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IOOPL in Detecting Fish School Migration

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***Abstract*— Nowadays satellite images are used to analyse marine environment like ocean temperature, tide waves, detection of fish school migration etc. the shadow due to clouds and others may occur incorrect result. So the detection and removal of shadow play is found to be very important. Here IOOPL method is utilized for shadow detection and removal and thus to detect fish school migration. In this clustering of image is done, and to detect shadow threshold value is fixed and compared, several properties of objects in the image are used to ruled out false shadows. For shadow removal IOOPL method is used .The shadow removal method used is suitable for high resolution image and, can restore texture details, and also more stable back ground radiance.**

***Index Terms*— Convexity model, IOOPL, Remote sensing, Shadow detection, Shadow removal.**

I. INTRODUCTION

Shadows in an image sometimes becomes handy, like in analyzing a 3D image by reconstruction, object recognition method, and also to find height of various object ; they can also interfere with the processing and application of high-resolution remote images. So for analyzing an first shadow need to be detected and removed in a proper manner, otherwise it may cause incorrect result. In the case of marine environment also the application like detecting fish school migration from satellite image can affected by the effect of shadow .

Nowadays satellite image is used to analyze marine environment like used to detect fish school migration. For detect shadows the three features, intensity values, geometrical properties, and light directions, are used by several efficient algorithms. The shadow areas are estimated according to the space coordinates of buildings calculated from digital surface models and the azimuth and the altitude of the sun. for efficient way most of the shadow detection algorithms is based on features of the shadow. For detect shadow region a threshold method is used which taken from the grayscale histogram. Comparing to non shadow area the shadow area have low gray scale .so by the comparison of grayscale value with the threshold value the shadow area can be detected.

To detect fish school migration from satellite image there may be shadow due to clouds and also other false objects first clusters are derived from the original image, then in accordance with the value of grayscale, a threshold is fixed from this the suspected shadow is detected. Then apply IOOPL method to get homogenous section. The shadow boundary is detected and marked, to get colour similar to human eye colour conversion is made, and also to smooth the image median filter i.e. to eliminate random noise which lead to efficient shadow removal.

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II. SHADOW DETECTION

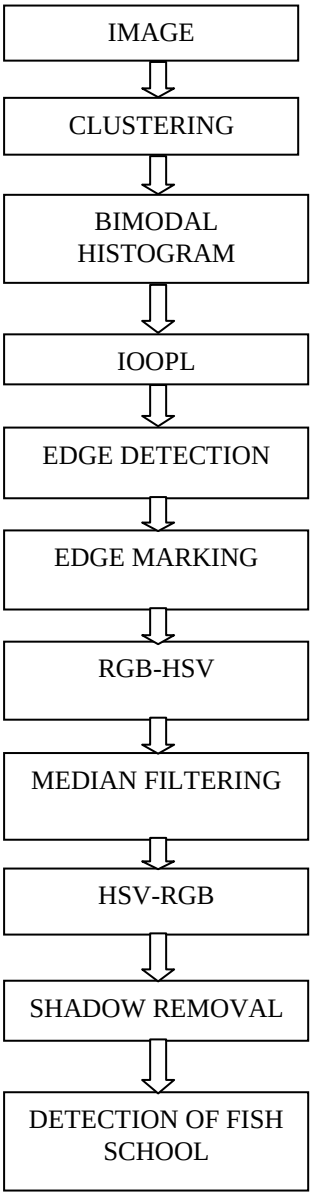

Figure 1: Proposed System Block Diagram

Shadow can be detected from many methods one of the method is to take many image of same area at different time.ie the shadow of region interest is noted from the different image of that area at various time instant. Then, from the noted

shadow pixels are replaced by the non shadow pixel of that region.

This latter approach is suitable in low-resolution images. To overcome the drawbacks of pixel-level shadow detection, in this study, we apply a new technique IOOPL based shadow detection and removal method. First, cluster of image formed this will result in segmentation of the image by this shadow features of the image are evaluated ,and using bimodal histogram suspected shadow regions are detected. False shadows makes important problem in the case of image processing so to ruled out this, the properties of the object such as spectral features and geometric features are combined with a spatial relationship.

