

EFFICIENT IMPROVEMENT METHOD FOR SEPARATION OF REFLECTION COMPONENTS BASED ON AN ENERGY FUNCTION

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Abstract

In this study, we propose a novel and effective method for improving the accuracy of separation reflection components in a single image based on the dichromatic reflection model after calculating the diffuse reflection component by any existing method. Our proposed method is based on unsharp masking and an energy function. Separating reflection component accurately is very important and useful in computer vision to enhance image quality because we can control the intensity and apply a filter independently to each reflection component.

Motivation

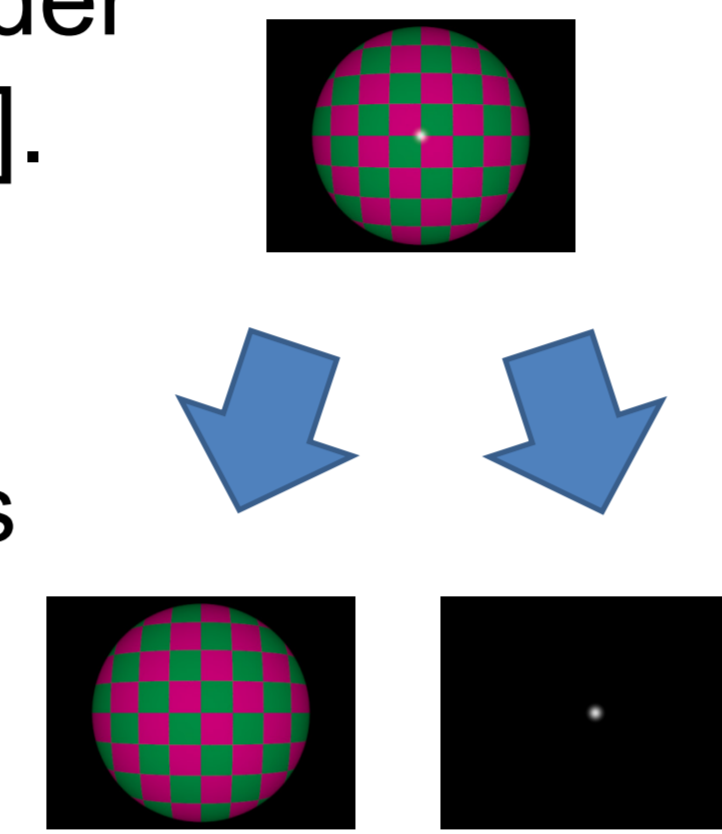
High-resolution displays such as 4K and 8K televisions are becoming more common. Therefore, we can not keep our competitiveness just by the resolution.

We have to develop new technologies except resolution.

Objective

As a new technology, we consider reality(gloss) improvement[1, 2].

Separating reflection components accurately and detecting a specular components are an important technology.

