EOTF Preference for LCD Televisions

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Abstract

Recent commercial LCD (liquid crystal display) televisions are larger and brighter than traditional televisions which impacts the viewing conditions. The adaptation level of the newer viewing conditions may require different electro-optical transfer functions (EOTFs) for the LCD televisions than those in traditional TVs. Two experiments were carried out to explore how the tone transfer function affected image preference. In the first experiment, a set of images, displayed in a darkened room, were modified using the intrinsic EOTF of the display, simulated gamma functions and an exponential modification of the intrinsic tone curves. Image preference was measured using paired-comparison. In a second condition, the procedure was repeated at a lower luminance level by placing a neutral filter in front of the screen. The results indicated that, in general, a gamma of 1.6 was preferred to the intrinsic LUTs and that this improvement was more marked at the lower brightness level. In the second experiment, the procedure of the first experiment was repeated in a more natural viewing environment by introducing a dim surround that was 10% of the luminance of the display’s unfiltered white point. With this surround, the improvement in image preference with the gamma-functions at both display levels was more enhanced. In addition, a wider range of gamma values were preferred over the intrinsic tone functions. The results indicate that image preference for different transfer functions are dependent on the intensity of the displays and that this dependence is maintained under natural viewing conditions with a dim surround.

Biography

Justin Laird received his B.S. degree in Imaging and Photographic Technology from Rochester Institute of Technology in 2003 and will have his M.S. in Color Science from RIT in 2005. He has interned at various companies while in school such as Gretag Imaging and Harley Davidson. His professional interest includes exploring new ideas pertaining to display technology and different approaches to showing images.