In this the image read using RGB colour space which contain colour in terms of the amount of red, green, and blue present. In this colour description plays an important role. Thus the HSV colour space model used in this colour which can be described in terms of the Hue, Saturation, and Value because in HSV model the colours are similar to how the human eye tends to perceive colour in the RGB. Colour is represented in terms of a combination of primary colors because of which the HSV color model is often preferred over the RGB model. In HSV comparisons such as color, vibrancy and brightness used to describes color. So determine the colour RGB is used after values are readied it get converted to HSV color model.

After performing colour transformation, median filtering is used to smooth the image i.e. unwanted noise like impulsive or salt-and-pepper noise are in image. It affects the process. The median filtering performs like low pass filtering to reduce noise. The edges may get distorted after removal of the random noise. The problem of distortion of the edges can be managed by using 'median filtering'. It is a nonlinear process which is capable of preserving the edge of the image. A random bit error in a communication channel can lead to salt-and-pepper or impulsive noise. The process of median filtering can also preserve discontinuities in a step function.

In this when shadow is extracted it can be removed by various steps. For apply IOOPL section matching method the inner and outer line of shadow boundary is formed by contracting and dilating the shadow boundary and IOOPLs indicated by the grayscale values of the corresponding points on the inner and outer outline lines. So by checking the correlation of inner and outer lines, homogeneous sections are acquired. Then the method of removal of shadows is applied based on the homogenous section to remove shadows.

A. A. Image segmentation

Clustering of image makes a group of data points into a small number of clusters. the K-means clustering method which use the square of Euclidean distance as a parameter to minimize the *distance* from the data points to the cluster to find the positions of the clusters for efficient clustering need to minimize the mean squared distance from each data point to its nearest center to get best result data set are distinct or well separated from each other.

Earlier image segmentation methods are likely to result in insufficient segmentation, so it is difficult to distinct dark objects from the shadow area. There are so many methods for image segmentation; to overcome drawbacks of existing segmentation the convexity constraints model can be used. It include factors like colour and shape which improve the segmentation process which result in distinction between shadows and dark objects .The parameters of object including grayscale average, variance, area, and perimeter is recorded so it result in better segmentation.

B. B. Detection of Suspected Shadow Areas

In this step bimodal histogram is used to detect the suspected areas where the shadows pertain. When an image consists of an object and shadow so that the object and shadow have gray levels, then it is grouped into two dominant modes in the grey-level histogram. In order to separate object from the shadow need to fix a threshold. this threshold is taken from the peak value of bimodal histogram then compare all point with threshold value threshold any point greater than T then that area belongs to object otherwise shadow region.

III. SHADOW REMOVAL

To remove the shadow areas from the image in this use IOOPL section matching .this first consider the shadow boundary and use vector representation to mark the inner and outer lines. when a shadow boundary is consider the area beyond the boundary may be part of the object and also the area inside the boundary belongs to shadow region so efficient shadow removal the area on the both sides of boundary need to analyze for that mark the shadow boundary by vector R and contract inwards to get inner line marked as R1 ang dilate the boundary outwards for outer line R2 .then to plot the inner and outer outline profile line and the gray scale value of both line is noted to determine the radiation features of the same type of object on both sides.

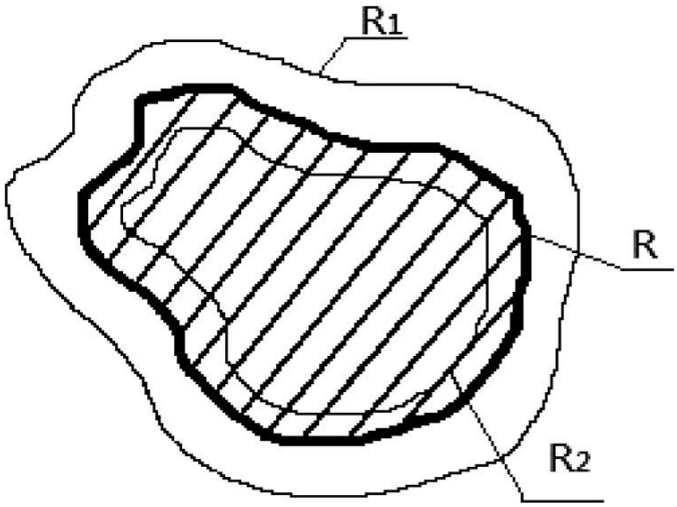

Figure 2: *S*hadow boundary: inner and outer line

There may be great chance that the grayscale value of inner lineR1 and outer line R2 will be same so the correlation of R1 and R2 is checked when correlation is high that area belongs to same object so IOOPL consist of grayscale value of inner and outer line.

