Modeling the leakage of LCD displays with local backlight for quality assessment

The recent technique of local backlight dimming has a significant impact on the quality of images displayed with a LCD screen with LED local dimming. Therefore it represents a necessary step in the quality assessment chain, independently from the other processes applied to images. This paper investigates the modeling of one of the major spatial artifacts produced by local dimming: leakage. Leakage appears in dark areas when the backlight level is too high for LC cells to block sufficiently and the final displayed brightness is higher than it should. A subjective quality experiment was run on videos displayed on LCD TV with local backlight dimming viewed from a 0° and 15° angles. The subjective results are then compared objective data using different leakage models: constant over the whole display or horizontally varying and three leakage factor (no leakage, measured at 0° and 15° respectively). Results show that for dark sequences accounting for the leakage artifact in the display model is definitely an improvement. Approximating that leakage is constant over the screen seems valid when viewing from a 15° angle while using a horizontally varying model might prove useful for 0° viewing.

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