Supplementary for Video Segmentation via Multiple Granularity Analysis

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1. Sweeping Line Sampling

In the proposed method, we form a pack of four concussive frames to conduct MIL method, even though in illustration figures we put three frames to keep the figures simple and clear. As explained in our paper, we use a sweeping-line method to sample positive and negative bags. Within bounding boxes, each sweeping line should contain at least one positive superpixel as an instance, and outside bounding boxes, there is no positive superpixels. This process is presented in Figure 1.

2. Results

Figure 2, Figure 3 and Figure 4 present visual results for our methods and comparison between different methods. In Figure 2 and Figure 3, we present final refined results as well as superpixel-level segmentation results, while in the last figure we give only a comparison between the proposed method as well as other state-of-the-art methods [1, 2].

References

[1] N. Märki, F. Perazzi, O. Wang, and A. Sorkine-Hornung. Bilateral space video segmentation. In CVPR, 2016. 1, 2, 3, 4

[2] A. Papazoglou and V. Ferrari. Fast object segmentation in unconstrained video. In ICCV, 2013. 1, 2, 3, 4



Figure 1. Sweeping line method for MIL. We sample positive bags within bounding boxes and negative bags outside bounding boxes. Width for horizontal sweeping line equals width of the bounding boxes, and same for height of vertical sweeping line. Bags for a pack of frames are calculated together to maintain temporal consistency. As explained in our paper, topological information included by adding a constraint on neighbouring superpixels.



Figure 2. [1] results in column 1, [2] results in column 2. Superpixel-level MIL results in third column and our final results in last column.



Figure 3. [1] results in column 1, [2] results in column 2. Superpixel-level MIL results in third column and our final results in last column.



Figure 4. First column for original images, [1] results in column 2, [2] results in column 3. Our final results in last column.