

Synthetic Bokeh and Removal Glare for Point Light Source

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In this thesis I propose the method to reproduce and synthesize "Round Bokeh" in images taken by smartphone camera. Round Bokeh effect occurs when point light source is photographed outside the Depth-of-Field and it is one of the important expressions in portrait and artistic works. Obtaining large bokeh using smartphone camera is difficult as having it requires a physically long focal length and a large aperture that smartphone camera lacks. In order to obtain bokeh effect computationally, I propose the following approach; detecting the glare in the image, removing it, and synthesizing the bokeh effect by multiplying estimated depth and lens parameters. In order to obtain actual bokeh parameters, I capture the Point Spread Function (PSF) of various lenses. PSF profile is created for each tested lens and the round bokeh with corresponded characteristics is reproduced. Compared to the previous efforts in imaging studies for computational bokeh, our approach enables the reproduction of round bokeh similar to actual lenses.

(Advisor: Yoichi Ochiai)