An Enhanced Method for Fusing Multiple Exposure Images for High Dynamic Range Scenes

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In order to overcome the limitations of standard digital cameras, high-dynamic-range (HDR) imaging is used by fusing a “stack” of multiple pictures with different exposure times. This project presents an enhanced method of producing HDR images to remove blurring and ghosting artifacts, which are created by significant brightness changes or movement within a scene. The method targeted handheld devices with cameras, including smartphones, which do not have the same capacity as large computer processing units (CPUs) and graphics processing units (GPUs). The enhanced algorithm was created using Open CV and MATLAB. Data sets were found and chosen to compare existing methods to the proposed method, and a camera was also used to test the algorithm on an actual device. It outperforms its predecessors by using contrast differences calculated using the Laplacian operator and Poisson blending to adjust images before they are fused. This project uses the power of HDR imaging to address human error in the use of technology. For point-and-shoot cameras, camera shake and brightness change during exposure are common problems, which in turn creates artifacts in photos. The improved method presented not only addresses these problems but provides a simplified, more effective solution to be used in handheld devices.

Awards Won:

Second Award of $2,000