# A Theory of Visual Search
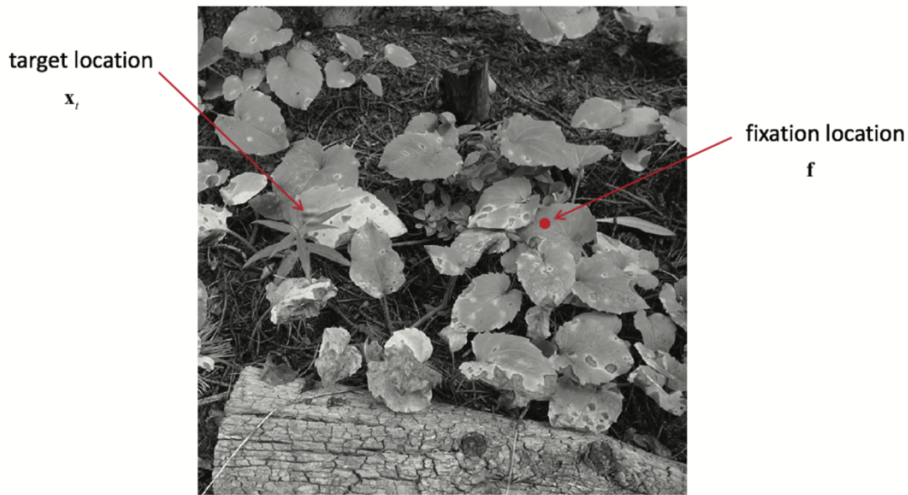
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November 1, 2019

# Background



target location $\mathbf{x}_t$

fixation location $\mathbf{f}$

# Theory of Visual Search - Overt Search



- asdf

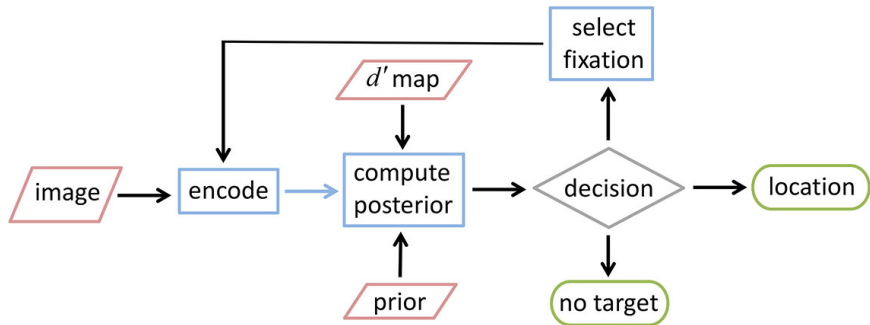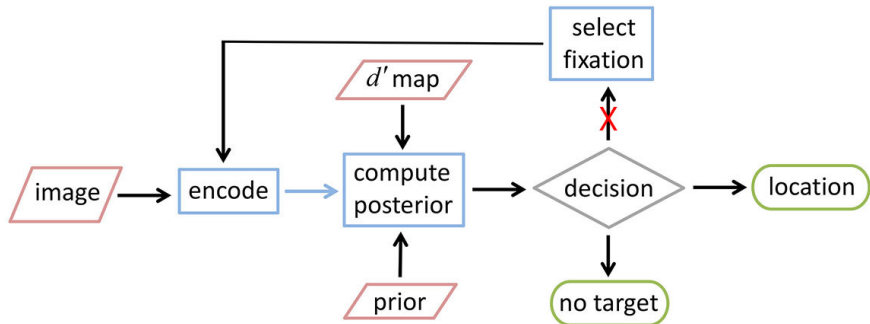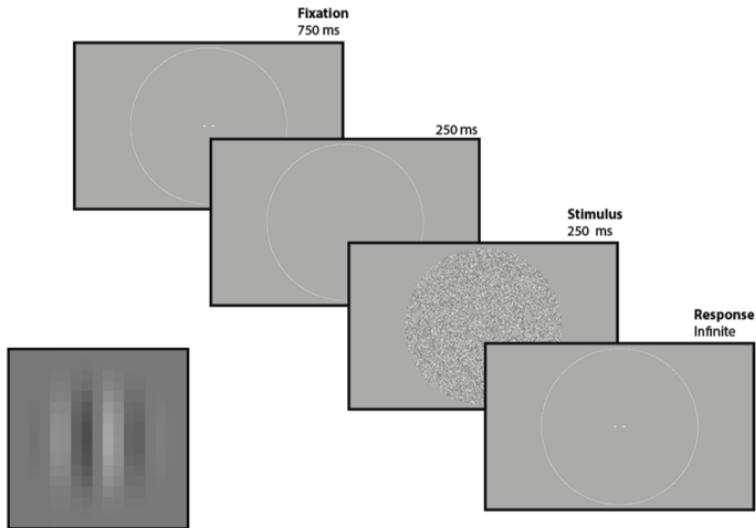# Theory of Visual Search - Covert Search

