ABSTRACT

Low-light image enhancement aims to improve visibility, contrast, and detail in images captured under poor lighting conditions. The Gradient Adaptive Convolution Algorithm offers a novel approach by dynamically adjusting convolution kernel weights based on local gradient information, ensuring effective enhancement while preserving edges and reducing noise. The Gradient Adaptive Convolution Algorithm adjusts its convolution operations based on the spatial gradients of the image, focusing on regions requiring more enhancement (e.g., low-contrast areas) and preserving details in high-gradient regions (e.g., edges and textures). Convolution kernel weights are dynamically adjusted based on local gradients:High-gradient areas: Reduce kernel strength to preserve edges.Low-gradient areas: Increase kernel strength to enhance contrast and brightness.