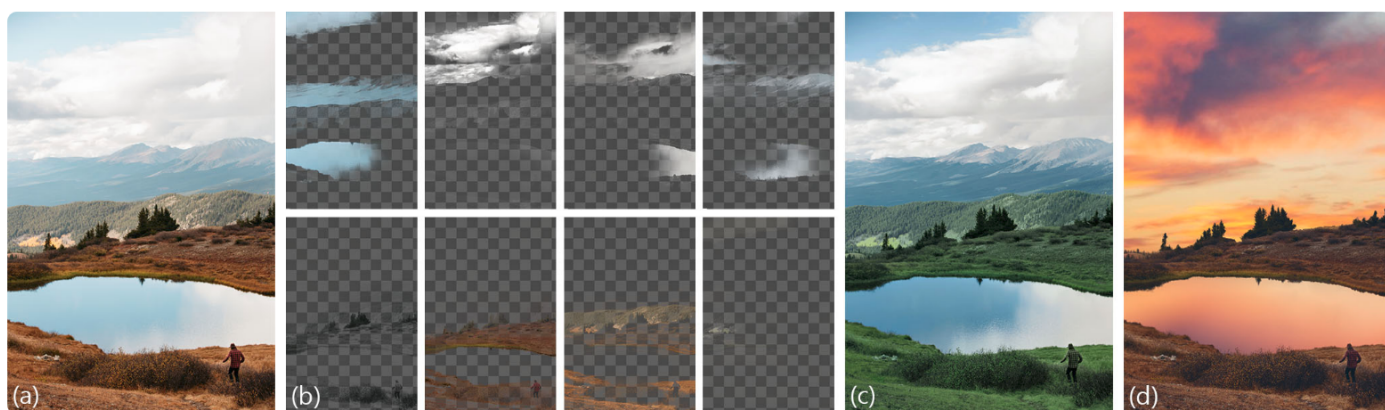# Unmixing-Based Soft Color Segmentation for Image Manipulation

Our method automatically decomposes an input image (a) into a set of soft segments (b). In practice, these soft segments can be treated as layers that are commonly utilized in image manipulation software. Using this relation, we achieve compelling results in color editing (c), compositing (d), and many other image manipulation applications conveniently under a unified framework.

Description :

Soft color segmentation (also known as matting, or color keying) is at the root of many visual effects. It consists in splitting a single image into layers based on its colors. This can be used to restrict an artistic image editing operation to some part of the image, for instance to do selective color grading, shadow removal or green screen integration. While simple ad-hoc methods based on thresholds on color components have been used for a long time, challenges arise when the image features semi-transparent objects or when color variations at multiple frequencies must be isolated. After testing some naive approaches and highlighting their limitations, this projects consists in implementing a more advanced matting from [1]. Once this is reproduced, the hypothesis/priors assumed by the paper could be questioned to develop color keyers specialized to some cases like uniformly colored transparent object or to study how the proposed method plays along with animation. The result of this project is easily usable in traditional image editing software and is a good way to get familiar with the notions of color spaces and color blending.

Nombre d'élèves : 3

Contraintes dures de développement :
- C++ recommended, other choice must be motivated

Difficulté :
- mathématique : medium+
- implémentation : medium

Encadrement :
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Merci de lire l'article de référence avant de prendre contact.

[1] Unmixing-Based Soft Color Segmentation for Image Manipulation, 2017