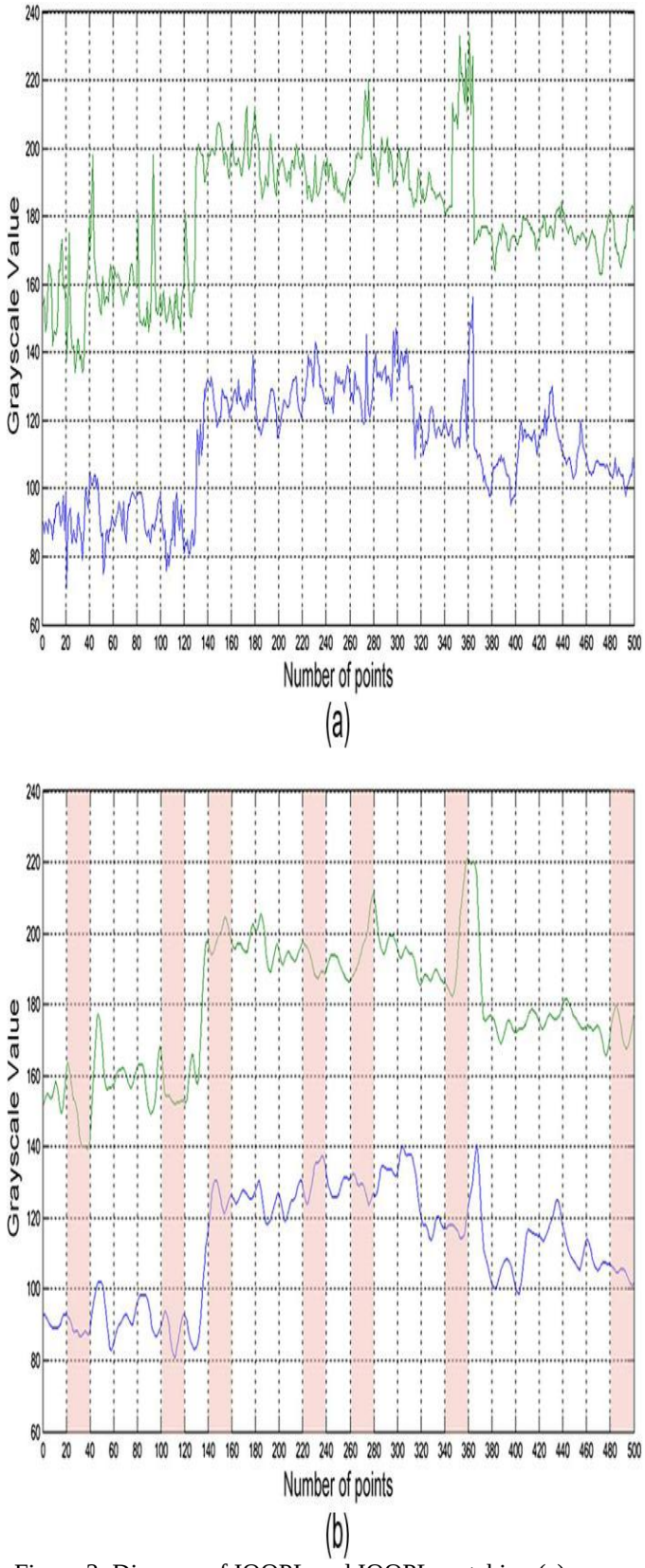

Figure 3: Diagram of IOOPL and IOOPL matching (a) gray level histogram at red band (b) after Gaussian smoothing

A. IOOPL Matching

In this process a section by section analysis of inner and outer line is done and there by homogenous sections are obtained which i.e. used for shadow removal for effective matching need to smooth the image i.e. elimination of random noise for that Gaussian smoothing is used with template parameters were $\sigma = 2$ and $n = 11$.

As a result IOOPL matching homogenous and non homogenous section are obtained in the above graph figure 3 the green line shows the homogenous line and red line indicate non homogenous line the non homogenous line which is the result of low correlation is to be eliminated. The homogenous section also reflect the illumination property i.e. if the correlation coefficient is very big, then it means that the features like shade and light fluctuation of the IOOPL line pair at this section are consistent or stable. For effective matching the non homogenous section can be further segmented and detecting the inner and outer line gets other homogenous section

B. Shadow Removal

When the shadows are detected it need to be removed .by IOOPL line pair matching homogenous sections are obtained for efficient shadow removal two approaches are used. Relative radiometric correction and polynomial fitting in the first approach homogenous point of each object is used to calculate the radiation parameter then applies the relative radiation correction to each object. The other approach is to obtain fitting parameters by analyzing all homogeneous section and it is applied to retrieve.

