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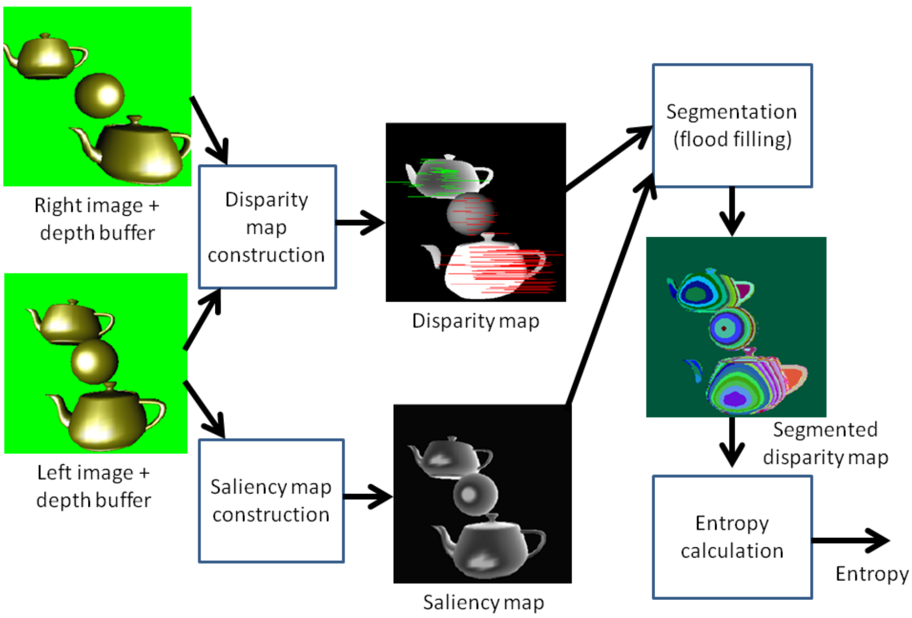
Computational Aesthetics for Rendering Virtual Scenes on 3D Stereoscopic Displays

Having a virtual scene, we can obtain images by setting studio objects like the camera and light sources differently, which are better or poorer in characterizing the scene. To find good studio object settings that lead to expressive images, users usually initiate a long manual search based on trial and error. Computational aesthetic measures can quantify the quality of images in terms of information content. It is intuitive that the purpose of tuning the camera and the lights is to help the user understand more of the scene, i.e. to increase the information arrived at the observer from the scene through the information channel associated with the rendering process. Using information theoretic measures we can automatically select the "better" solution from two alternatives, or optimizing with the objective of maximizing the aesthetic measure, the "best" option can be found.

In stereo imaging two images are rendered for the two eyes, which can reproduce *vergence*, i.e. the phenomenon that the same point is visible in two different directions from the two eyes. The vergence depends on the *interocular distance* and the distance of the point of interest. The vergence can be characterized by the angle difference in which a point is visible from the two eyes, or, expressing it from the point of view of the objects, the translation between the two projections of the same point, which is called the *disparity*. Disparity values of points visible in the pixels constitute the *disparity map*.



The dataflow of the proposed method

In this paper, we propose an algorithm to measure the depth information of a stereo image pair, which is based on the *entropy* of the disparity map, and also takes into account perceptual metrics. With the proposed measures, the parameters of a stereoscopic virtual camera can be optimized, including, for example, the interocular distance.

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