# Testing the theory in white noise

## Theoretical Predictions
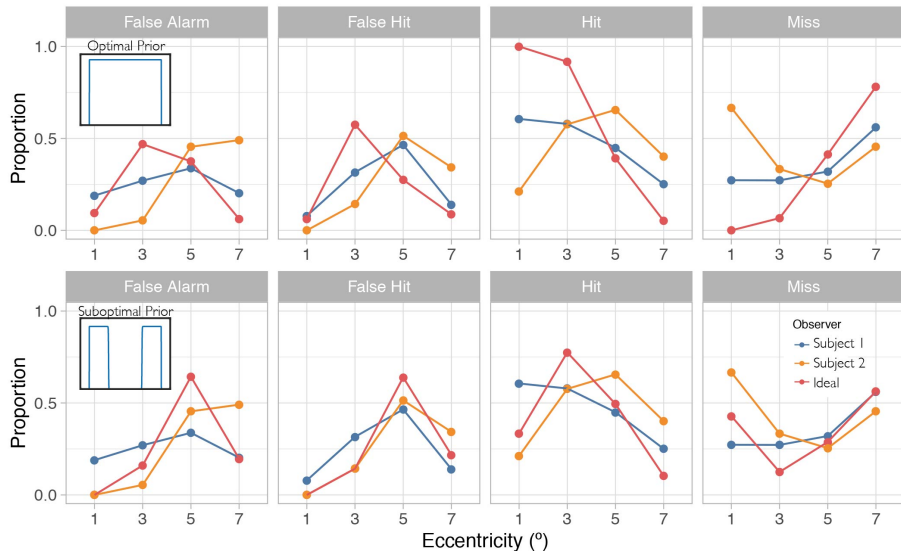
Log-likelihood ratio

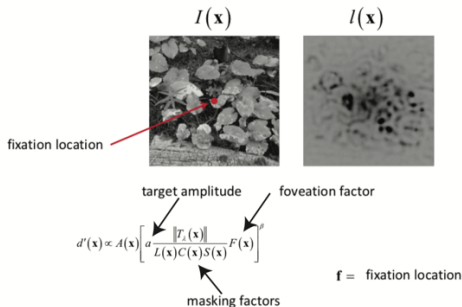$$LLR(\mathbf{x}) = d'(\mathbf{x})R(\mathbf{x}) - 0.5d'^2(\mathbf{x}) \tag{1}$$

Decision rule

$$\max_{\mathbf{x}}[LLR(\mathbf{x}) + \ln \text{prior}(\mathbf{x})] > \gamma \tag{2}$$

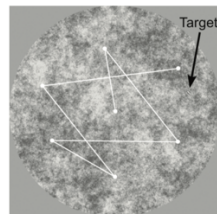# Results

# Future

## Covert Search in Natural Backgrounds



$I(\mathbf{x})$      $l(\mathbf{x})$

fixation location

target amplitude    foveation factor

$$d'(\mathbf{x}) \propto A(\mathbf{x})\left[ a\frac{\|T_s(\mathbf{x})\|}{L(\mathbf{x})C(\mathbf{x})S(\mathbf{x})}F(\mathbf{x})\right]^\beta$$

$\mathbf{f} = $   fixation location

masking factors

## Multiple Fixation Search



Target

Covert Search Model + Fixation Selection