Segmentation of Satellite Imagery of Amedi Site Using Chan–Vese Model with Saliency Estimation

Abstract

The images that have been taken from space satellites are described by satellite imagery. The presence of the earth's surface is detected by remote sensing. Normally the source of the satellite image is barely seen, because many points in the sky are obscured with cloud shadows. Therefore, one of the most important and ubiquitous tasks in image analysis is segmentation. Segmentation is the method of dividing a image into a collection of specific regions that vary in some essential qualitative or quantitative manner. In this paper we will focus on a method for segmenting images that was developed Three different methods to detect the location of the satellite images have been studied, implemented, and tested; these are based on Chan-Vese and saliency map segmentation, and multi-resolution segmentation to obtain a proper object segmentation. In this study, the combination of the proposed segmentation automatic detection and image enhancement technique has been performed to reduce the noise of the original image. In addition, the Bilateral filter, and histogram equalization are used in these proposed techniques. Experimental results demonstrate that the suggested method can precisely extract the objective of Amedi site from the satellite images with difficult backgrounds and overlapping regions.

Keywords: *Image Processing, Satellite image, Segmentation Analysis, Saliency Map, Bilateral Filter.*

I. Introduction

The main geological activities are aiming for identifying and analyzing our past sites. Indeed, several other sciences are involved in researching the identity of our past activities, for example in preserving them [1]. Satellite imagery consists of images taken by artificial satellites of the earth or other planets. Satellite images have many meteorological, agricultural, geological, forestry, biodiversity conservation, regional planning, education, intelligence, and warfare applications. With the beginning of images of very high resolution and new efficient methods, Remote sensing technologies to urban zones are forwarded to prompt significance. One of the greatest commonly utilized remote sensing technology the characterization, identification, description and quantification of urban structures is intended in urban areas [2].

Through over in this study segmentation is the procedure of separating a digital image into different segments (pixel sets, also known as super pixels). The segmentation objective is to condense and/or alter an image's representation into something that is more meaningful and simpler to explore. The segmentation of images is usually utilized to locate artifacts and borders in images (lines, curves, etc.). More specifically, segmentation of images is the process by which a tag is allocated to each pixel in an image, so pixels with the same label share similar visual appearances. The outcome of image segmentation is a collection of segments that mutually overlay the whole image, or a set of image contours. As regards other characteristic or simulated properties, such as color, intensity or texture, each pixel in a region is identical. Neighboring regions are notably different about the same function [3].

The Modern world, a large-scale phenomenon is the tendency of most important objects to detect. In the computer and science period, and especially in the processing of images, we tend to find the most feasible techniques that can extract the most important and salient features of the selected image database. We are supplied with some of the most available image recovery methods, but we're still not pleased with the decision of the process used. With the development of technology and image processing techniques, we have new methods to illustrate the salient features [4].

In segmentation dependent on salient, saliency determines the most concentrating position based on the human vision system, which will give the image foreground and the rest of the region as background. The closer the saliency model is to the process of human vision the probable likely it would be to derive all the salient artifacts required for the perception of images. Thus, saliency-based segmentation will eventually be cooperative in psychovisual image translation [3]. Throughout the subject analysis, we have tried to generate very successful data and attach another material that we have presented the various saliency detection methods that are being used in the current scenario, because it is an increasing technique that will deliver more productive sources.

The Chan –Vese method [1] in this paper is generalized to representations represented by vectors. Our algorithm uses the Osher and Sethian level-set method [3] to evaluate the limits of the artifacts observed. Through channel has a separate component lacking but the entire entity is identified when the two channels are merged. Another scenario where this technique is of special importance is an occlusion that exists in one pipe, while there is a second path, full and noisier. The source is RGB images, in which channel boundary detectors and strength detectors malfunction [5]. Both these details are given in experimental results Section 2.

To improve the segmentation precision of overlapping crop location. While bilateral filters are applied to the satellite image, the bilateral filter is a non-linear technique capable of bluing an image while concerning strong edges. In computational photography purposes such as tone mapping, style transfer, relighting, and denoising, its ability to decompose an image into different scales without producing haloes after modification has rendered it ubiquitous. The arrangement of this paper starts with an introduction followed by brief information and the literature study on the satellite imagery and the segmentation algorithm used in the study. Details on methodology and implementation are given after this section. Furthermore, the findings have been mentioned and the research performed concluded.