1) Relative Radiometric Correction: In the same urban in an image the shadow and non shadow region may be in different lighting condition. This can be used for shadow removal i.e. the radiation parameter can be calculated and relatively radiometric correction can be done. In order to carry out this process, each object needs to be considered as a unit for avoiding the influence of scattering light. So the shadow removal is applied for every object. This kind of method uses the linear relationship between the gray scale value and the digital number of image (DN).

2) PF: By IOOPL matching the homogenous sections are which belong to different lighting condition. In this section, for fast way the polynomial method is used. In using the polynomial method, the grayscale value of shadow area is transformed into polynomial and by analyzing it fitting parameter is calculated to improve accuracy and also to minimize the calculation the polynomial of gray scale must atmost have a degree of three. Through this method the problem of detecting minor shadow can be overcome and also through this many IOOPL matching points can be obtained.

Figure 4: An Example Input Image

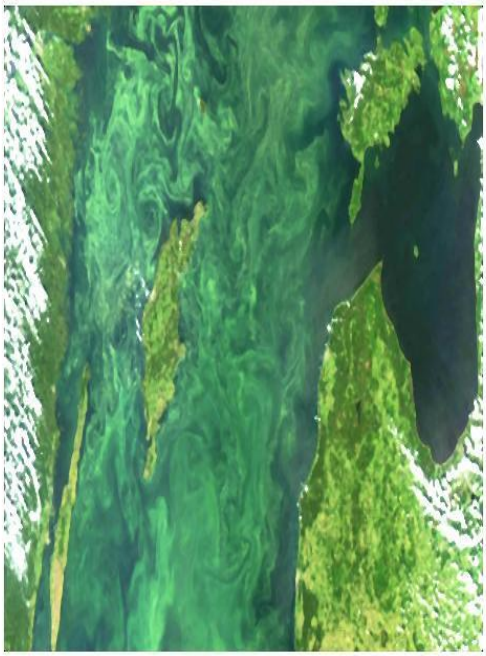

Figure 5: An Example Shadow Removed Image

The Fig. 4 and 5 shows an example input image and its corresponding shadow removed image respectively. When using this method results in obtaining a clear image from which various analyses can be made easy.

IV. CONCLUSION

This proposed method is very suitable for the high resolution image. The use of bimodal histogram to detect the suspected shadow region increase the accuracy apart from the existing method this method exploit the full information of each object in the image which result in the elimination of false shadows. The IOOPL section matching process results in the restoration of information in the shadow area. This is useful to detect fish school migration.

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REFERENCES

[1] Habib Ullah, Mohib Ullah, Muhammad Uzair, and Fasih Ur Rehman, "Comparitive Study: The Evaluation Of Shadow Detection Methods," International Journal Of Video& Image Processing And Network Security, vol. 10, No. 02.

[2] Krishna Kant Singh, Kirat Pal and M.J Nigam, "Shadow Detection And Removal From Remote Sensing Images Using NDI And Morphological Operators", International Journal Of Computer Applications, vol. 42, No. 10, pp. 0975 – 8887, March 2012.

[3] Gayathri Gurav, Prof. M .B Limker, Prof Sanjay M .Hundiwale, "Study of Different Shadow Detection and Removal algorithm," International Journal Of Research In Electronics And Communication Technology, vol. 01, Issue. 02, April- June 2014.

[4] Maryam Golchin, Fatimah Khalid, Lili Nurliana Abdullah and Seyed Hashem Davarpanah, "Shadow detection using color and edge information," Journal of Computer Science, vol. 9, Issue. 11, pp. 1575-1588, 2013.

[5] Jyothisree V and Smitha Dharan, "Shadow detection using tricolor attenuation model enhanced with adaptive histogram equalization," International Journal of Computer Science & Information Technology, vol. 05, No. 02, April 2013.

[6] Wenxuan Shi and Jie Li, "Shadow detection in color aerial images based on HSI space and color attenuation relationship," Shi and Li EURASIP Journal on Advances in Signal Processing 2012.

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