

Image Denoising using Daubechies 4 Wavelet

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Abstract

This project focus on removing noises in the long bone x-ray images using Daubechies 4 Wavelet. Noise appears as unwanted dots, lines and smudges of color. It can be defined as random spaces speckles that exist in most of the digital images. The process of reducing the noise in the x-ray images was done by decomposing the images into different frequency sub-bands and reconstructing the images into an image the less noise. The objectives of this project are to implement the Daubechies 4 wavelet transforms technique to remove noise in x-ray images and to evaluate the result of Daubechies 4 wavelet transforms technique using Peak Signal to Noise Ratio (PSNR). The scope of this project is the long x-ray images containing noises that are in JPG format. From the experimental results, it shows that Daubechies 4 Wavelet transform can be used to remove noise in the images through the decomposition and reconstruction process. In the future, this project needs enhancement to produce better result with implementing advance techniques.

Keywords: Noise, X-ray Image, Daubechies 4 Wavelet, Decomposition and Reconstruction

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Noise is defined as random spaces speckles that appear in most of digital images. It is similar to grain that appears in photos taken with traditional cameras using high ISO films. ISO is defined as how sensitive the image sensor is to the amount of light present. The sensitivity of the image sensor is depending on the value of the ISO. If the value is increase or high, the more sensitive the image sensor will be. Noise will be visible when viewing a photo at 100% on a computer monitor, but when the image is reduced in size, it may be barely visible. In fact, it may not be noticeable at all in small sized prints but still it has to be removed so that the images will be clearer. When there is noise in an image, the image detail and clarity will be reduced significantly (Rangarajan, 2002).

There are many types of technique that can be used to reduce or removing the noise from the images. Filtering technique is the earliest technique used but along the year, other techniques had been developed to cover the disadvantages of filtering technique. For now, wavelet technique has shown a good result in many fields including denoising (Ce Liu, 2006).

Wavelets are mathematical functions that will divide the data into some different components before using each component of it to understand it with its own resolution that