Performance Analysis of Various Filtering Techniques for Smoothing and Sharpening the Brain Tumour Images

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Abstract

Image filtering is considered as one of the procedure to remove the noise in order to improve the digital images for various applications. The main intention of filtering the image is to obtain the processed image so that the resultant image will be quite applicable for a precise application when compared with the original image. This paper addresses the various Image processing applications and filtering techniques that suits for the health care domain to check for some major disease in human being. In order to obtain the objective, smoothing and sharpening of the image must be done. In this paper, the Ideal, Gaussian and Butterworth high pass and low pass filtering are applied on images. In this work different recent image filtering methods are compared based on certain factors.

Keywords: Fourier Transform, Ideal filter, Gaussian Filter, Butterworth Filter.

1. Introduction

Digital Image Processing is really a wide field which provides the different fundamentals for the digital image. A digital image is really a depiction of two dimensional images as a finite group of digital values. It concentrates on two important tasks. Primary is a pictorial data for human elucidation. Next, the storage and transmission of image is considered and finalized according to the illustration for autonomous machine observation [9].Digital Image is also defined as the two dimensional image which have a finite quantity of elements in which all the elements are with a specified position and value. The other names for these elements are picture element, pels or pixels. The least administrable element of an image viewed on the screen is known as pixel [13].

Altering the attributes of the captured image to make it more acceptable for further processing is the main aim of the Image enhancement process. During this process, attributes of the image are modified according to the method applied on that. The way the attributes are chosen and their variance are particular according to a specific application [16].

Filter out unwanted frequencies from the image is called filtering. Processing an Image and finding the applicable resultant image for the expected applications is the main aim of the Image filtering. Removal of noise in order to improvise the resultant image for various applications is referred as Image filtering [2]. The digital filter can be categorized as a low pass or high pass filter depending on which part of the frequency spectrum it affect [7].

Enhancement of image in the frequency domain is simple and easy. The image to be enhanced is computed using the Fourier Transform and the result is multiplied by a filter then it is inversed in order to receive the resultant image. The high frequency components can be reduced to blur an image or the magnitude can be increased to sharpen the image to make it easy to understand [3].