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{Annotated Bibliography}

1. Color2gray – Saliency-preserving color2gray

Color-to-gray conversion algorithm based on the human visual system sensitive to local changes. Using 3 user-defined variables, it successfully accomplishes the general color-to-gray problems. However, its complexity is high. The worst case is O(N^4), with the specific parameter O(N^2)

@ARTICLE{Gooch05color2gray:salience-preserving,

author = {Amy A. Gooch and Sven C. Olsen and Jack Tumblin and Bruce Gooch},

title = {Color2gray: Salience-preserving color removal},

journal = {ACM Transactions on Graphics},

year = {2005},

volume = {24},

pages = {634--639}

}

1. Mark D. Fairchild, Color Appearance Models, 2nd Ed., Wiley-IS&T, Chichester, UK (2005).

A book that comprises of various color models and effects. It well explains the pros and cons of The hunt color model. It resolves many negative effects, such as the hunt phenomena.

@article{Fairchild2004\_1,  
        Abstract = {N/A},  
        Author = {Mark D. Fairchild},  
        Journal = {Journal of Vision},  
        Keywords = {},  
        Month = {},  
        Number = {11},  
        Pages = {},  
        Title = {Color appearance modeling: Splicing color science and practical applications,},  
        Url = {},  
        Volume = {4},  
        Year = {2004}}

1. . W. G. Hunt, The Reproduction of Colour, 6th Ed., Voyageur Press

Specific implementation and theories of the Hunt color model is explained.

1. Re-coloring Images for Gamuts of Lower Dimensions

Similar to Gooch et al, it proposes the linear transform that maps the greyscale to the color difference. The linear color mapping onto the axis is optimized for color differences. The quantized color present should have an impact on the results.

@ARTICLE{Rasche05re-coloringimages,

author = {Karl Rasche and Robert Geist and James Westall},

title = {Re-coloring images for gamuts of lower dimension},

journal = {Computer Graphics Forum},

year = {2005},

pages = {423--432}

}

1. Perceptual Evaluation of Color-to-Grayscale Image Conversions

User-study publication. In terms of how visually pleasing, its experiment gives useful information on human visual perceptions and state-of-the-art techniques.

@article{ cadik08perceptual,

author = {Martin {\v{C}}ad\'{i}k},

title = {Perceptual Evaluation of Color-to-Grayscale Image Conversions},

journal = {Comput. Graph. Forum},

volume = {27},

number = {7},

year = {2008},

pages = {1745-1754},

}

1. An Efficient Perception-Based Adaptive Color to Gray Transformation

This may be the first technique that does not have a user-defined variable. Image’s gradient field by colour differences in the Coloroid color space, which is a useful tool to represent aesthetical relationships between colors.

@InProceedings{ cadik07color\_to\_gray,

author = {Laszlo Neumann and Martin {\v{C}}ad\'{i}k and Antal Nemcsics},

title = {An Efficient Perception-Based Adaptive Color to Gray Transformation},

booktitle = {Proceedings of Computational Aesthetics 2007},

pages = {73-- 80},

publisher = {Eurographics Association},

year = {2007},

address = {Banff, Canada},

}

1. Aparent Greyscale

Using the perceptual color mode, it achieves visually pleasing results. The Nayatani color model resolves many negative effects just like the hunt color model although not as comprehensive. It also decomposes an image into many pyramid levels(Laplacian pyramids) to visually discriminate the local color differences.

@MISC{Smith\_apparentgreyscale:,

author = {Kaleigh Smith and Pierre-edouard Landes and Joëlle Thollot and Karol Myszkowski},

title = {Apparent Greyscale: A Simple and Fast Conversion to Perceptually Accurate Images and Video},

year = {}

}

1. Decolorize: fast, contrast enhancing,

Image lightness strongly affects perceived contrast, meaning techniques that can arbitrarily modify lightness. This implies that This decolorizing method may affect image appearance in an adverse way. However, it shows decent color discriminability and visual accuracy. It gets color difference using RGB space and Y component in YPQ space, and then define an axis. Using their own unique method called predominant component analysis similar to PCA, it achieves the general representation and color differences. One thing to note is that although it gets color difference, it computes faster than any of state-of-the-art technique since they pick one neighbor pixel using isotropic bivariate Gaussian distribution.

@article{journals/pr/GrundlandD07,

author = {Mark Grundland and Neil A. Dodgson},

interhash = {43d437c780d4ed745aa57e97d982b890},

intrahash = {3c53ecbe6c956becd5026b15379d6093},

journal = {Pattern Recognition},

number = 11,

pages = {2891-2896},

title = {Decolorize: Fast, contrast enhancing, color to grayscale conversion.},

url = {http://dblp.uni-trier.de/db/journals/pr/pr40.html#GrundlandD07},

volume = 40,

year = 2007,

keywords = {dblp},

ee = {http://dx.doi.org/10.1016/j.patcog.2006.11.003},

added-at = {2007-11-05T00:00:00.000+0100},

description = {dblp},

biburl = {http://www.bibsonomy.org/bibtex/23c53ecbe6c956becd5026b15379d6093/dblp},

date = {2007-11-05}

}

1. Robust Color-to-gray via Nonlinear Global Mapping

This most recent state-of-the-art technique defines a non-linear global mapping technique. To find the optimization point, it uses a kind of eigen vector decomposition and find the optimization point by using a simple linear algebraic computation, and apply it.

@article{kim09\_c2g,

author = {Yongjin Kim and Cheolhun Jang and Julien Demouth and Seungyong Lee},

title = {Robust Color-to-gray via Nonlinear Global Mapping},

journal = {ACM Transactions on Graphics (SIGGRAPH ASIA 2009)},

year = {2009},

month = dec,

volume = {28},

number = {5}

}

User study for perceptual pleasing factor – highest grades for Smith et al.

Each of inquired conversions ranked the worst for at least

one input image ==> Why?

==> Each image has different qualities and characteristics.

==> Use Hunt model

==> If not applicable, use smith et al.

==> I need an adaptive method.

Decolorize good for images with narrow gamuts --> Maybe I could design nonlinear PCA.

Smith08 good for colorful images

Overall best accuracy: Smith08

Overall best preference: Decolorize

No universally best conversion