Unsupervised Region-Growing Network for Object Segmentation in Atmospheric Turbulence

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New Approach Limits Distortion for Long-Range Computer Vision Applications

Researchers at Arizona State University, Clemson University and George Mason University developed a two-stage unsupervised foreground object segmentation network designed to reduce distortion in dynamic scenes affected by atmospheric turbulence. The algorithm generates robust optical flow feature maps, which are resilient to the effects of turbulence and may be used to produce initial coarse masks for each object in every frame. This method does not require labeled training data and works across varied turbulence strengths for long-range video.

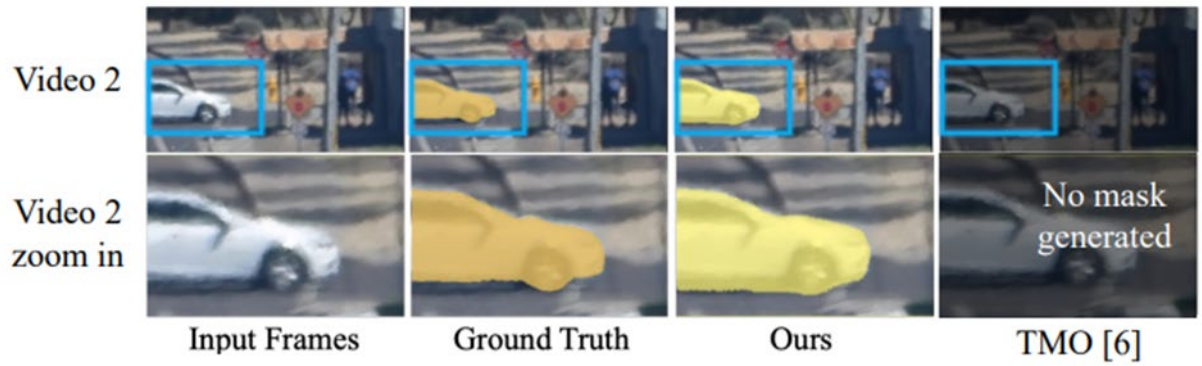
Foreground and background segmentation is an important part of computer vision tasks including surveillance, remote sensing, and environmental monitoring. However, in long-range imaging for outdoor environments, substantial image distortions can occur due to atmospheric turbulence. Distortions limit the effectiveness of segmentation methods, which obscure crucial details including the separation between foreground and background elements, causing blurred and distorted moving objects in dynamic scenes, thereby hindering reliable segmentation and tracking.

Potential Applications:

- Long-range imaging in outdoor environments
- Surveillance
- Remote sensing
- Environmental monitoring

Benefits and Advantages

- Resilient to degradations caused by atmospheric turbulence
- Generates optimized and robust optical flow feature maps
- Evaluated against real-world data to improve accuracy
- Labeled training data not required for algorithm



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