Outdoor daytime multi-illuminant color constancy

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- Color constancy
- Dataset
- Model
- Results
- Conclusion



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Color constancy

- Ability of human visual system to perceive the intrinsic object color under a variety of lighting conditions
- Object color important feature of object
- Useful for object detection, object tracking





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Dataset

- Many large-scale datasets for color constancy
 - Cube++[1], Intel-TAU[2], NUS-8[3]
- Problem with these dataset that they contain only one illuminant
- Datasets with two illuminants have a very small number of images
 - Most of the images taken in laboratory conditions
 - Largest dataset[4] contains 20 real world images





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Dataset

- Existing two-illuminant dataset too small for neural network training
- Created dataset contains over 100 real world images
- Sunlight and shadow represent the two illuminants
- Dataset created using the Canon EOS 550D



Example images







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Illuminant extraction

- To extract the illuminant a SpyderCube is used.
- Each SpyderCube two grey faces and two white faces
- Illumination was extracted from a grey face





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Proposed model

- A model was created to accompany the new dataset
- Existing methods use image patches and the assumption that each patch has only one illuminant
- Proposed model uses entire image for illumination estimation
- Model based on FC4[5]



Proposed model



Results

Model	Mean	Median	Trimean	Best 25%	Worst 25%
Grey-World[6]	14.4	15.25	15.11	10.34	17.06
White-patch[7]	12.38	13.16	13.03	7.32	15.74
General Grey-World[8]	13.85	15.05	14.68	9.41	16.93
1st order Grey-edge[8]	6.76	3.84	4.33	1.29	17.39
2nd order Grey-edge[8]	6.64	5.5	5.32	1.81	14.18
Proposed model	2.14	1.78	1.88	0.57	4.28



Conclusion

- Introduced a new color constancy dataset containing multiple illuminants in scenes
- Created a model that employs the entire image to extract image illumination when multiple illuminant are present in a scene



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