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Object Optimization Using S-E-A Algorithms

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Abstract: **- A novel method has been proposed for the identification of shadows in satellite images. The method is based on the use of Ant Colony Optimization (ACO) for the identification of shadows in remotely sensed images. The existence of shadow regions in images has been a hindrance to image analysis and hence accurate shadow detection and removal is still a current research topic. The proposed work is a combination of the previous techniques and an object based technique. The proposed work first identifies the edges of all the objects in the scene and then each object is analyzed using ant colony optimization to determine whether it is a shadow or a foreground object. The shadow regions are detected in a finite number of steps, considering the various properties of the shadow regions.**

***Index Terms*— Ant Colony Optimization (ACO), Edge Detection, Shadow Detection, Shadow Properties, Threshold, edge iterations.**

I. INTRODUCTION

Image processing is any form of signal processing for which the input is an image, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it. An image defined in the "real world" is considered to be a function of two real variables, for example, a(x,y) with a as the amplitude (e.g. brightness) of the image at the real coordinate position (x,y). One of the fundamental application of image processing is edge detection. Edges are significant change in the intensity of images. Edges occur at the boundary of two different regions of an image. Edges form an important part of an image. But detecting the edges the important features can be extracted easily. These features can be further used for computer vision operations such as image recognition etc. Edge detection can be done in four steps which are: 1.Image smoothing 2.Image Enhancement 3.Detection of noise and image pixels 4.Edge Detection.

The purpose of detecting sharp changes in image brightness is to capture important events and changes in properties of the world. Many filters have been used so far to detect the edges. But in case of noisy images, these filters give less significant results. So a much efficient technique needs to be developed that can detect edges in noisy image. I. In real world, optimization techniques are needed to faster the processes. Optimization is the process of obtaining best results under given circumstances. ACO algorithm has been the proposed method so far in detecting edges at a faster rate. Further input variables can be changed in ACO to have more better results. Ant colony optimization algorithm is used mainly for finding the optimal solution. ACO uses iterative procedure to enhance the results. ACO as the name suggests is a nature inspired approach. It uses the behavior of ants to find the optimal solution. The ants move randomly in all directions to search the food. When they reach the food they release a chemical substance called pheromone at that place so that other ants that come that way may get to know about the location of food. Hence the ants give shortest path for other ants. The number of ants that uses the image will output the same number of results of path. These outputs will be stored in the memory positions for each number of iterations. Our basic idea is to design an application to implement our concept. How is this actually possible is explained in this paper.

II. RELATED WORK

In [1], it is analyzed to derive a 1 -d illumination invariant shadow-free image. Then the use of the invariant image together with the original image to establish shadow edges. By setting these shadow edges to zero in an edge representation of the original image, and by consequently re-integrating this edge representation by a method paralleling lightness recovery, They are able to arrive at their sought after full color, shadow free image. A requirement for the application of the method is that they must have a calibrated camera. It has been analyzed that a good calibration can be achieved simply by recording a sequence of images of a fixed outdoor scene over the course of a day. After calibration, only a single image is

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required for shadow removal. It is shown that the resulting calibration is close to those achievable using measurements of the camera's sensitivity functions. Illumination conditions can confound many algorithms in vision. Like, changes in the color or intensity of the illumination in a scene can cause problems for algorithms which intend to segment the image, or recognize, objects in the scene. One illumination effect which can cause particular problems for these algorithms is that of shadows. The disambiguation of edges due to shadows and those due to material changes is a complicated problem and has a long history in computer vision research In addition; the exploration of shadows as cues for image understanding has an even older lineage. Recently, the significance of understanding shadows has come to the fore in digital photography applications including color correction and dynamic range compression. One possible solution to the confounding problems of shadows is to originate images which are shadow free: that is to process images such that the shadows are removed whilst retaining all other salient information within the image. Recently, a study aimed at lightness computation set out a clever method to attenuate the consequence of shadows in an image. Unfortunately however, this method requires not just a single image, but rather a sequence of images, captured with a stationary camera over a period of time such that the illumination in the scene (specially the position of the shadows) changes noticeably The example used by the author was a sequence of grey-scale images of a fixed outdoor scene, captured over the course of a day.
Assuming that material changes are constant in the scene and that shadows move as the day progresses, it follows that the median edge map (for the sequence) can be used to determine material edges (shadow edges since they move are transitory and so do not affect the median). Given the material edge-map it is possible to create an intrinsic image that depends only on reflectance. This reflectance map might then be compared against the original sequence and an intrinsic illuminant map for each image recovered. While this method works well a major limitation of the approach is that the illumination independent (and shadow free) image can only be derived from a sequence of time varying images. In this paper a method has been proposed for removing shadows from images which in contrast to this previous work requires only a single image. The approach is founded on an application of a recently developed method for eliminating from an image the color and intensity of the prevailing illumination.

