Title:	Dithering Based High Dynamic Range Imaging
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Keyword(s):	Exposure Value, Dynamic Range Low Dynamic Range Images, High Dynamic Range Images Dithering, Fusion or Blending of LDR Images
Subject(s):	Digital Image Processing Computer Vision High Dynamic Range Imaging
Abstract:	Real world scenes have a wide range of intensity variation in general. The human eye has greater dynamic range to handle such intensity variations. This leads us to accurately visualize a scene even at very high intensity as well as very low intensities and allows us to make a clear distinction of a huge range of di erent intensity levels. Digital cameras, on the other hand, have limited dynamic range, so they can not record all such variations and this results in loss of detailing. For example, it can be observed that some of the regions of low dynamic range images may appear brighter and leveled out, thus implying loss of information at those regions due to over-saturation. This is referred as white wash. At the same time, some other regions may appear darker and leveled out, which again implies loss of details in those regions due to under-saturation. This is referred as black wash. To overcome these limitations of the standard digital cameras in handling a wide dynamic range of real world scenes containing brightly and poorly illuminated areas, fusion of di erent low dynamic range images taken at di erent exposure settings is usually adopted. However, the high dynamic range images thus obtained still can not be displayed on conventional low dynamic range display devices. This motivates us to develop such a fusion algorithm which can e ciently capture all details present in the real world scene and can be displayed directly on the display devices without requiring a tone mapping step. In this thesis, we have proposed a dithering based fusion algorithm which blends pre-processed dithered low dynamic range images in proportion to certain weighting coe cients which have been derived on the basis of exposure values, saturation matrix and the exposure penalty matrix. The resulting image has high dynamic range, maximal information of the scene, and additionally, it can be directly displayed on existing display devices without tone mapping. We have also done a comparative study among the results obtained using roposed algorithm with results obtained from existing techniques, quantitatively using widely accepted performance measures.

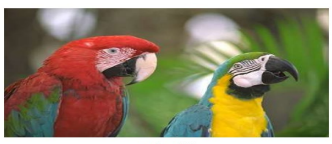

Figure 1.1: Different Exposure Regions

Figure 4.1: Interpolating value of p

Figure 3.3: Error Diffusion Dithered Image

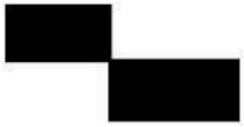
Figure 3.2: white and Black pixels are grouped together

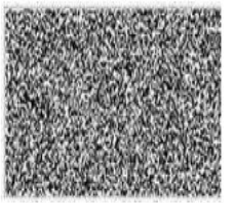
Figure 3.1: White and Black pixels are randomly arranged