Burst Images

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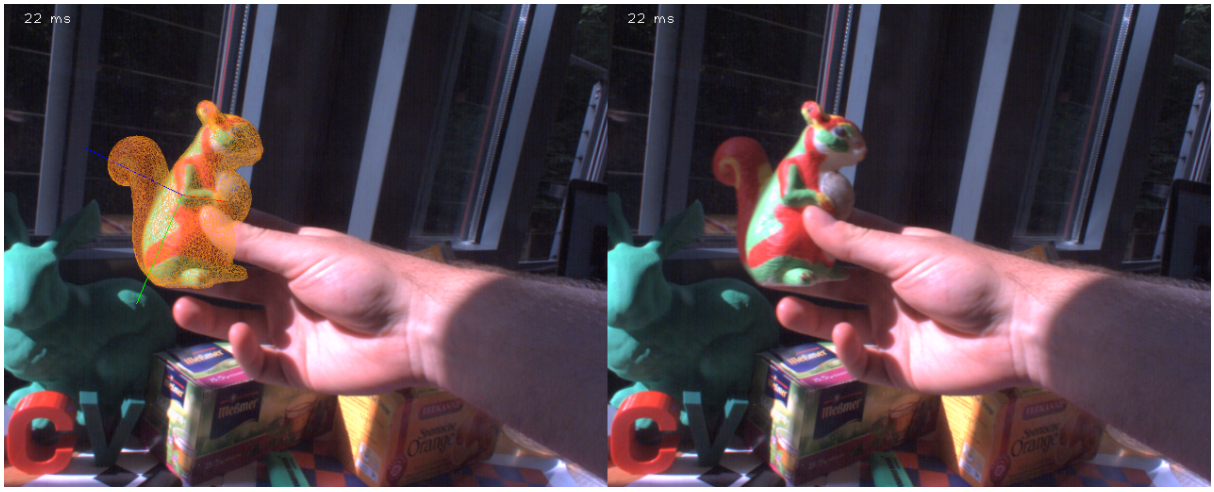

Figure 1: *Best teaser image you can provide . . .*

Abstract

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1. Introduction

Burst photography is a technique in which a series of photographs is taken quickly in succession. This can be useful in a variety of situations, such as capturing action or movement, or to create a sense of motion. In digital photography, burst images are stored as a sequence of image files, typically in a format such as JPEG or RAW.

High Dynamic Range (HDR) is a technique used to improve the dynamic range of an image, which is the range of luminance or brightness levels that can be captured in a photograph. The dynamic range of a scene can often be greater than what a camera is able to capture in a single image, resulting in lost detail in the highlights or shadows. HDR techniques can be used to extend the range of luminance in an image, resulting in more detail and a more realistic representation of the scene.

One way that burst photography and HDR techniques can be used together is to capture a series of photographs with different exposures in a burst, and then combine the exposures into a single HDR image using software. This can be particularly useful in low-light situations, where the camera may struggle to capture a wide range of luminance levels in a single exposure. By capturing multiple exposures and combining them into an HDR image, it is possible to extend the dynamic range and capture more detail in both the highlights and shadows.

2. Related Work

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3. Approach

The classic manual approach from digital photography is to take three images of the same scene: One overexposed, one underexposed, and one normally exposed. These are superimposed in post-processing so that the bright areas of the resulting image are not too bright and the dark areas are not too dark. This results in an image that not only contains many bright areas, but also many dark areas at the same time.

This classical approach will be contrasted with the method described in 2. For this purpose, image bursts of the same scene are processed once according to the classical method and once according to the method described in 2. To get a good comparison, images of stationary and moving objects are taken, both from a tripod and handheld.

4. Experiments

[Bro16] has implemented the image processing pipeline described in 2. To do this, he uses Halide, a programming language embedded in C++ that allows efficient image processing pipelines to be implemented with little effort. Halide itself requires LLVM to compile. Unfortunately, the project has not been actively maintained for quite some time and since new versions of Halide and LLVM have been released in the meantime, some of which were not backwards compatible, the project could not be compiled out of the box. After many hours of trial and error, the project was able to compile with version 10 of both Halide and LLVM. To get a reproducible executable version of [Bro16], a Docker image was created that contains the application and runs it on container startup.

5. Conclusions

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6. Acknowledgements

Maybe you like to acknowledge . . .

References

[Bro16] BROOKS T.: HDR+ implementation. `https://github.com/timothybrooks/hdr-plus/`, 2016. Commit: 0ab70564493bdbcd5aca899b5885505d0c824435.