Information pursuit as a model for efficient visual search
Hee Yeon Im, Sheng-hua Zhong, Bruno Jedynak, Lisa Feigenson, & Jonathan Flombaum

The microgenesis of efficient search
Pop-out or ‘efficient’ visual search is fast because the target evokes a strong and easily discriminable signal.
But how knowledge of the target’s position evolves over time - its microgenesis - has not been extensively investigated.

Method: Exposure limited search and localization

By limiting exposure time and measuring localization precision, we can measure how uncertainty decreases with exposure time = information gain / entropy decline.

A more standard paradigm

Pressing space bar induces a mask, after which participant clicks where she saw the target (to confirm successful search).

Advantages of information pursuit as an algorithm for search
Maximal information gain in situations where search time is limited or unknown
A constant rate of information gain
Savings when searching for more than one thing
Empirically
Predicts reaction times, even fast ones.
Also predicts shallow slope in efficient search (not shown, but ask...)

Math of information pursuit and passive learning

Information pursuit continuous time function

\[ h(t) = \log(2^{h(0)-\beta t} + 2^{h(\infty)}) \]

Passive learning continuous time function

\[ h(t) = \log(2^{h(0)-0.5\log(1+\beta t)} + 2^{h(\infty)}) \]

Entropy decline as a function of exposure

* Information pursuit model provides significantly better fits (Wilcoxon rank sum test: p < .01)

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