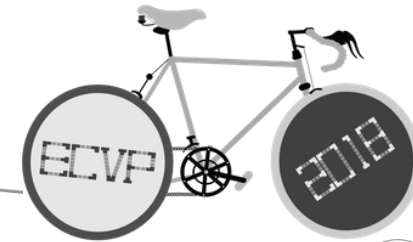# 41st European Conference on Visual Perception ECVP 2018

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Test of Goodness of Population Receptive Field Estimates with Computer Simulations

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Abstract

We present a method based on computer simulations to test the goodness of population receptive field (pRF) estimates. We first simulated fMRI responses using linear and non-linear "simulation HRFs (hemodynamic response function)", and plausible pRFs in the primary visual cortex. We added noise and down-sampled the results to obtain fMRI responses per voxel. Next, assuming a certain "estimation HRF", we analyzed the simulated data to estimate the pRFs. Critically, we used different, as well as same HRFs for simulation and estimation. We found that a mismatch between the HRFs may lead to erroneous pRF estimations. The errors were particularly severe when the simulation HRF was non-linear and the estimation HRF was linear. Because commonly a linear HRF is used to perform pRF estimation, but the actual underlying HRF is likely to be non-linear, we recommend that the stimulation protocol should be fine-tuned using computer simulations before an actual fMRI experiment is conducted.

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Research Area

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