

ABSTRACT

In present scenario, digital image processing is the use of computer algorithms to perform image processing on digital images. It allows a much wider range of algorithms to be applied in the input data and can avoid problems such as noise and signal distortion during processing. During image transmission and acquisition, the images are corrupted by noise. One of the important noises is impulse because it happens from electromagnetic interference, faulty hardware and channel error.

The purpose of this thesis is to investigate the impulse noise removal is to suppress the noise while preserving the integrity of edge and detail information. A fundamental problem in image processing is to effectively remove noise from an image while keeping its features intact, but the nature of problem depends upon the type of noise in the image. According to the distribution of noisy pixel values, impulse noise can be classified into two types namely fixed valued impulse noise and random valued impulse noise. The former is also known as salt-and-pepper noise because the pixel value of a noisy pixel is either minimum [0] or maximum [255] value in grayscale images. The values of noisy pixels corrupted by random valued impulse noise are uniformly distributed in the range of [0, 255] for grayscale images. The random valued impulse noise is very difficult to handle due to the random distribution of noisy pixel values. This thesis focus on removing the random valued impulse noise from the corrupted image.

Filters having better edge and image detail preservation properties are highly suitable for image filtering. New algorithms and techniques can

take advantage of reducing the elapsed denoising latency. Thus, the development of linear filtering techniques, which perform equally well under wide variety of applications, is of great importance.

In general, fundamental and simplest method is Mean Filter. The Mean Filter is a linear filter which is used to remove the random valued impulse noise. The simulation results prove that the proposed technique gives a better performance in terms of quality related parameters of image like PSNR and MSE value, which is obtained from MATLAB 6.1 compared with other denoising algorithms.

A hardware based denoising system can be designed on Field Programmable Gate Array (FPGA) Implementation. This work is aimed to develop a low power, high performance and real time system. Evaluation of this work is based on synthesis report and timing report, which is obtained from Xilinx ISE 9.2i. Finally we have studied the throughput achieved by hardware and compared with that of the existing hardware implementations.

In the application area, interest focuses on procedures for extracting from image information in a form suitable for computer processing. Examples include automatic character recognition, industrial machine vision for product assembly and inspection, military recognizance and automatic processing of fingerprints.

The future work can be focused on video denoising. It can be extended to real time applications.