II. Literature Review

A Number of works as carried out in literature to get the efficient techniques in image segmentation method is discussed in this section. Various techniques have been proposed for image segmentation. These are categorized according to the application, imaging modality, and other factors. This section provides an overview of current methods used for computer assisted or computer automated segmentation of satellite images [6].

Segmentation, a subtask in the processing of images, dates back over 40 years, with implementations in many other fields than computer vision. Since the launch of in 1972, the first Landsat Multispectral Scanner System (MSS), which launched the golden age of land remote sensing from space, obtained vast amounts of satellite image data that are essential for many applications including climate. Evaluation and control, forestry, sustainable natural resources and planning. Recent advances in satellite imaging have seen groundbreaking growth in satellite imaging, with major contributions from electrical, electronic engineering and computer science. Revolutionary advances in engineering and computational technology have allowed high-resolution satellite images to be obtained, structural and functional knowledge analyzed for computer-assisted research, evaluation and intervention.

Satellite image segmentation is characterized as an image processing task that partitions an image of non-intersecting regions in such a way that each region is homogeneous and that the union of no two adjacent regions is homogenous and therefore possible used to process objects of interest isolated from the rest of the scene. These techniques are of critical importance in many SAR processing systems, as they identify region of interest that leads to understanding content and recognition of visual objects[7].

For vector-assessed images, numerous types of restauration, border detection and even active contours have been suggested. We list the works in [5],[7] for restore the color images. 132 CHAN, SANDBERG, AND VESE in [5], [6] the edges of the vectors are calculated on the principle of classical Riemannian geometry, whereas in [5] the approach is built on a fundamental expansion of the complete deviation of Fatemi, Rudin , And Osher [8] for color images. A model of color snakes is implemented in [5], [6] established on the definition of vector edges expressed the traditional Riemannian geometry from and the geodesic active contour type used during single-value images [9]. Then, the concept of vector edges is utilized in [10],[11]to express the preventing edge-function. Besides vector-assessed images gained from a textured image, this model applies. Once again, to differentiate edges, both of these approaches for vector-evaluated images are constructed on the image gradient.

A color image segmentation founded on the Mumford-Shah model and the area way is provided in [12], and a segmentation of vector-assessed image for texture perception is recommended in[13], [14] We even specify the author for an effort on curve evolution and segmentation functionals for color images in[15], and for a study on snakes, area development, and energy – Bayes – MDL for multiband image segmentation in[16]. In [17] using a multi-value frame analysis, a simultaneous geodesic active area type for texture separation is proposed. In this work, the Chan – Vese method [18] is applied to vector value images. Our algorithm treats the Sethian and Osher level-set method [19] to evaluate the boundaries of the objects identified.

Further, Methods of saliency can be categorized as; Jianping Shi JiayaJia Qiong Yan Li Xu (2013) in their paper entitled "Hierarchical Saliency Detection" reported that when interacting with objects with complex architectures, identification of salience arises when salient foreground or context exhibits high contrast patterns on a small scale. This paper proposes a multi-layer approach to the saliency clew analysis. In a hierarchical model, the final saliency map is made, and a new dataset is also created.

S. Masthanic Aruna, D. Venkata Raob, Chesti Altaff Hussaina (2016) reported in their paper entitled Robust Pre-processing technique focused on saliency detection for content-dependent image retrieval that used to retrieve appropriate images from a wide variety of digital image collections. Image saliency is nothing more that shows each of the artifacts in a way that renders them distinct from their neighbors, and open to spectators. They're concentrating on region of importance [4].

Hence, this study provides an improved satellite edge detection algorithm stand on image improvement utilizing Bilateral Filter to preserve edges. The aim of this work is to study Bilateral Filter's traditional edge detection on satellite image and optimize border detection with this Filters, then the reasonable examination managed. In this study will see the improved edge detection.

