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Important Clues that Facilitate Visual Emergence: Three Psychological Experiments

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Abstract

Visual emergence is a phenomenon whereby the visual system processes local signals, groups them, and reorganizes them into a holistic perception. The Dalmatian dog picture is commonly used to illustrate this concept. This type of image, which consists of a set of discrete black speckles (speckles), is called an emerging image. Not everyone can spot the dog in the Dalmatian picture, and those who can take varying amounts of time to do so. This study aims to investigate the factors that influence the perception of emerging images through three psychological experiments. In the first experiment, we identified that speckle-density and speckle-arrangement play a crucial role in the perception of emerging images. Based on these factors, we established parameters in the algorithm and generated diverse emerging-test images (ETIs) automatically. We then verified the effectiveness of these ETIs in two subsequent experiments.