An efficient noise immune image edge segmentation algorithm in wavelet domain

Dr.C.Sujatha

Department of ECE, SSM Institute of Engineering and Technology, Dindigul.

Dr.S. Karthigailakshmi

Department of ECE, SSM Institute of Engineering and Technology, Dindigul

G.Saranya

Department of ECE, SSM Institute of Engineering and Technology, Dindigul

ABSTRACT

In image processing and computer vision, edge detection is a process which attempts to capture the significant properties of objects in the image. An edge is defined as discontinuity in gray level values of an image. Edges are predominant features in images and their analysis and detection are essential goals in computer vision and image processing. Wavelet Transform is used to segment the edge features of an image. The image edge detection using Simplified Gabor Wavelet is proposed in this paper.

Keywords: Edge detection, Wavelet Transform, Simplified Gabor wavelet, FOM, PSNR

1. INTRODUCTION

Research in automatic edge detection has been active because of this topic's wide range of applications in image processing, such as automated inspection of machine assemblies, diagnosis in medical imaging, and topographical recognition [1]. Many researchers have been working on the image edge detection using wavelet transforms and publishing their works in the past few decades. Some of the works are stated in this section. Brannock & Weeks have proposed an edge detection method based on the Discrete Wavelet Transform (DWT), which combines DWT with other methods to achieve an optimal solution to edge detection algorithm [2]. Edge analysis and detection approach using Shearlet transform is presented in [3] and it is used to extract the information about the edges and their orientations even in the presence of noise. Two corner detection methods for gray level images based on log Gabor wavelet transform have been presented by [4]. Gabor Wavelet (GW) algorithm is used to achieve edge detection of precision parts, acquires the precise edge features through a reasonable choice to directions and scales is proposed in [5] This method reduces image noise by optimizing GW filter and extracts the image edge by using wavelet multi scale transform. Simplified Gabor Wavelet (SGW) has achieved a performance level similar to the original GWs for face recognition. The computational cost and performance are better than other methods. The SGW is proposed by some other authors [1, 4, 5, 6, 7]. The computational cost of SGW based edge detection method is less than other wavelet based method. This proposed SGW method yields very good results than the conventional edge detection method and other wavelet based methods. This proposed method proves its performance for noisy images also.