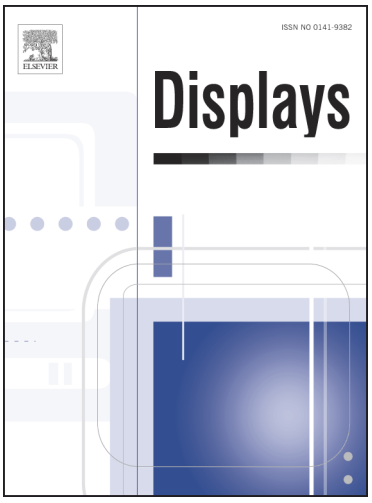

Psychophysical research on switching between light emitting and reflecting modes of light adaptable display considering equal visibility

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Psychophysical research on switching between light emitting and reflecting modes of light adaptable display considering equal visibility

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Highlights

This study has investigated the best illuminance conditions for switching the modes of light adaptable displays (LADs).

These conditions were obtained by means of a psychophysical experiment. The appropriate illuminance conditions for the mode change depending on the reflectance of light reflective mode (LRM) displays are calculated.

Experimental results indicate that display modes for LADs with 80%, 59% and 43% reflectance should be switched at 2,170, 3,090, and 4,970 lx, respectively.

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Abstract: Viewing high-luminance displays such as liquid crystal displays or organic light emitting diode displays under low-light conditions causes an unbearable glare, while viewing them with low luminance under bright-light conditions reduces visibility. Recently, several research groups have reported light adaptable displays (LADs) to extend display visibility over a wide range of light conditions. Here, we present a psychophysical study on how to effectively utilize the LAD using two different display types for the first time. LAD features two switchable display types: light emitting mode (LEM) and light reflecting mode (LRM). To maintain visibility and prevent visual artifacts, we investigate when to switch modes between LEM and LRM. We conduct psychophysical experiments involving seventy