Study and Comparison of Various Image Edge Detection Techniques

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Edge Detection, Noise, Digital Image Processing

ABSTRACT

Edges characterize boundaries and are therefore a problem of fundamental importance in image processing. Image Edge detection significantly reduces the amount of data and filters out useless information, while preserving the important structural properties in an image. Since edge detection is in the forefront of image processing for object detection, it is crucial to have a good understanding of edge detection algorithms. In this paper the comparative analysis of various Image Edge Detection techniques is presented. The software is developed using MATLAB 7.0. It has been shown that the Canny’s edge detection algorithm performs better than all these operators under almost all scenarios. Evaluation of the images showed that under noisy conditions Canny, LoG (Laplacian of Gaussian), Robert, Prewitt, Sobel exhibit better performance, respectively. It has been observed that Canny’s edge detection algorithm is computationally more expensive compared to LoG (Laplacian of Gaussian), Sobel, Prewitt and Robert’s operator.

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ABSTRACTING & INDEXING

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Edge detection is one of the most commonly used operations in image analysis, and there are probably more algorithms in the literature for enhancing and detecting edges than any other single subject. The reason for this is that edges form the outline of an object. An edge is the boundary between an object and the background, and indicates the boundary between overlapping objects. This means that if the edges in an image can be identified accurately, all of the objects can be located and basic properties such as area, perimeter, and shape can be measured. Since computer vision involves the identification of objects in an image, it is necessary to point out the true edges to get the best results from the matching process. That is why it is important to choose edge detectors. In this respect, we first present some advantages and disadvantages of Edge Detection Techniques. They are as follows: 2.3.1 Classical (Sobel, Prewitt). The edge detection is the primary step in identifying an image object, it is very essential to know the advantages and disadvantages of each edge detection filters. In this paper we dealt with study of edge detection techniques of Gradient-based and Laplacian based. Edge Detection Techniques are compared with case study of identifying a shark fish type. Image Edge detection significantly reduces the amount of data and filters out useless information, while preserving the important structural properties in an image. Since...
Conclusions The edge detection is the dominant step in determining an image object. The adverse is that it will reduce that of highly precise in discovering out the assimilation of edges and malfunctioning at the corners. It is very fundamental to know the dominance and disadvantages of each edge detection filters. The major adverse is the computing of Gradient calculation for generating the angle of elimination and its threshold values. In this paper we handle with study of edge detection methods of Gradient-based and Laplacian based. The dimension of the kernel filter and its coe