Fake Tilt Shift Miniaturization Causes Negative D-Prime for Detecting Reality

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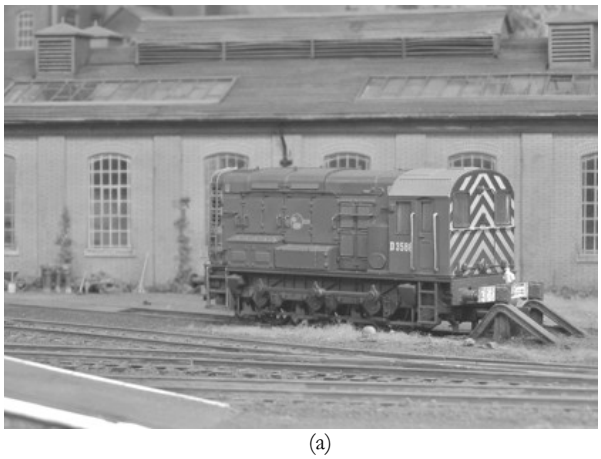
Tilt-shift lens technology can produce photographs of distant objects with very narrow depths of field. For scenes with appropriately placed foreground and background, fake tilt shift (FTS) effects can be achieved by applying blur gradients to the upper and lower parts of a conventional photograph. Either way, the treatment causes real scenes to look like small-scale models. This happens because the blur produces a shallow depth of field, which makes the focused object appear close, which means it must also be small to be within view. Previous attempts to study this FTS miniaturization used subjective measures of perceived distance, but these are complicated by the observer's choice of cognitive strategy or interpretation of instructions. We improved on this method here by devising a 2AFC performance task where participants viewed pairs of achromatic railway scenes for 5 seconds. One scene was always real and the other was always a detailed 1:76 scale model (see Figure 1) and observers were informed of this. Their task was to decide which of the two was the real full-scale scene. There were six treatments of the real photographs: null, total blur, FTS blur, inverse FTS blur (i.e. blurred across the middle and sharp at the top and bottom), orthogonally oriented FTS blur (i.e. the blur gradient was orthogonal to the ground plane) and FTS blur with no gradient (i.e. a strip of focus through a blurred image). Each of 6 real photographs was given each of the treatments and compared to each of 6 model photographs. Each of 108 participants performed 6 trials in a random order. For the null treatment, observers detected reality reliably, whereas for FTS blur with and without gradients, the model world was mistaken for reality (i.e. percent correct was significantly less than 50%, corresponding with negative d-prime). Participants were around chance for the other treatments. We conclude that the most important factor for achieving FTS miniaturization is the correct alignment of the treatment with the subject/ground plane, not the inclusion of a blur gradient.



(a)

(b)

Figure 1. Fake tilt shift miniaturization. The photograph in (a) is of a 1:76 scale scene taken using a small aperture and long exposure time. The photograph in (b) is of a full size railway scene subjected to fake tilt shift treatment (see abstract). The photograph in (b) looks more like a small-scale model than the one in (a).

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