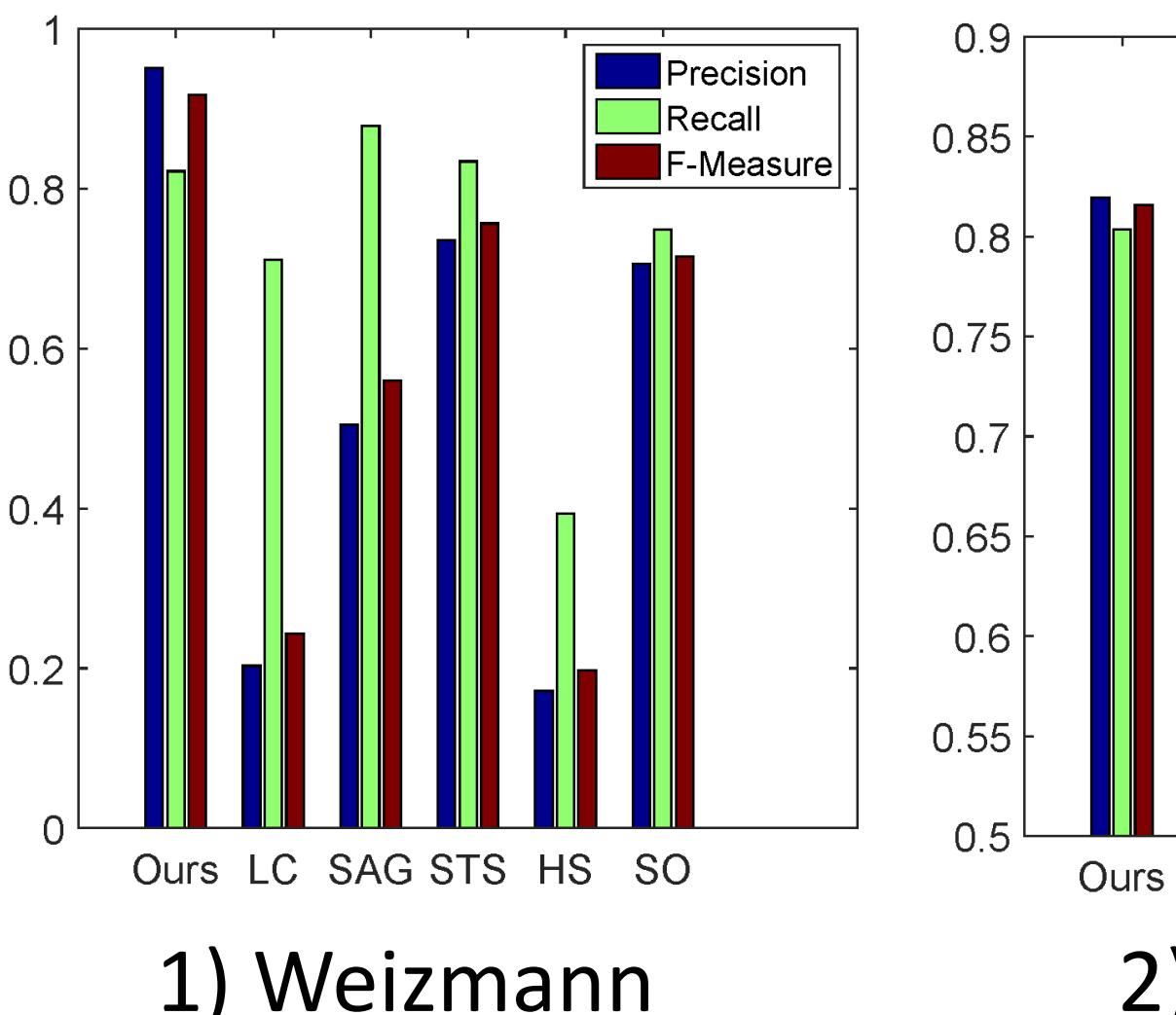


1) Weizmann

2) 10-Clips

3) JHMDB

4) MCL

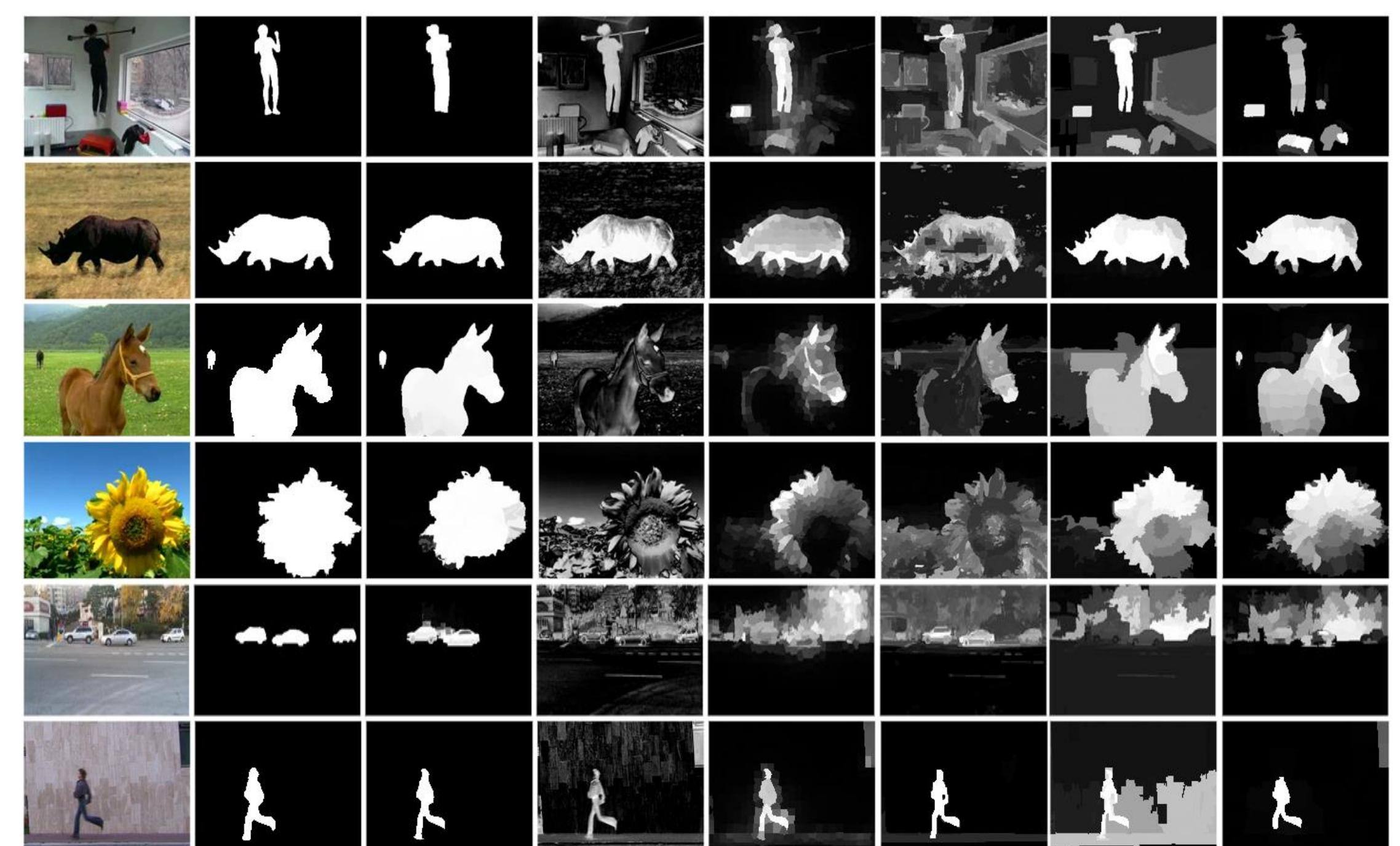


1) Weizmann

2) 10-Clips

3) JHMDB

4) MCL



- [1] Visual attention detection in video sequences using spatiotemporal cues, MM, 2006.
 [2] Saliency-aware geodesic video object segmentation, CVPR, 2015.
 [3] Time-mapping using space-time saliency, CVPR 2014.
 [4] Hierarchical saliency detection, CVPR 2013.
 [5] Saliency optimization from robust background detection, CVPR 2014.