

MULTISCALE PIXEL LEVEL IMAGE FUSION

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ABSTRACT

Image fusion is a process which combines the data from two or source images from the same scene to generate one single image containing more precise details of the scene than source image. Multistage pixel-level image fusion is a transform coefficient of an image associated with a feature of its value is influenced by the feature's pixel. Most of the previous image fusion method aim at obtaining as many information from the different modality images. With respect to satellite image fusion the edges and outlines of interested objects is more important than other information. Image with high contrast contain more edge-like features. In our new system we defined the ratio of maximum detail components to the local mean of the corresponding approximate component.

Keywords - Image fusion, pixels

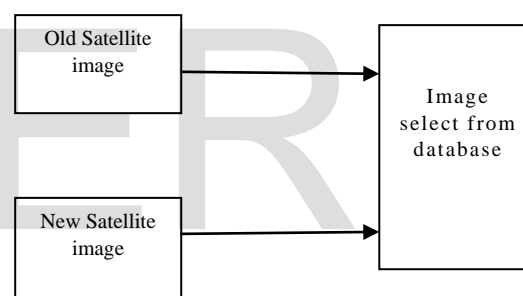
I. INTRODUCTION

Image processing is processing of image using mathematical operations by using any form of signal processing for which the input is an image or video frame, the output of image processing may be either an image or set of characteristic or parameters related to that image. In DWT system satellite image fusion scheme is based on an improved wavelet coefficient contrast, used to define the ratio of the maximum of detail components to the local mean of corresponding approximate component. The visual experiments and quantitative assessments demonstrate the

effectiveness of this method compared to present image fusion schemes, especially for satellite image fusion.

II. IMAGE SELECTION

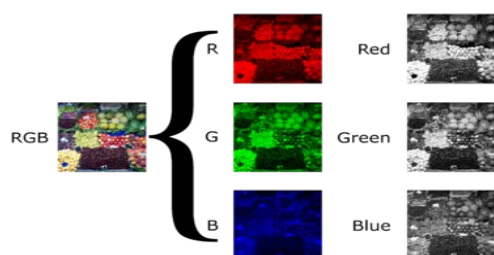
Images are selected from the database which is digitally recorded on the disk. Selected images are downloaded to a computer. To order and request satellite images some of the factors to be determined are: 1) Imaging purposes 2) Image characteristics 3) Region size.



III. Grayscale Conversion:

In photography and computing a grayscale digital image is an image in which the value of each pixel is a single sample which carries only intensity information. The intensity of a pixel is expressed within a given range between a minimum and a maximum (ie) 0 for black and 1 for white. Grayscale helps to extract descriptors instead of operating on color images which simplifies the algorithm and reduces

computational requirements.



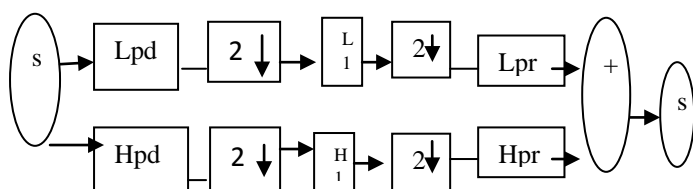
IV. DISCRETE WAVELET TRANSFORM(DWT)

In numerical analysis and functional analysis, a DWT is any wavelet transform in which the wavelets are discretely sampled. As with other wavelet transforms, a key advantage it has over Fourier transforms is temporal resolution: it captures both frequency and location information. The DWT was developed to apply the wavelet transform to the digital world. Filter banks are used to approximate the behaviour of the continuous wavelet transform. The coefficients of these filters are computed using mathematical analysis.

- Lpd: low pass decomposition filter
- Hpd: high pass decomposition filter
- Lpr: low pass reconstruction filter
- Hpr : high pass reconstruction filter

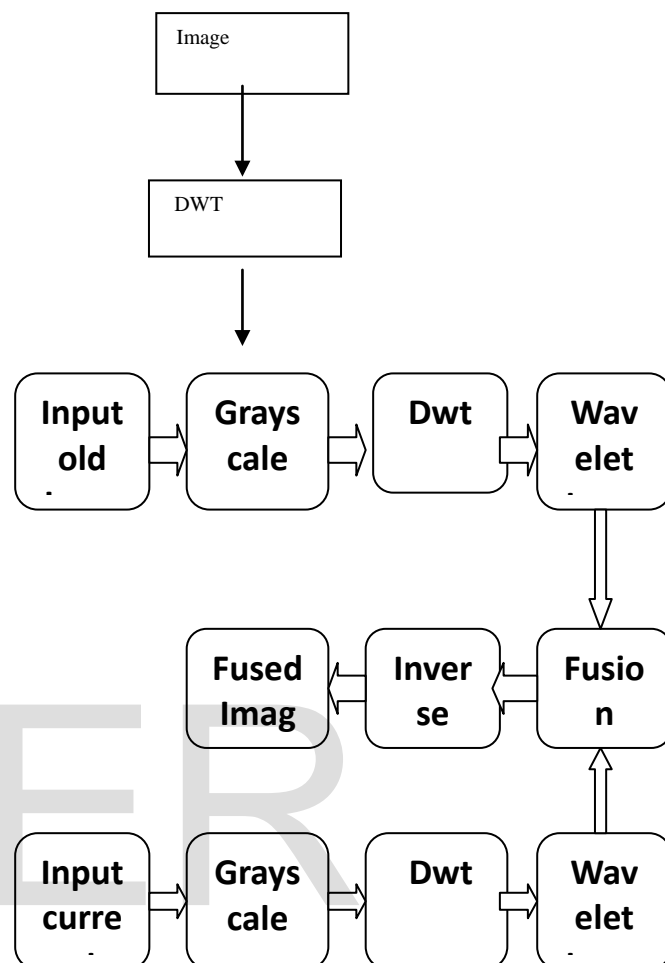
Frequency bands separation

Decomposition and Reconstruction



The basic concept of the DWT is to sector the portrait into high and low sub bands.

