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Review Of Image Fusion Algorithm Using Different Methods

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Abstract - *The main purpose of image fusion is that it reduces the amount of data and creates new images that are more applicable for the purposes of human/machine perception.*

The image fusion algorithm combines information from different source images of the same scene and achieves a new image which can provide much more visual information than the original source images. This article represents various techniques by which Image Fusion Algorithm can be implemented.

Key Words: Image Fusion, Algorithm, Human, Machine, Techniques.

1. INTRODUCTION

The expansion in the field of sensing technologies multi-sensor systems have become a actuality in various fields such as remote sensing, medical imaging, machine vision and the military applications for which they were developed. The result of the use of these techniques is a increase of the amount of data available. Image fusion provides a productive way of reducing the increasing volume of information while at the same time removing out all the useful information from the source images. Multi-sensor data often presents compatible information, so image fusion provides an effective method to enable comparison and survey of data.

1.1 System Specification and Block Schematic

With the high speed growth of information processing technology, we are now living in a highly informative world, and among various kind of information people obtain in their everyday life, 75% is received from vision, i.e. imaging

information has already turned into a main carrier that people gain and interchange information. Thus, under large and growing demand on information data processing, how to swiftly and efficiently handle huge image data has become a major issue to be solved. As a significant branch of image processing, image fusion also develops quickly.

With the eruptive growth of visual information and the rapid development of image study processing in both hardware and software fields, these achievements solidly lay a foundation of the research and application of image fusion.

Owing to the ability to not only enhance the clarity of images and amount of visual information but also improve the accuracy of extraction and study of image character, image fusion is widely used in military, remote sensing, agriculture, medicine and other fields.

1.2 Hierarchial classification of Image Fusion

An identified classification of image fusion divides it into 3 levels, which are pixel level fusion, feature level fusion and the decision-making level fusion. In pixel level fusion which is at the bottom of all image fusions, there is a study of images in pixels with the original image and are able to preserve more original information. The image fusion based on pixel level can produce fused image as well as providing support.

The research and application based on pixel level are far more widespread and represent greater opportunity in the near term.

The feature level fusion processing can provide the decision-making level fusion with supports. But not like the pixel level fusion, feature level fusion processing doesn't require the high image matching metric. Besides, since the feature level fusion processing consisits of the information of

characteristics, the data size has effectively diminished which leads to it is easier to compress visual information and send data.

The first step of decision-making level fusion is deriving out the objective and types of several source images. Secondly, according to credibility criterion to process image after

making decision aiming to a particular objective. Image fusion should satisfy three aspects before we call it efficient. First, the fusion image should preserve all the characteristic information of the original images as far as possible.

Second, it should not bring any duplicate or conflicted information in images while doing image fusion. Last but not the least, it should lessen the impact of the unfortunate characteristics of source images as much as possible.

2. IMAGE PYRAMID APPROACHES

An image pyramid consists of a collection of low pass or band pass copies of an image, each copy showing pattern information of a unique scale. An image pyramid can consist of all the information needed to rebuild the primary image.

2.1 Gaussian Pyramid

The scientist pyramid consists of low-pass filtered, reduced density (i.e., down sampled) mathematician of the preceding level of the pyramid, where very cheap level is defined as a result of the first image. The method involves producing a series of images that are fully employing a mathematician average and scaled down.

Once this method is used many times, it creates a pile of successively smaller images, with each part consisting of a neighbourhood average that accords to a part of neighbourhood on a lower level of the pyramid.

2.2 Laplacian Pyramid Fusion

Laplacian pyramid (fundamental tool in image processing) of an image is a collection of band pass images; throughout that everyone could be a band pass filtered copy of its forerunner. Band pass copies are usually obtained by calculative the excellence between low pass images at serial levels of a Gaussian pyramids.

A test is used to work out from that which provides what pixels contribute at each specific sample location. Take the common of the two pyramids like each level and add them. Secret writing of a picture is finished by increasing, then summing all the degree of the fused pyramid that's obtained by straight forward averaging.

The Laplacian pyramid is derived from the Gaussian pyramid illustration, that's for the most part a sequence of additional filtered and down- sampled versions of a picture. The strategy of face detection is achieved by exploitation and economical algorithmic program for multi-focus image fusion called Laplacian pyramid algorithmic program.

Multi resolution signal decomposition theme is efficiently used for any applications like gestures, texture, produce and lighting conditions whereas taking a picture. Fusion approach is very helpful for applications like Hand Gesture. Hand gestures plays an important role in Human computer Interaction. They function primary interaction tools for gesture primarily based laptop management.

2.3 Fusion in Wavelet Domain

Wavelet transform is considered as an alternate to the short time Fourier transforms. In Fourier transform, the signal is dissolved into sine waves of varied frequencies whereas the wavelet transform break down the signal into scaled and shifted varieties of the original wavelet or function.

A fusion rule is applied to combine these two coefficients and so the resultant image is obtained by taking the inverse wavelet work.

3. Block Diagram

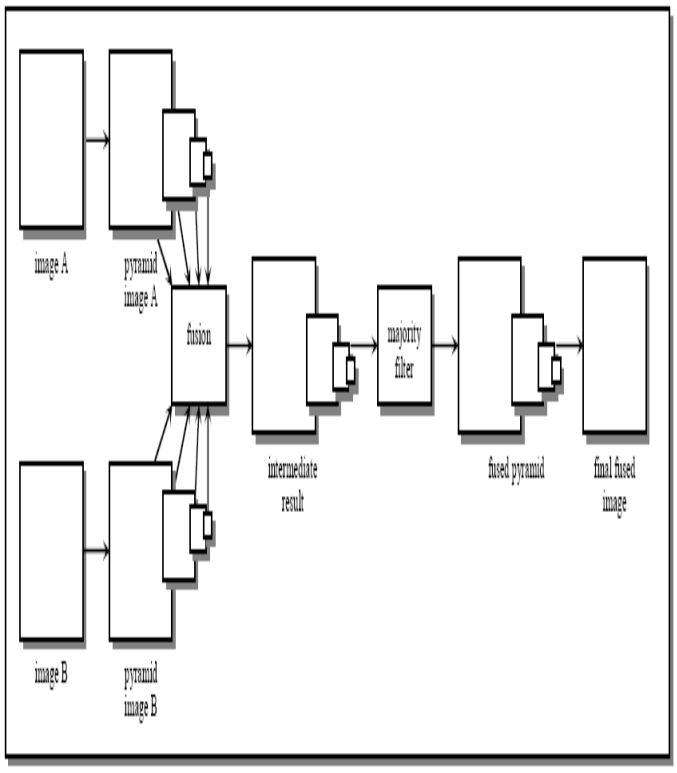

Fig -1: Pyramid Decomposition

4. CONCLUSION

We will be getting a reconstructed image which is formed after the pyramid decomposition of the source image.

This reconstructed image will be much better in resolution, pixel size etc than the source image.

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