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COMP.4270 Computer Graphics 1

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Literature Review One

In Interactive High-Quality Green-Screen Keying via Color Mixing, the authors write about a novel algorithm that they've worked out and tested that allows for easier green screen keying methods. They have tested state of the art methods such as the widely used natural matting benchmark, that's among the currently most well known tools. The method employs natural matting to separate layers in a medium. The method, however, evaluates the resulting performance based only on alpha masks but not foreground layers.

The method is successful in accomplishing matting but does not fare very well with green screen-keying.

In addition the commercial software tools that are used in the industry also have difficulty dealing with regions in an image where colors of multiple objects mix. They therefore proposed a novel energy function that attempts to unmix color in a photograph or other medium

The central component of this method is a framework in which a color of a pixel is hypothesized to be a mixture of a number of underlying colors. They then attempt to find the ration of each of the underlying colors in the pixel. This is accomplished by building a model in which the underlying colors in a scene and their mixing ratios are a linear combination that when weighted, gives back the original pixel color.

In Unmixing-Based Soft Color Segmentation for Image manipulation, the authors write about a method of decomposing an image into a set of color segments. These are akin to color layers with alpha channels in the language of image manipulation. This can then lead to various image manipulation

tasks. However, these layers must have retained enough color information in order for them to be meaningfully used during the image manipulation stage. In addition, the colors in every layer should be sufficiently similar.

The authors devise an energy formulation method they call sparse color mixing that produces "compact color segments by favoring fully opaque or transparent pixels."

What these papers have in common is the color-unmixing technique they both employ. However, the respective end goals could not be more different. The technique has been used to get the different. In In the first paper (Green Screen Keying) they use the technique to

The Color Segmentation team borrows the Bayesian methods also used by the Green-screen Keying team, that solve for the alpha (transparency) values first and thereafter estimate the colors.

In conclusion, both these papers employ color-unmixing to accomplish their goals, and even though said goals are quite different, they do intersect. However, the color segmentation method can still be employed during green-screen keying to edit colors, since it's the process is also based on heavy employment of layer-based editing; an editing feature directly following green-screen keying.

References

Interactive High-Quality Green-Screen Keying via Color Unmixing

@article{Aksoy:2016:IHG:2965650.2907940,
 author = {Aksoy, Ya\u{g}iz and Aydin, Tun\c{c} Ozan and Pollefeys, Marc and Smoli\'{c},
Aljo\v{s}a},
 title = {Interactive High-Quality Green-Screen Keying via Color Unmixing},
 journal = {ACM Trans. Graph.},
 issue_date = {September 2016},
 volume = {35},
 number = {5},
 month = aug,
 year = {2016},
 issn = {0730-0301},
 pages = {152:1--152:12},
 articleno = {152},
 numpages = {12},
 url = {http://doi.acm.org.umasslowell.idm.oclc.org/10.1145/2907940},
 doi = {10.1145/2907940},
 acmid = {2907940},
 publisher = {ACM},
 address = {New York, NY, USA},
 keywords = {Green-screen keying, image matting, interactive segmentation, soft segmentation},
}

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    Transactions on Graphics*, vol. 35, no. 5, 2016, pp. 1–12., doi:10.1145/2907940.

Unmixing-Based Soft Color Segmentation for Image Manipulation

@article{Aksoy:2017:USC:3068851.3002176,
 author = {Aksoy, Ya\u{g}iz and Aydin, Tun\c{c} Ozan and Smoli\'{c}, Aljo\v{s}a and Pollefeys,
Marc},
 title = {Unmixing-Based Soft Color Segmentation for Image Manipulation},
 journal = {ACM Trans. Graph.},
 issue_date = {April 2017},
 volume = {36},
 number = {2},
 month = mar,
 year = {2017},
 issn = {0730-0301},
 pages = {19:1--19:19},
 articleno = {19},
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 url = {http://doi.acm.org.umasslowell.idm.oclc.org/10.1145/3002176},
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