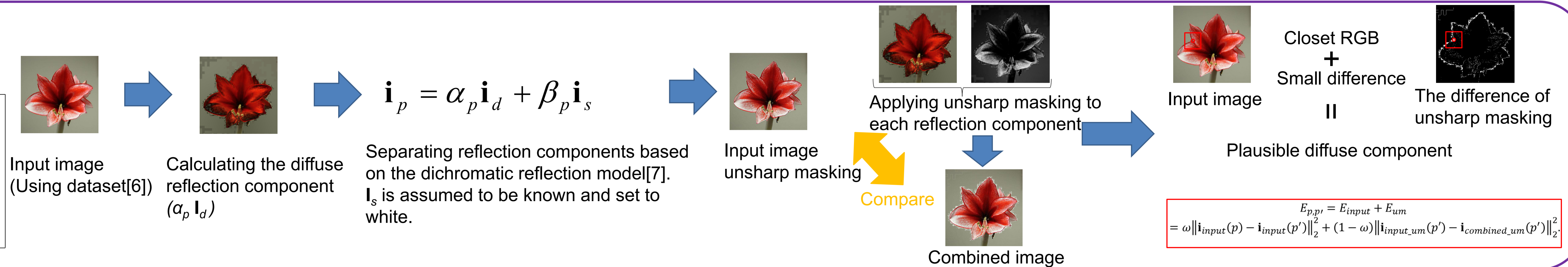
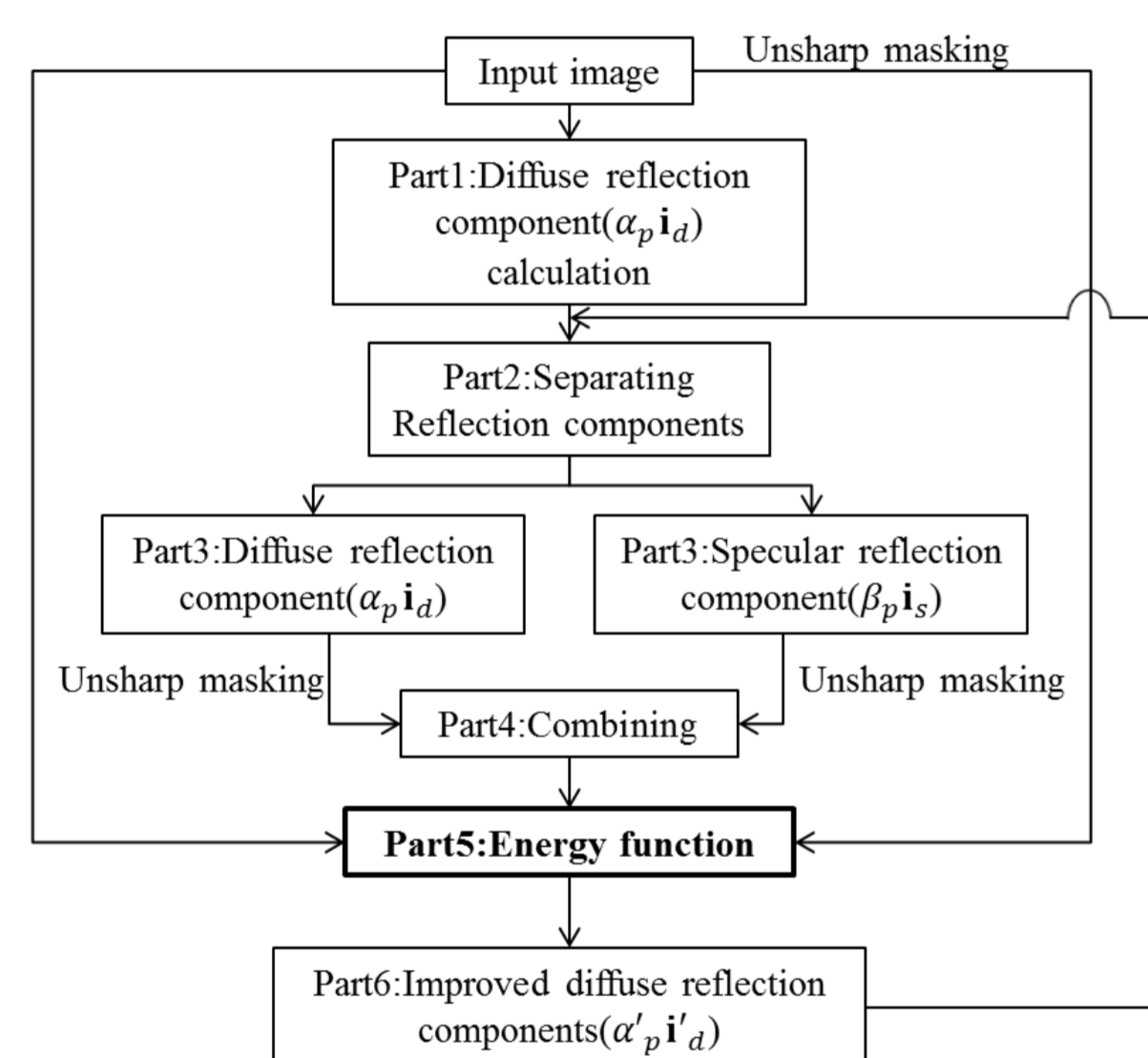


