“Optimal” Information Encoding in Retinal Neural Population

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-Lab Meeting-

Kevin Sean Chen
What the Frog’s “Sensory Population” Tells the Brain

Class 1. Sustained Edge detection.
Class 2. Convex edge detection.
Class 3. Changing contrast detection.
Class 4. Dimming detection.
Class 5. Dark detection.

Distinct Strategies in Visual Encoding

Coordinated dynamic encoding in the retina using opposing forms of plasticity

David B Kastner & Stephen A Baccus

Spatial Segregation of Adaptation and Predictive Sensitization in Retinal Ganglion Cells

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Adaptation and Sensitization in Separate Neural Populations

Increase Information Transmission Using Opposing changes in Firing Rate
Three Different Adaptive Fields in the Retina

Model for Sensitization
Critical and Maximally Informative Encoding

Critical and maximally informative encoding between neural populations in the retina

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Jared Salisbury\textsuperscript{1,2} · Stephanie E. Palmer\textsuperscript{2}

Optimal prediction and natural scene statistics in the retina
Bifurcation between maximally informative solutions

\[ P(\text{spike} \mid x) = \left[ 1 + \exp \left( \frac{-(x - \mu)}{\nu} \right) \right]^{-1} \]

\[ H(r \mid x) = -\int p(x) \sum_{i=1}^{2} \sum_{p_i=0}^{1} p(r_i \mid x) \log_2 p(r_i \mid x) dx. \]

Optimal dynamic range placement by fast Off populations
Adaptive FitzHugh-Nagumo Model

Dose OSR Imply Optimization of Predictive Information?