Robust Lens Flare Removal

Floris Chabert

Abstract

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1 Motivation

Lens flare and ghosting can be prevalent artifacts when taking pictures of a scene with a direct bright light (see Figure 1). Those artifacts are usually caused by internal reflections of the lens due to a thin anti reflective coating.

This project aims at automatically removing those lens artifacts to produce a clean image. We will design an algorithm involving two steps: flare detection and recovery of the damaged region.

2 Related Work

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3 Method

3.1 Detection

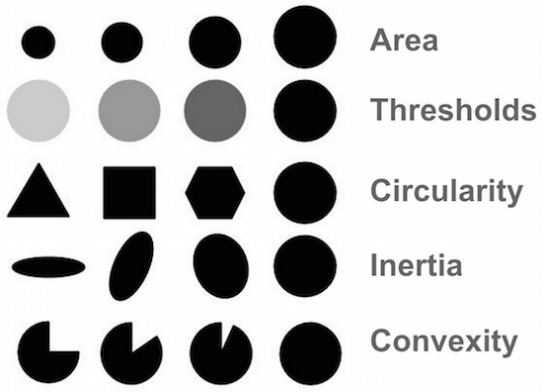

Figure 1: Filtering parameters for blob detection[4]

The lens flare and ghosting will be precisely detected in the image. They have specific properties which can be used to segment the image [1]. Those can have different shapes and colors but the affected pixels usually saturate one or multiple color components of the image. We will first use thresholding and blob detection to segment the image and find the potential candidates. Then, other properties of those glares - their specific color and intensity distribution (halo shaped) - will allow us to eliminate potential false positive. We will evaluate the algo-

rithm effectiveness with regard to the different categories of lens flare.

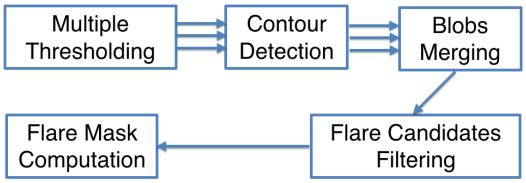

Figure 2: Flare detection algorithm

3.2 Inpainting

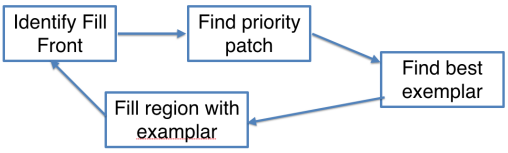

Figure 3: Flare inpainting algorithm

Finally, we will recover the area damaged by the identified artifacts. In order to fill those small regions we will use a partial differential equations inpainting algorithm based on the Curvature-Driven Diffusion model [2][3].

4 Results

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5 Discussion

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Figure 4: Pictures with lens flare artifact

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