

Dear all,

I wrote a simple note to clarify our work on text legibility. Our approach was to choose an appropriate equation for evaluating color differences and then focus on performing psychophysics experiments to define an algorithm (that is, how to use this equation (in our case which threshold use and under which conditions)). We are aware of the guidelines for legibility (5:1 contrast for legibility (ISO standard), 3:1 minimum legibility, 10:1 recommendation for small text). Our approach was not to take this values and verify their application. On the contrary, we are working on the definition of a whole algorithm (equation and corresponding parameters).

I did a very simple comparison to explain the difference of our approach based on lightness difference and the approach based on luminance contrast.

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Let us consider a color scale composed by gray patches. This is the achromatic axis of the Munsell Color Space (Munsell Book of Colors), a perceptually uniform color space defined by observers (it means that adjacent colors have the same perceptual distance along the scale according to observers judgment). These colors are specified in tristimulus coordinates under the standard illuminant C (which is the illuminant considered in the creation of the atlas). If we convert the colors in the sRGB color space, we obtain the following scale:



If we number the patches from 0 to 10 (0=black, 10=white) and we consider the admissible combination according to the following criteria:

- 1) $(\text{luminance max} + 0.5) / (\text{luminance min} + 0.5) > 10$
- 2) $\text{lightness max} - \text{lightness min} > 30$

we obtain the following choices:

patch	1) <=	1) >=	2) <=	2) >=
0		3		3
1		6		5
2		7		5
3	0	9	0	6
4	0		0	7
5	1		2	8
6	1		3	10
7	2		4	
8	2		4	
9	3		5	
10	3		6	

It means that, if we consider the patch n.0 (black), according to the first criterion we can choose the patches 3,10. The same selection for the second criterion. If we consider the patch n.3, we can use n.0, n.9, and n. 10 according to 1), while we can use colors n.0, 6, 7, 8, 9, 10 according to 2). And so on.

I have reported examples following the table above.