EXISTING METHOD FOR SHADOW DETECTION, EDGE DETECTION AND REMOVAL

There are various approaches proposed by various researchers for shadow, edge detection and removal. In this chapter a brief description of these approaches and a comparison between them are given.

A. An Object Oriented Shadow Detection and Removal Method

Hongya Zhang et al. [3] put forward an object oriented shadow detection and removal method. In this method, shadow features are taken into consideration during image segmentation, and then, according to the statistical features of the images, suspected shadows are extracted. Furthermore, some dark objects which could be mistaken for shadows are ruled out according to object properties and spatial relationship between objects. For shadow removal, inner–outer outline profile line (IOOPL) matching is used. First, the IOOPLs are obtained with respect to the boundary lines of shadows. Shadow removal is then performed according to the homogeneous sections attained through IOOPL similarity matching. Here he provided a comprehensive survey of shadow detection and removal in indoor and outdoor scene, traffic surveillance images etc. survey is done on various types of images real time application or traffic images. A survey on various shadow detection and removal method and algorithm.

B. Detection of Salient Shadow and Object Regions in Underwater Acoustic Images

Trevor Beugeling et al. [9] present novel methods for detection of salient shadow and object regions in underwater acoustic images. Both methods are based on the watershed transform. The methods exploit shape and appearance characteristics of salient shadows and objects. Experimental evaluation shows satisfactory results for the shadow detection algorithm.

III. PROPOSED SYSTEM

Now as we have understood the existing system and have figured out that there are a lot of problems in it. So, what we propose is a GUI connected to the Government websites which will help the government to check the land corruption as well as will help in the progressive development. For this we will be implementing the S-E-A Algorithm together using Mattlab and Virtual Studio.

The procedure for ACO based edge detection is given as:

• Take random position of ants on an image of resolution 512X512 and initialize the pheromone matrix.

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• One end moves randomly on whole image following its neighboring pixel positions according to transition probability

$$p_{ij}^{(n)} = \frac{(\tau_{ij})^{(n-1)}\alpha(\eta_{ij})^{\beta}}{\sum_{j\in\Omega_i}(\tau_{ij}^{(n-1)})^{\alpha}(\eta_{ij})^{\beta}} \quad \text{if } j\in\Omega_i$$

where τ (n−1) i,j denotes the pheromone value of the node (i, j), Ω(l,m) gives the value of the neighborhood nodes of the node (l,m), ηi,j represents the heuristic information at the node (i, j). The constants α and β denotes the value of the influence of the pheromone matrix and the heuristic matrix, respectively.

The ACO determines the edges using threshold value.

Threshold value is calculated using mean of above and below threshold value.

Requirements in proposed system

There are no requirements as such when compared to existing system. In proposed system we just need to use the existing resources effectively for setting up the GUI and connecting it with the Database.

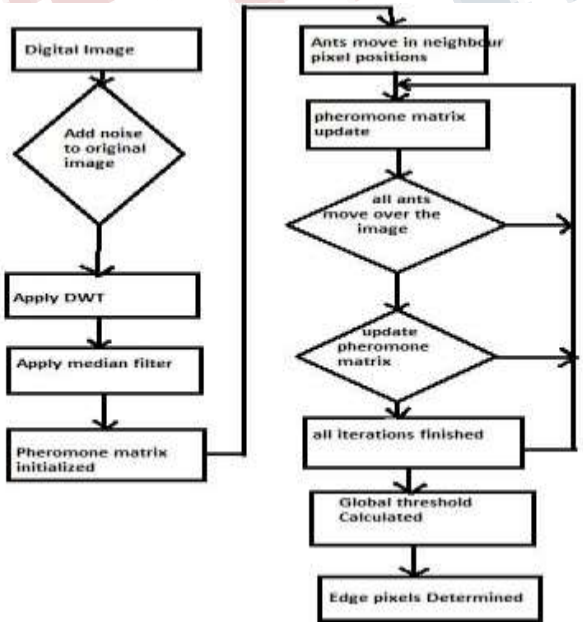
Advantages of proposed system

- Easy analysis of image.
- Better user interface.
- Useful information for government projects.

Flows in our system

• User can misuse the information provided.

IV. FLOWCHART



V. CONCLUSION

sIn this paper, discrete wavelet transform is applied to a noisy image. This removes the noise in an image to an extent. After that median filtering is applied to wavelet transformed image. This removes the remaining noise to almost whole extent. Then the ant colony optimization is applied to this filtered image. After applying the proposed algorithm the edges detected are much visible and denser than previous work. The results show better edge detection after performing only one step of iteration. But the edge detection using dwt based aco shows results after 4 steps of iterations. Hence the algorithm works better for the noisy or corrupted images and gives better results in only one iteration. We proposed a novel approach to detect and remove shadows from a single image. We also show that by applying soft matting to the detection results, the lighting conditions for each pixel in the image re better reflected.

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