Mobile Depth from Focus and Applications

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Figure 1: *Spring Training 2009, Peoria, AZ.*

Abstract

Depth information is crucial in providing scene understanding for many post-processing applications in computational photography. While depth maps can be easily obtained through stereo cameras or external devices such as infrared sensors, it is difficult in mobile photography because of hardware limitation. In this project, we will implement depth-by-focus, sweeping a single lens across various focus distances and composite an approximate depth map. The depth map will be improved by segmentation and bilateral filtering. We will then demonstrate the effectiveness of the technique by utilizaing the depth map and simulate light-field photography as well as synthetic depth of field.

CR Categories:

Keywords: depth from focus, depth map, tablet, computational photography

1 Introduction

Mobile devices have become the most common photography means, and they have presented a new set of opportunities and challenges for computational photography. While many applications take advantage of these devices' location, accelerameter, and other meta data, the inherent hardware limitation on size computation power makes it worth revisiting prior works on computational photography to this application. Specifically, since depth information is one of the most useful piece of scene understanding, we wish to demonstrate a mobile solution producing a depth map that

assist in computational photography. Since most mobile devices have only one camera (lens) and no active focusing equipment, we will attempt to implement depth from focus, approximating depth information from images captured at different depths.

2 Prior Work

Depth from Focus is a technique that has been studied for decades [Grossmann 1987] and with numerous applications [Nourbakhsh et al. 1997]. It is useful

3 Results

4 Concolusions and Further Works

Acknowledgements

References

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