Related studies

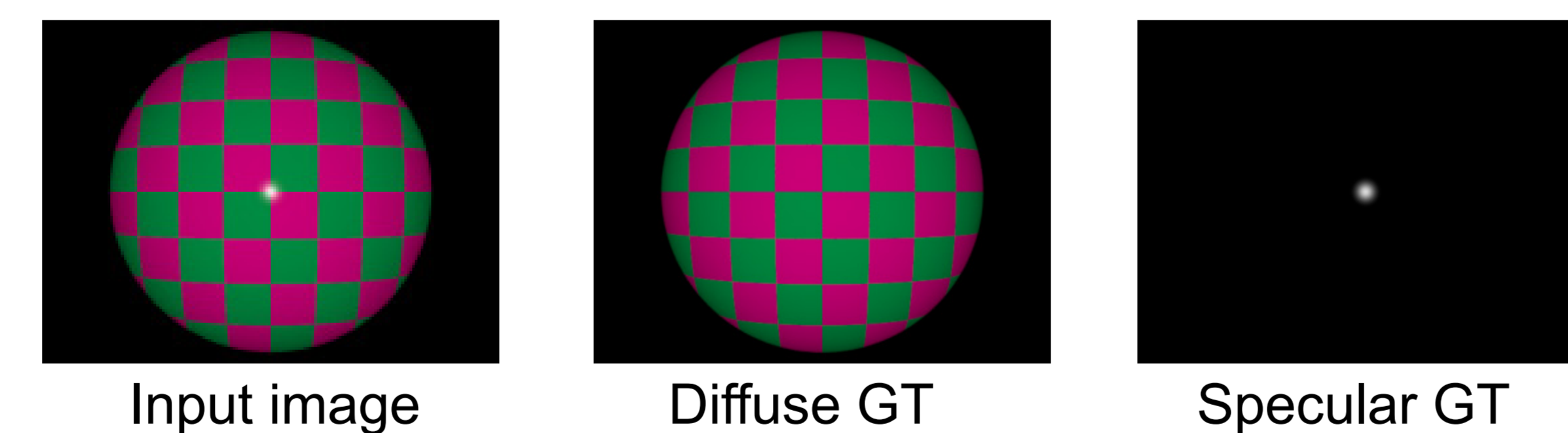
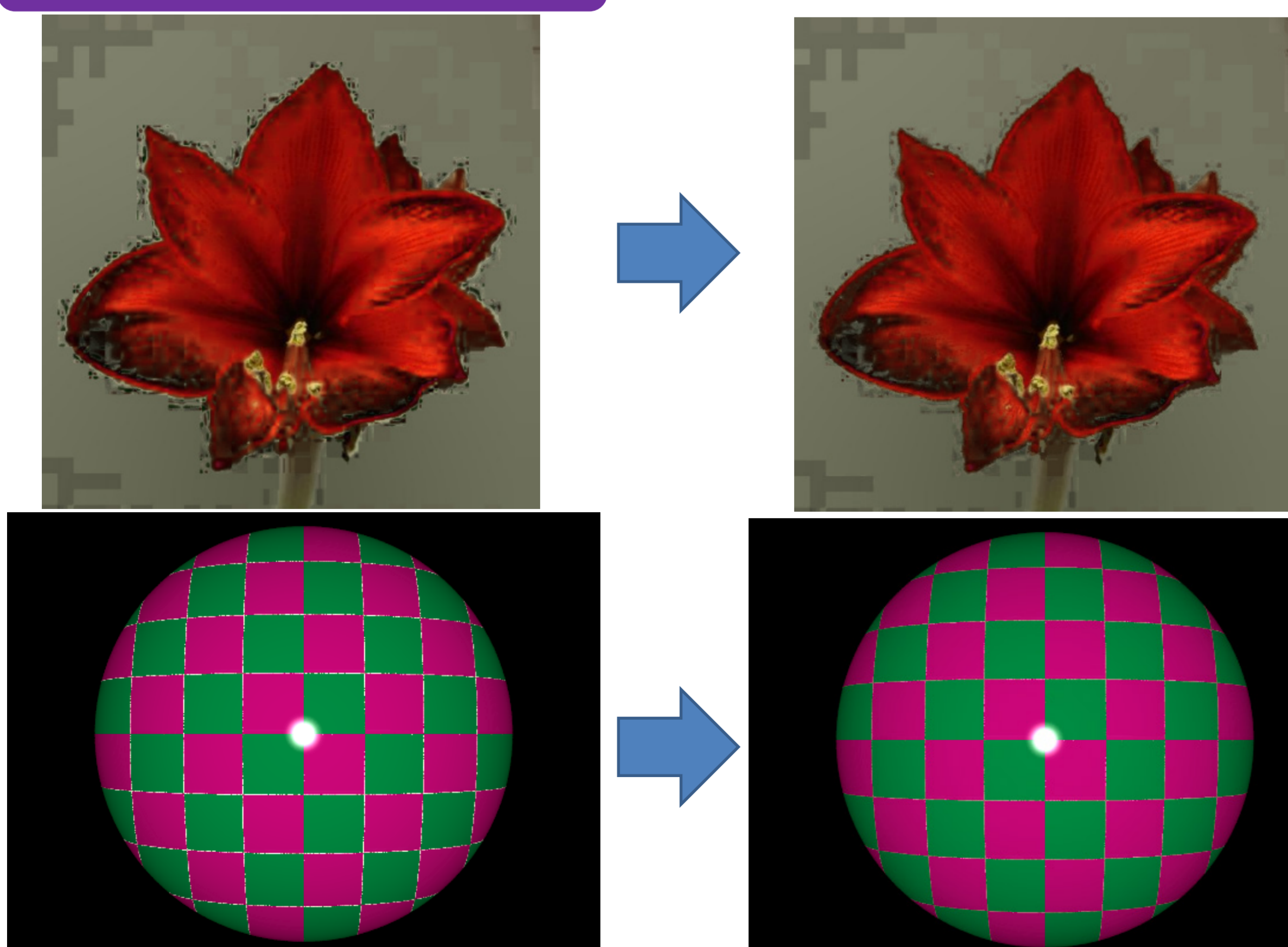
Technique	Images	Hardware	Remarks
Specular-Free Image[9,10]	1	Single camera	Yang[5]
Inpainting	1	Single camera	Manual segmentation
NMF[4]	1	Single camera	Parameter setting
Multi-Baseline Stereo	50-70	Multiple camera	
Polarization	6-10	Polarized filters	
Multi-flash	4-8	Flash system	

*Excerpt from [3].

Proposed method



Experimental results



	Tan[9]	Yang[5]	Akashi[4]	Shen[10]
Diffuse				
Conventional	34.80	31.75	31.57	29.08
Our method	40.13	37.16	37.30	30.36
Improvement	5.33	5.41	5.73	1.28
Specular				
Conventional	35.44	32.60	32.11	29.72
Our method	48.50	42.31	39.82	31.62
Improvement	13.06	9.71	7.71	1.90

Conclusion

- Our proposed method can improve the separation of reflection components by a maximum of 13.06dB.
- We can show the effectiveness by using real images.

References

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