Denoising Technique and Analysis of Statistical Parameters for Endoscopic Images of Gastric Cancer

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Abstract

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Abstract:
Gastric cancer (GC), which is commonly referred to as stomach cancer, is a kind of cancer that develops in the stomach cells. The gastrointestinal tract is a component of the alimentary canal, which is composed of a series of spherical muscular organs linked by a long, curved tube that passes from the inside of the mouth to the anus. Endoscopic gastroduodenoscopy (EGD) using an upper endoscope is a procedure that helps identify most stomach cancers because the endoscopic pictures that using filtering algorithm to increase endoscopic image tissue that are obtained vulnerable noises. Denoising is extremely important of the endoscopic images in diagnosis and subsequent medical care. On the basis of the endoscopic imaging data that has been obtained, filtering and denoising for image management were performed in order to obtain quality data and, as a result, to protect and safeguard the dependability of important clinical information. During the course of this study, numerous algorithms like Gaussian, median, wavelet, Weiner, filtering were performed on the selected endoscopic images and the resulting data has been statistically analyzed and characterized in detail. The various filtering algorithms were used on the endoscopic images and the results have been analyzed using a descriptive parameter statistical analysis approach. The skewness and kurtosis values for all the filtered images were calculated and compared. The results obtained from the parametric method were analyzed using various tools like ANOVA, t-test, z-test, linear regression, and covariance. The data obtained were used

to calculate the ranking and percentile for analyzing the performance of the filters. Based on the results obtained from the analysis the good and best filter that can be used for denoising endoscopic images of gastric cancer was identified.

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Contents

I. Introduction

Endoscopy is the recommended and most gentle treatment for gastric cancer (GC) or stomach cancer. Endoscopy has become a common medical practice as science and technology have advanced. Endoscopy enables physicians to not only observe the tissue shape and abnormalities within an individual's tissues and organs directly, but also to process endoscopic pictures for improved visual and diagnostic outcomes. Still, as a result of the special characteristics of the body's regions and the constraints of imaging conditions, direct endoscopic images usually display low levels of contrast between the coronary arteries as well as surrounding tissues, resulting in the absence of some vascular features [1]. As a result, endoscopic pictures must be improved. Methods of noise evacuation have become common place in clinical imaging applications for anatomical structure study and processing of images. Exact images should be obtained in clinical image handling to obtain precise perceptions of the application for which they are intended. Any denoising approach's purpose is to eliminate noise from an image, which is the most important stage in any form of image processing. The noise removal method must be utilized with caution in order or artefacts will be displayed, obscuring the image. This study evaluates the implementation of endoscopic image denoising algorithms. The Gaussian filters, Median filters, Weiner filters, and Wavelet filters are among the approaches employed. Each of the filters listed below is used, and the results of that filter are noted. The proposed technique is then broken down with the other image filtering computations and feature extraction of filtering techniques has been analyzed based on manual correlation calculation and statistical analysis test. Clinical imaging is critical for health identification as well as treatment preparation [2]. Endoscopic pictures are acquired medically to determine whether cancer is predicted. Sign In to Continue Reading is a common procedure for gastric cancer identification. However, in some circumstances, insufficient image quality makes segmentation of diagnosed regions and disease diagnosis difficult. The presence of noise in endoscopic images caused by artifacts, as well as some mucous layer in the images. So, getting a clear image for higher-level processing in computerized image processing in computer assisted method denoising is critical for the purpose of training in the medical field of healthcare. Endoscopic quality of images may be low for a wide variety of reasons; consequently, it is critical to improve endoscopic image quality. The following are the shortcomings of endoscopic images. Initially because standard imaging produces low image quality, enhancing endoscopic image quality and raising the information contained in the image are both essential to performing a successful diagnosis [3]. Additionally, a number of cells and vessels in the body viewed with an endoscope have a black scenery. The overall image contrast is low, making it difficult to distinguish tiny blood vessels from the connective tissue baseline and determine lesions, thereby threatening diagnosis. Moreover, endoscope images captured with a suitable metal-oxide transistor lenses may be dim due to light source issues or poor contact, impairing the interpretation of the image. Ultimately, the inside of human tissue called connective tissue is smooth during endoscopy and includes a variety of water droplets that fall which gives rise to speckle-like areas that appear in gastroenterology pictures. This article which has been clearly stated the various denoising filtering techniques and justified has the novelty of filtering techniques and feature extraction to finding out the manual correlation coefficient and shows the comparison of statistical parameters by ANOVA test. To analyze the best filter for the endoscopic images.

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