



# Saliency Cuts Based On Adaptive Triple Thresholding

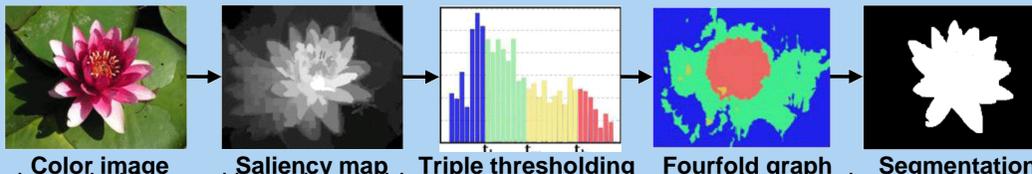
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**Abstract:** Our segmentation approach using unsupervised seeds generation and GrabCut. We take a saliency map as input, and produce four kind seeds using adaptive triple thresholding. Then we fed these seeds to GrabCut framework. A high quality object mask is generated by iteratively optimization. Our approach can fit in well with the state-of-the-art saliency object detection methods. The experiments show the effectiveness of our method.

**Key idea:**



We introduce global threshold  $t_m$  and local threshold  $t_l, t_h, t_m$  segment the gray histogram into set  $T_b, T_t, T_l, T_h$  segment it into set  $T_{cb}, T_{pb}, T_{pf}, T_{cf}$ .

$$t_m = \operatorname{argmax}[w_b(u_t - u_b)^2]$$

$$\{t_l, t_h\} = \operatorname{argmax} \sum w_{cb}w_{pb}(u_{cb} - u_{pb})^2 + w_{pf}w_{cf}(u_{pf} - u_{cf})^2$$

where  $w_i$  is the weight of  $T_i$ , and  $u_i$  are the mean saliency values of  $T_i$ . The saliency map is segmented by three threshold into fourfold graph. Use fourfold graph to initial the Grab Cut algorithm and get the segmentation results.

**Experiments:** We evaluate our method on MSRA 10k dataset [1] and compare it with: Otsu [2], frequency-tuned (FT) [3], auto-labeling [4], automatic salient region extraction (ASRE) [1]. Fig.1.are some examples of our segmentation results. Fig.2. gives the precision, recall and  $F\beta$  values of different methods. Comprehensively, our  $F\beta$  is higher than other three methods except ASER. But experiments show that ASRE is subject to missing part of salient object (Fig.3.third row) and our method (fourth row)can avoid such problem and get integral salient object.

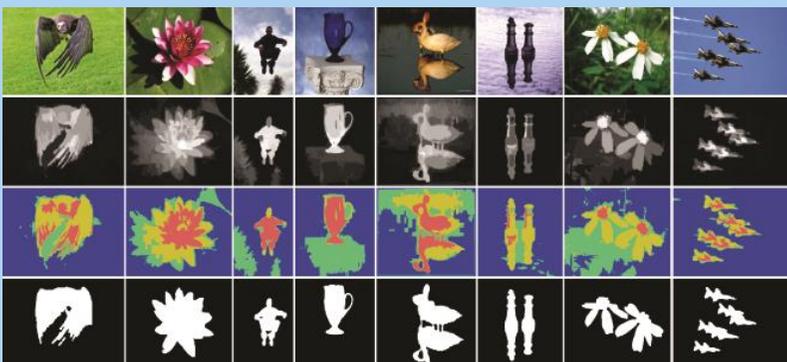


Fig.1. Examples of saliency cuts results

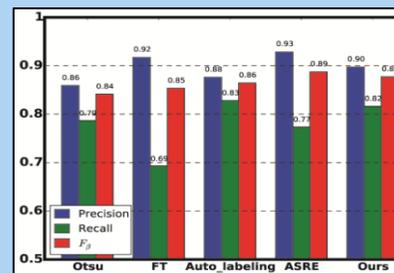


Fig.2. Evaluation of five methods

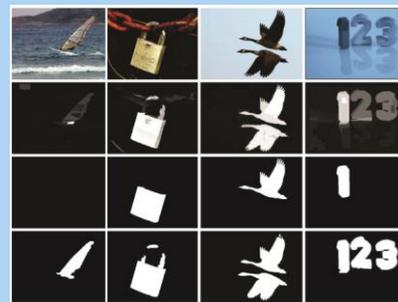


Fig.3. Comparison of ASRE and our result

## Reference:

- [1] Cheng MM, Zhang GX, Mitra NJ, Huang X, and Hu SM. Global contrast based salient region detection. *TPAMI*, 37(3):409-416, 2015.
- [2] Otsu N. A threshold selection method from gray-level histograms. *TSMC*, 9(1):62-66, 1979.
- [3] Achanta R, Hemami S, Estrada F, and Susstrunk S. Frequency-tuned salient region detection. *CVPR*, 1597-1604, 2009.
- [4] Fu Y, Cheng J, Li Z, and Lu H. Saliency cuts: An automatic approach to object segmentation. *ICPR*, 1-4, 2008.