REMOVING PHOTOGRAPHY ARTIFACTS USING GRADIENT PROJECTION AND FLASH EXPOSURE SAMPLING

ABSTRACT

Flash images are known to suffer from several problems: saturation of nearby objects, poor illumination of distant objects, reflections of objects strongly lit by the flash and strong highlights due to the reflection of flash itself by glossy surfaces. We propose to use a flash and no-flash (ambient) image pair to produce better flash images. We present a novel gradient projection scheme based on a gradient coherence model that allows removal of reflections and highlights from flash images. We also present a brightness-ratio based algorithm that allows us to compensate for the falloff in the flash image brightness due to depth. In several practical scenarios, the quality of flash/no-flash images may be limited in terms of dynamic range. In such cases, we advocate using several images taken under different flash intensities and exposures. We analyze the flash intensity-exposure space and propose a method for adaptively sampling this space so as to minimize the number of captured images for any given scene. We present several experimental results that demonstrate the ability of our algorithms to produce improved flash images.

EXISTING SYSTEM

This paper presents two results: first, illumination invariants do not exist for Lambertian surfaces; and second, the angle (or direction) of the image gradient is insensitive to changes in illumination direction. The latter statement is consistent with the conclusion in that linear litters for image comparison do not exist, since the gradient angle is a nonlinear function of the image. However, we cannot conclude that image edges are good measures of image comparison under varying illumination | in fact the contrary is true. Most edge detection methods are highly sensitive to the magnitude of the image gradient. As we can see from Eq. 12, the magnitude of the gradient varies drastically with the change in the direction of the light source. The distribution also shows the slow variation of the density function with respect to the magnitude of the gradient. Therefore the gradient magnitude is a poor indicator of the underlying surface geometry and photometry. Nevertheless, when combined with the gradient angle, the magnitude may extract more information from extremely low intensity images.

DISADVANTAGES

- The lack of generalization from known objects to unknown objects,
- All objects belonging to the ideal class are assumed to have the same shape.

PROPOSED SYSTEM

We have presented techniques to improve flash photography and have addressed three well-known problems: over-illumination or under-illumination at a given flash intensity, reflections or highlights, and attenuation over depth. We reduce these artifacts by exploiting information in the ambient image. To remove reflections and highlights, one might think that higher-level prior knowledge or global image features are required. But we have presented a simple technique based on the local gradient analysis. Nevertheless, a global scheme may improve the results. To overcome the limited dynamic range in the flash and ambient images, we propose adaptively sampling the flash-exposure space. By understanding the flash-exposure space, one can design better cameras and develop novel re-synthesis effects. Current cameras already use onboard sensors and processing to coarsely estimate the flash level and exposure settings. We hope our methods can further improve pre-capture parameter selection and post-capture processing of the images

ADVANTAGES

- Better illumination of subjects who are farther away.
- A cleaner look to the diffusers you use to soften your lighting.

SYSTEM REQUIREMENT:

HARDWARE REQUIREMENTS:

Processor	:	Intel
Ram	:	2 GB (Minimum)
Monitor	:	15” COLOR
Hard Disk	:	500 GB
Keyboard	:	STANDARD 102 KEYS
Mouse	:	3 BUTTONS

SOFTWARE CONFIGURATION:

Operating System	:	Windows 7 / 10
Environment	:	MATLAB
Matlab	:	Version 18a

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