

Is there a preattentive shapes language by which Human visual system interpret complex images ?

In **figure 1** are shown a family of random distractors generated during an experiment with one subject by a stochastic genetic algorithm. In figure 2 control primitives, unrelated to the target, are tested by the GHT transform and given a fitness value for each distractor. No particular relation between distractor and reaction time (RT) is found in this case.

In **figure 3** an hypothetical preattentive primitive of the target (an “ear” of the rabbit) is tested, and evident correlation is found suggesting that primitives have a role in the determination of reaction times in visual search. The complete analysis of 12 subjects over 6 preattentive primitives is under development.

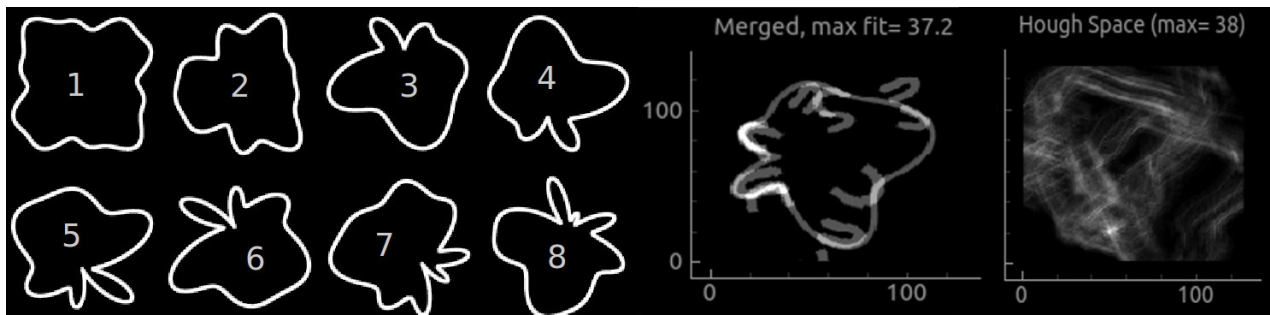


figure 1: An example family of eight distractors with their generation number. In the middle is shown a heat map of one of the distractor with superimposed a target preattentive shape. On the left the corresponding "Hough space"

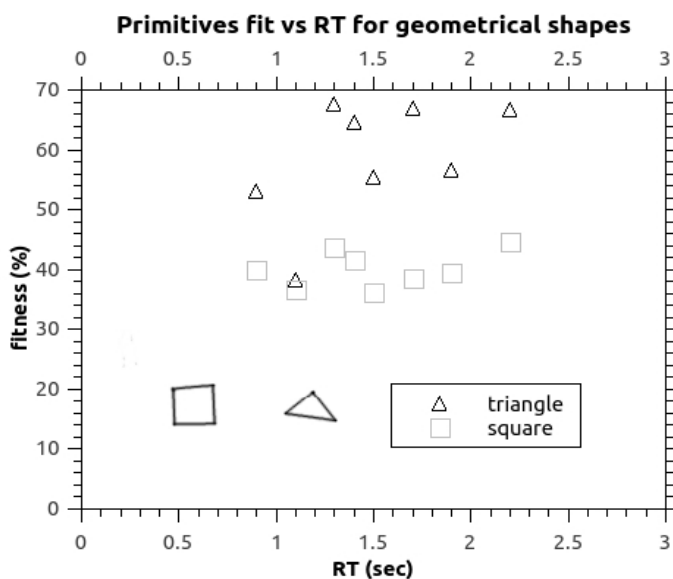


Figure 2: The distractors above are processed by a Generalized Hough Transform (GHT) using triangular and square shapes as test primitives. The GHT gives a measure about how well a certain primitive shape (the square or the triangle) fits in each of the target images (the 8 distractors above). Each distractor in the plot is indexed by its RT obtained with the experiments (horizontal axis).

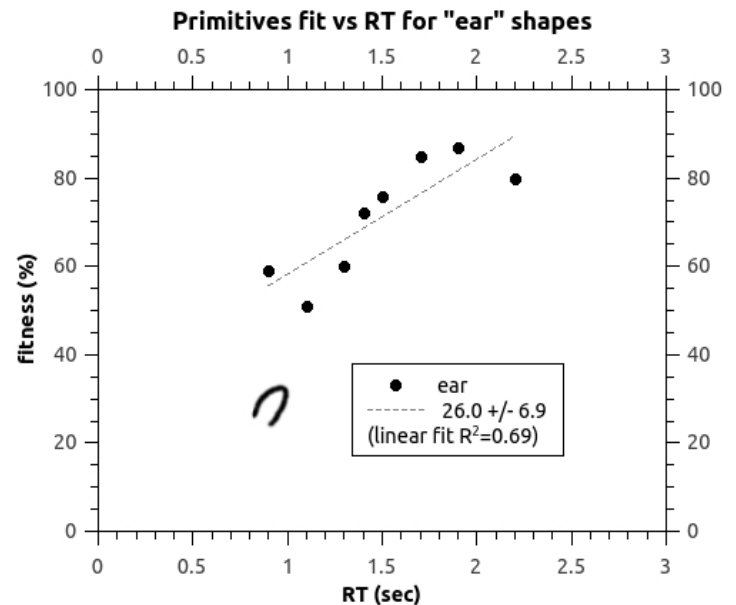


Figure 3: The arbitrary shape in the inset resembles the “ear” of the target rabbit (intentionally drawn by hand to avoid pixel-to-pixel correspondence with target). Interestingly, the GHT of this primitive shape is a good predictor of response times. This suggests that the visual system is using this feature as a sort of preattentive target in the visual search, so distractors that contain this primitive shape generate longer RTs.