CTENet: A Weakly Supervised Approach to Camouflage Detection Using Enhanced Texture, Contrast, and Edges

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Abstract

Identifying camouflaged objects in images is a major challenge in computer vision, requiring precise differentiation from complex backgrounds. Traditional methods often struggle due to the unpredictability of camouflage patterns, necessitating extensive labeling efforts. Deep learning can help, but a lack of labeled data hinders progress. To address this, we employed weak supervision using scribble annotation to reduce labeling efforts while maintaining accuracy. We introduced CTENet (Contrast Texture Enhanced Network), trained on the S-COD dataset. CTENet features four key modules:The LCC module simulates the visual suppression process of the visual system to improve image contrast and clarity. The TEM module utilizes the receptive field present in the visual system to enhance texture. The boundary ambiguity between foreground and background has been a fundamental challenge; thus, the EDB module was proposed to assist the network by reinforcing these boundaries. The CBAM module is used to highlight important features in the image. Experimental results demonstrate that our model outperforms previous approaches in camouflage detection.

Keywords: Camouflaged objects, Deep learning, scribble annotation, Weak supervision

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