

Retargeting Operators

Retargeting operators currently used in our study and benchmark. When applicable, we link to the author's paper and project website. Please refer to the [supplemental document](#) for a more detailed description of each method.

1	Cropping	CR	Manually choosing the best window of the target size from the original image
2	Streaming Video	SV	<i>A System for Retargeting of Streaming Video</i> - Krähenbühl et al. 2009 [paper]
3	Mutli-operator	MULTIOP	<i>Multi-operator Media Retargeting</i> - Rubinstein et al. 2009 [paper] [website]
4	Seam Carving	SC	<i>Improved Seam Carving for Video Retargeting</i> - Rubinstein et al. 2008 [paper] [website] [code]
5	Scaling	SCL	non-uniform scaling with bi-cubic interpolation
6	Shift-maps	SM	<i>Shift-Map Image Editing</i> - Pritch et al. 2009 [paper] [website]
7	Scale-and-Stretch	SNS	<i>Optimized Scale-and-Stretch for Image Resizing</i> - Wang et al. 2008 [paper] [website]
8	Nonhomogeneous warping	WARP	<i>Non-homogeneous Content-driven Video-retargeting</i> . Wolf et al. 2007 [paper] [website]
9	Energy-based deformation	LG	<i>Energy-Based Image Deformation</i> . Karni et al. 2009 [paper]
10	Quadratic Programming	QP	<i>Content-Aware Image Resizing by Quadratic Programming</i> . Freedman et al. 2010 [paper]
11	Object Size Adjusted	OSA	<i>A Content-Aware Image Resizing Method with Prominent Object Size Adjusted</i> . Meiling et al. 2010

* LG and QP were not used in this study as we received their results while the survey was already taking place. However, the results are still included in the benchmark for the benefit of future studies.