

A Survey on Assessing Reconstructability of Shadow Areas in VHR Images

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ABSTRACT: VHR pictures are acknowledged for their abnormal state subtle elements, which significantly build their application potential. In any case, normally, VHR pictures are influenced by the vicinity of shadows. An endeavour answer for the issue of shadows is to restore shadow areas by repairing the estimation of shaded pixels. Unfortunately, it might happen that not all shadow zones are conceivable to restore. In this paper, we propose distinctive criteria valuable to help in comprehension from the earlier in the event that it is conceivable or not to remake a specific shadow region. A perfect reconstructability rule ought not endure that an unreconstructable shadow territory is allotted as reconstructable and, in the meantime, ought to augment the likelihood of discovery of reconstructable zones. A few assessment criteria working at the pixel and textural levels are introduced.

KEYWORDS: Very high resolution (VHR) images, Shadow detection, Shadow Reconstruction.

I. INTRODUCTION

Very high resolution (VHR) means there are many more pixels per square inch. Due to (VHR) image it is very easy to distinguish each and every object of image. VHR images give the detailed information about the object like trees, roofs, vehicle and building structures. On the other side VHR images having some drawbacks like unwanted presence of shadow. Shadow is created when any object lies in the way of light emerging source e.g. sun. They are having different colour tone than non shadow part of that image.

Usually shadows are affecting information present in the shadow. Shadow may cause severe problem like false colour tone, wrong shape and size of object. To overcome this drawback necessary steps are shadow detection and shadow reconstruction. An example of getting shadow free images is the massive Tsunami in 2004 where it was crucial to obtain such images in very short time in order to take rapid and crucial decisions in rescue missions. The Processing of shadow relies on image processing and pattern recognition tools.

II. RELEVANCE

Very high resolution images opened a new era in the remote sensing field. However presence of shadow in such images may lead to total or partial loss of information. For this reason shadow contaminated regions need preferably to be compensated. In general after detection of shadow regions reconstruction techniques try to remove this unwanted presence by compensating the value of shaded pixels. Unfortunately it may happen that not all shadow areas are possible to restore. To deal with this problem it is needed to use such criteria which will help to know a priori if a shadow area can well be recovered.

The proposed method is intended to provide an objective assessment of the shadow reconstructability by combining pixel and textural level criteria.

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III. LITERATURE REVIEW

SHADOW: A shadow is an area where direct light from a light source cannot reach due to obstruction by an object. There have been few studies concerning shadow removal, and the existing approaches cannot perfectly restore the original background patterns after removing the shadows.

Assumptions of Shadow: Here are our basic assumptions are as follows :

1) The illumination image is spatially smooth. 2) There is no change in the texture inside the shadow region. 3) In the shadow regions, the illumination image is close to being constant. Pixels inside shadow regions have different colours because of the reflectance image, not the illumination one.

The detection and classification tasks are implemented by means of the state-of-the-art support vector machine approach. A quality check mechanism is integrated in order to reduce subsequent misreconstruction problems. The reconstruction is based on a linear regression method to compensate shadow regions by adjusting the intensities of the shaded pixels according to the statistical characteristics of the corresponding nonshadow regions. Moreover, borders are explicitly handled by use of adaptive morphological filters and linear interpolation for the prevention of possible border artifacts in the reconstructed image[1].

The proposed method begins with a segmentation of the color image. It is then decided if a segment is a shadow by examination of its neighboring segments. They use the method introduced in Finlayson to remove the shadows by zeroing the shadow's borders in an edge representation of the image, and reintegrating the edge using the method introduced by Weiss. This is done for all the colour channels thus leaving a shadow free image[2].

This paper focuses on an approach that uses normalized saturation value difference index in Hue saturation value color space to detect shadows and exploits histogram matching to recover the information under shadows[3].

In this paper, the proposed method is given to discriminate the presence of shadow based on physical properties of a black body radiator. This method allows adaptively calculating the parameters for a particular scene and allows one to work with different illumination conditions. The adaptiveness of the method consists in the calculation of the parameter set values for a particular image [4].

In this paper, a digital image processing method for remote sensed images is given. This consists of four steps i.e. Image correction, Image transformation, Image Enhancement and Image Classification. Multispectral classification is an information extraction process that analyses these spectral signatures and assigns the pixels to classes based on similar signature[5].

Literature study reveals that reconstruction is given but accuracy can be improved if objective assessment for reconstructability of shadow areas in VHR images is done.

