‘The Perfect Picture’: Optimising Chromostereoscopic Images for Desired Depth and Colour

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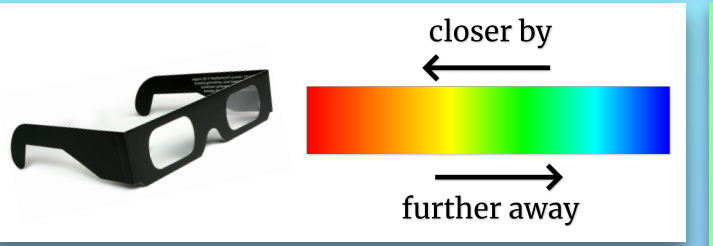


1. Background

- Chromostereopsis is an optical illusion where warmer colours appear closer to the viewer, and cooler colours appear further away
- With chromostereopsis, this effect is enhanced by using a pair of cardboard glasses with special optics to disperse and bend incoming light
- Techniques exist to map depth images to vivid chromostereoscopic images; blending these with the original image gives a more natural effect

2. Problem analysis

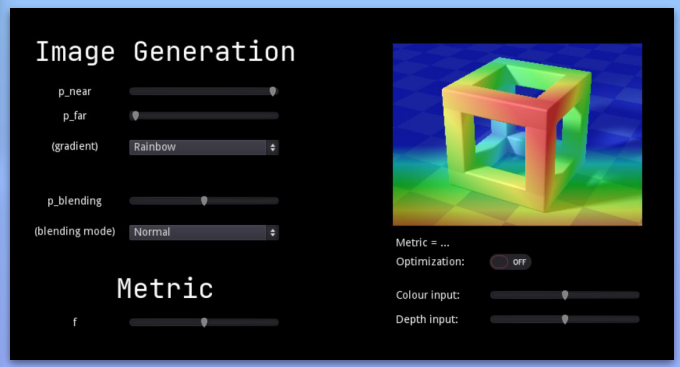
- Existing techniques only focus on maximising stereoscopic effect, they do not focus on also accounting for the original colour image

3. Research question

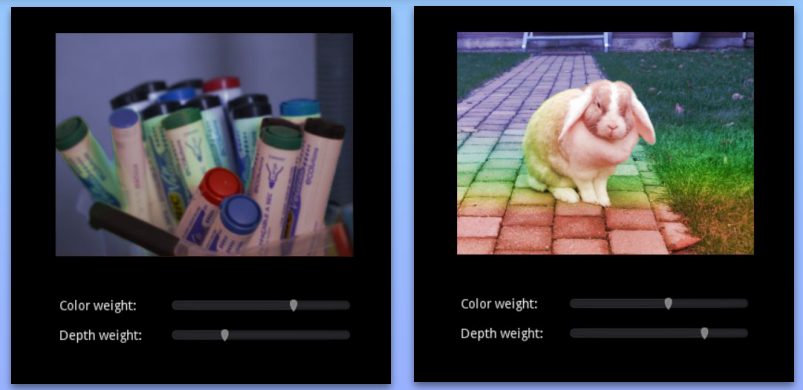
“Does there exist a technique for generating an ‘optimal’ chromostereoscopic image, such that both the target depth and the original colour image are conveyed simultaneously?”

4. The Program

- A program with GUI gives desired manual artistic control to tweak the image
- A parametric chromostereoscopic image generation pipeline was created (a depth-to-colour mapping, which is blended back with the original image)
- A metric with parameter *f* optimises the generation parameters with respect to colour accuracy and depth perception (such that the same *f* gives a perceptually equal effect with different images)



The program with all parameters.

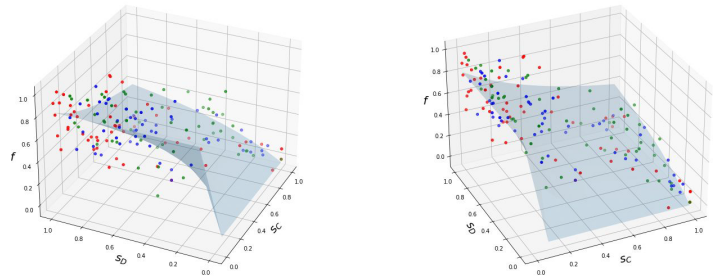


The program with only user preference inputs.

5. User study

- Following a user study, a mapping from user preferences in colour and depth, to a metric parameter *f* was created, to give the user a less abstract interface to create final images with
- Show participants image variations, generated with a differing *f*
- Let them score colour and depth correctness s_C and s_D
- Construct a regression from s_C and s_D to metric parameter *f*

6. Results



The scatterplot and the final mapping: $\hat{f} = 0.847 \cdot \left(\frac{s_D}{s_C + s_D}\right) - 0.028.$

References

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