

MODELFESt DATA: FIT OF THE WATSON-SOLOMON MODEL ((Andrew B. Watson and Joshua A. Solomon))

Purpose.

ModelFest, a symposium hosted for a number of years by the Optical Society of America, was conceived originally as a workshop for the demonstration and discussion of models of early human vision. More recently, it has undertaken the collection of a communal set of data designed to both calibrate and test vision models. It was envisioned that the data set would be large and varied enough to adequately serve both purposes, and that the complete data set would be collected by a number of different labs, to enhance both generality and accuracy. The initial ModelFest data set consists of detection thresholds for static, achromatic patterns superimposed upon a uniform background and confined to a square area of 2 by 2 degrees centered upon fixation. The selected stimuli consist of approximately fifty patterns, including Gabors, Gaussians, lines, edges, multipoles, and various complex stimuli. Data are collected using standardized methods and display conditions. Here we report an initial effort to fit the ModelFest data with the Watson-Solomon spatial vision model (1997, *Journal of the Optical Society A* 14, 2378 – 2390).

Methods

The Watson-Solomon model consists of an array of Gabor receptive fields with parametrically variable properties, a contrast-gain control process, an output non-linearity, and a probability-summation mechanism. It is thus representative of the current “standard” model of spatial pattern detection. The Watson-Solomon model is fit to the data using least squared log contrast error.

Results.

We describe the fit of the Watson-Solomon model, as well as several other, simpler models such as a filtered contrast energy detector.

Conclusions.

The ModelFest data provide a useful common point of reference for models of early vision. The fit of the Watson-Solomon model provides a useful benchmark for comparison with other models.