

Edge detection involves a process to discriminate, highlight, and extract useful image features (edges and contours). In many situations, we prefer an edge detector that distinguishes these features more accurately, and which comfortably deals with a variety of data. Our observations, however, discovered that most edge-defining functionals underperform and generate false edges under poor imaging conditions. Therefore, the current research proposes a robust diffusion-driven edge detector for seriously degraded images. The method is iterative, and suppresses noise while simultaneously marking real edges and deemphasizing false edges. The anisotropic nature of the new functional helps to remove noise and to preserve semantic structures. Even more importantly, the functional exhibits a forward–backward behavior that may sharpen and strengthen edges. Comparisons with some other classical approaches demonstrate superiority of the proposed approach.