Full high-dynamic range images for dynamic scenes

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The limited dynamic range of digital images can be extended by composing photographs of the same scene taken with the same camera at the same viewpoint at different exposure times. This is a standard procedure for static scenes but a challenging task for dynamic ones. Several methods have been presented but few recover high dynamic range within moving areas. We present a method to recover full high dynamic range (HDR) images from dynamic scenes, even in moving regions. Our method has 3 steps. Firstly, areas affected by motion are detected to generate a ghost mask. Secondly, we register dynamic objects over a reference image (the best exposed image in the input sequence). Thirdly, we combine the registered input photographs to recover HDR values in a whole image using a weighted average function. Once matching is found, the assembling step guarantees that all aligned pixels will contribute to the final result, including dynamic content. Tests were made on more than 20 sets of sequences, with moving cars or pedestrians and different backgrounds. Our results show that Image Mapping Function approach detects best motion regions while Normalized Cross Correlation offers the best deal speed-accuracy for image registration. Results from our method offer better result when moving object are roughly rigid and their movement is mostly rigid. The final composition is an HDR image with no ghosting and all dynamic content present in HDR values.

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