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IV. PROPOSED WORK

It is proposed to develop a novel algorithm for reconstructability of shadow areas in VHR images. The details of proposed work shown in fig. below. It consist of following steps:

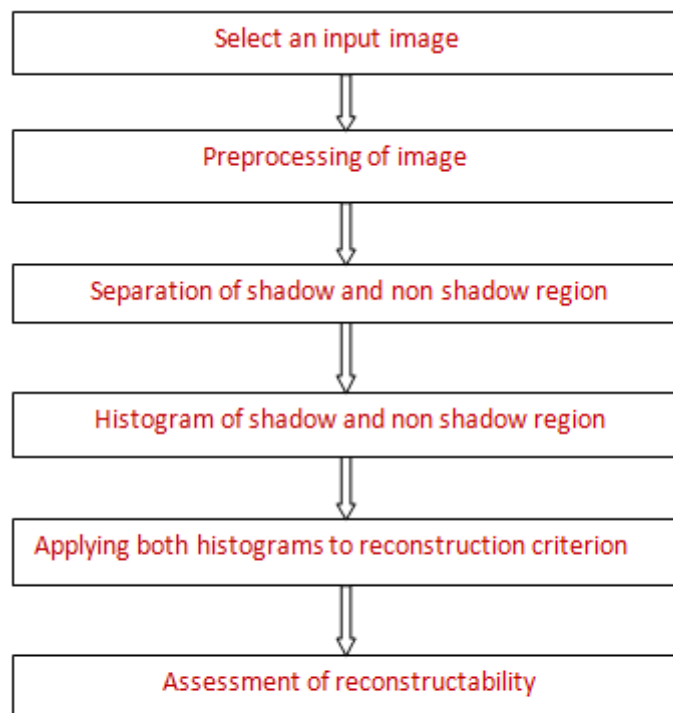


Fig: Key steps of proposed work

Preprocessing:It consist of selection of an input image and preprocessing it with different median filters, morphological opening and dilation process to detect boundaries.

Separate the shadow and non shadow region in image. Then histogram for both shadow and non shadow area will be obtained. Two histograms will be given as input to reconstruction criterion.

Reconstruction criterion :It consists of both pixel and texture level criteria such as histogram quantization error(HQE),gray-level ratio (GLR), variance ratio (VR), Kullback–Leibler divergence (KLD), angular second-moment difference (ASMD), and homogeneity distance.

Reconstruction Evaluation: For a given foundation, the issue turns out to be currently the one to find the edge esteem Th, which will go about as the reference for the standard on the premise of which a given shadow class will be assessed as a reconstructable or unreconstructable class.

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V. CONCLUSION

In this paper, we have provided a comprehensive survey of shadow detection and removal. There are several shadow reconstruction methods. But still accuracy is a challenging task in order to obtain better shadow reconstruction. So keeping in mind the reconstruction criterion can be used. The main objective of proposed work is to obtain better accurate results.

REFERENCES

- [1] L. Lorenzi, F. Melgani, and G. Mercier, "A complete processing chain for shadow detection and reconstruction in VHR images", *IEEE Trans. Geosci. Remote Sens.*, vol. 50, no. 9, pp. 3440–3452, Sep. 2012.
- [2] Zvi, Figov, Yoram Tal, and Moshe Koppel, "Detecting and Removing Shadows", *International Journal Of Engineering Trends and Technology*, volume 4, Issue 5, May 2013.
- [3] H. Ma, Q. Qin, and X. Shen, "Shadow segmentation and compensation in high resolution satellite images", in *Proc. IEEE IGARSS*, vol. 2, pp. 1036–1039, Jul. 2008.
- [4] A. Makarau, R. Richter, R. Müller, and P. Reinartz, "Adaptive shadow detection using a blackbody radiator model", *IEEE Trans. Geosci. Remote Sens.*, vol. 49, no. 6, pp. 2049–2059, Jun. 2011.
- [5] Minakshi Kumar, "Digital Image Processing of Remotely Sensed Satellite Images For Information Extraction.", *Conference on Advances in Communication and Control Systems*, 2013.
- [6] D. Shen, "Image registration by local histogram matching," *Pattern Recognit. J.*, vol. 40, no. 4, pp. 1161–1172, Apr. 2007.
- [7] F. Yamazaki, W. Liu, and M. Takasaki, "Characteristic of shadow and removal of its effects for remote sensing imagery", in *Proc. IEEE IGARSS*, vol. 4, pp. IV-426–IV-429, 2009.
- [8] L. Lorenzi, F. Melgani, and G. Mercier, "Inpainting Strategies for Reconstruction of Missing Data in VHR Images", *IEEE Geosci. Remote Sens. Lett.*, vol. 8, no. 5, pp. 914–918, Sep. 2011.