The wavelet transform is computed separately for different segments of the time-domain signal at different frequencies.



The low sub band and high sub band are used to form LL, LH, HL and HH.

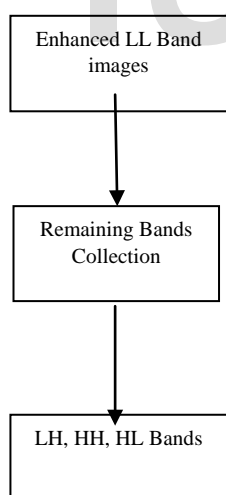
V. CONTRAST ENHANCEMENT

Inspite of increasing demand for enhancing remote sensing images, existing histogram-based and contrast enhancement methods cannot preserve edge details and exhibit saturation artefacts in low- and high intensity regions. In the proposed system we present a novel contrast enhancement algorithm for remote satellite images using dominant brightness-level based adaptive intensity transformation. If we Problems

we decompose the input image into multiple layers of single dominant brightness levels. To use the low-frequency luminance components, we perform the DWT on the input satellite image to estimate the dominant brightness-level using the log-average luminance in the LLsub band. Since high-intensity values are dominant in the bright region and vice versa.

VI. INVERSE DWT (IDWT)

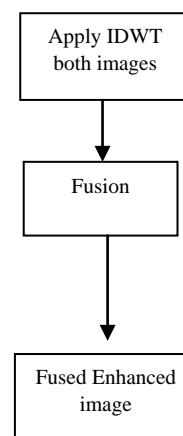
IDWT is used to separate the input low contrast satellite image into different frequency subbands, where the LL subband concentrates the illumination information. That is why only the LL goes through the process, which preserves the high-frequency components (i.e., edges). Hence after inverse DWT (IDWT), the resultant image will be sharper with good contrast.



VII. IMAGE FUSION

Image fusion is a process of combining images at different wavelengths simultaneously viewing of the same scene, to form a composite image.

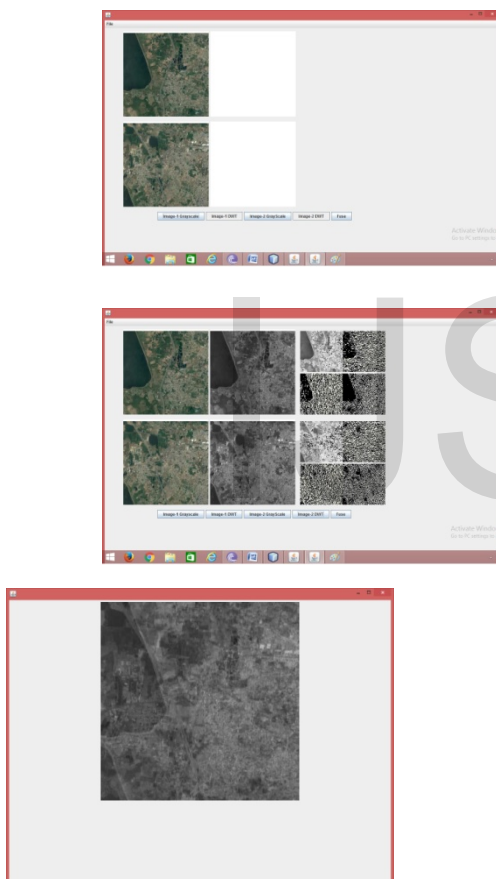
The composite image generated is used to improve the image content in order to make it easy for the user to detect recognize, and identify targets and increase his situational awareness. Image fusion is one of the data fusion technology which keeps images as main research contents. It refers to the techniques that integrate multi-images of the same scene from multiple satellite image data or integrate multi images of the same scene at different times from one image sensor. The image fusion algorithm based on wavelet transform which faster developed was a multi-resolution analysis image fusion method in recent decade. The wavelet transform contains the low-high bands, the high-low bands and the high-high bands of the image at different scales, plus the Low-low band of the image at coarsest level. Except the low-low band which has all positive transform values, all other bands contain transform values in these bands correspond to sharper brightness values and some of the salient features in the image are edges, lines and region boundaries. After applying wavelet transform we have the approximation image at the coarsest resolution and the detail images at all the resolution for both the images. The next step is to merge the two approximation or detail structures obtained from image 1 and 2 element wise by using certain fusion method.



VIII. MERITS

- The advantage of this paper is the 'contrast' method and proposed fusion method presents lightly better visual effect than others.
- The proposed fusion method has less disturbing details.
- DWT analyses 0, 45, and also 90 degrees.

EXPERIMENTAL RESULTS



VIII. CONCLUSION

We have presented a novel image fusion method based on guided filtering. The proposed method utilizes the average filter to get the two-scale representations, which is simple and effective. More importantly, the guided filter is used in a novel way to make full use of the strong correlations between neighbourhood pixels for weight optimization. Experiments show that the

proposed method can well preserve the original and complementary information of multiple input images. The proposed method is very robust to image registration.

IX. FUTURE WORK

The proposed method is computationally efficient, for real world applications. And it helps to improve the performance of the proposed method by adaptively choosing the parameters of the filter which can be further researched.

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