Filtering is one of the supports utilized in numerous activities of image processing, for instance, translation, re-sampling, and noise reduction. The filter utilized builds on the type of the filter's purpose, and the kind of data to be worked for the operation[23]. Filtering is one implement which is expended in several domains on behalf of different claims, mainly in this unit for image improvement and segmentation[24].

The most common technique for analyzing a satellite image's color quality is that of comparing color histograms. The use of shape information for automated image comparisons requires algorithms which perform some form of edge detection or segmentation of images. Segmentation refers to defining the different color regions on an image [21]. Then you can compare certain regions from one image to the next. Detection of edges appears to be much more complicated as it attempts to recognize the main contours and edges of a given image. These edges can then be compared in relation to the image edges, based on their direction [22].

The benefits of this approach include its applicability to photographs in black and white. All the same, the algorithm efficiency is not invariant on image scale or translation manipulations. Information about the texture of images can be even more difficult to retrieve automatically during retrieval. Algorithms generally rely on comparing the adjacent pixels to determine the contrast or similarity between pixels [21].

III. Prepare Creating Raw Data Images taken from Geospatial SatelliteYour Paper Before Styling

The main aim of the proposed system is to develop methods that are fast, handle noise efficiently and perform accurate detect of Amedi site in very high spatial resolution images. For this purpose, the proposed methodology uses two steps. The first step enhances the image in such a way that it improves the segmentation process, while the second step performs the actual segmentation. The working of the enhancement and the segmentation procedures is explained in this section.

We present a quantitative discussion of our technique in geographical site analysis by comparing the own results to other previous work, then we explore the application of our technique to other remotely sensed imagery, most of objects are about the detect, segment the places, urban, road, building, or animal and no one has discussed or explored an ancient or certain place like Amedi. The resolution satellite image database which includes images of various scenes are differ from the available databases that used for saliency studies in the previous literature. As stated above the salient area may be a man-made entity, a man-made structure without a predefined outline (such as those with camouflage) or a natural structure very different from its surroundings. The size of the salient area can vary from very small to very large. In an image, there may be more than one salient zone. The algorithm of Chan-vese can be used to segment images of comparatively less busy backgrounds. But images like satellite images with busy backgrounds need to be pre-processed before the chan-vese. Here we use a color canny edge detector with a threshold as a pre-processing operation to pick only the necessary limits. Therefore, with the pre-processing of the input image combined with the chan-vese we can get the desired segmentation.

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One of the Graph Based Visual Saliency (GBVS) and Itti-Koch (IK) typical problems is that they typically focus on a single salient area. If more than one salient region has different features in the image, only one of them can be detected as the salient region/object. If there is a single purple pixel, for example, which is actually a noise in an image .These methods detect this purple pixel only as the salient object/region, which is simply a noise in an image that actually contains several other salient artifacts and regions.

Now if the result of Shi JiayaJia Qiong Yan Li Xu (2013) models ought to be considered, much less information to explain the scenario. The area close to the tree masked by these models creates an ambiguous picture of effects that would ultimately be impossible to interact with at the time of image analysis. 132 CHAN, SANDBERG, AND VESE artifacts are distinctly and completely visible in other versions, such as houses, clouds and other paths, while this is not the case with Fatemi, Rudin, and Osher-based models are better for one object image, as these two models are better.

Fig.1. Geographical place of Amedi city on the map

A. Data and Study Area

Amedi is an ancient town and historical site with about 34 archaeological features located in northern Iraq Kurdistan as seen in Figure 1 , some of which go back to the time of the Assyrians, Medeans, and different Kurdish periods. The town sits atop a rocky promontory approximately 1 km x 500 m in size and the surrounding areas features cliffs and gorges, including a ridge running east to west to the north of the town, a valley to the south and another east-west ridge at the southern extent of the site. The Amedi is 1106 m above sea level. The climate here is moderate, and warm and temperate in general. The rain in Amedi falls mainly in the winter, with the rain in the summer being relatively low. The temperature is 15.2 °C | 59.3 °F on average here. The precipitation here is around 897 mm / 35.3 inches a year.

Fig.2. High-resolution satellite image of Amedi city

In this paper, have been used images acquired over Amedi city by using high-resolution satellite image as indicated in Figure 2.

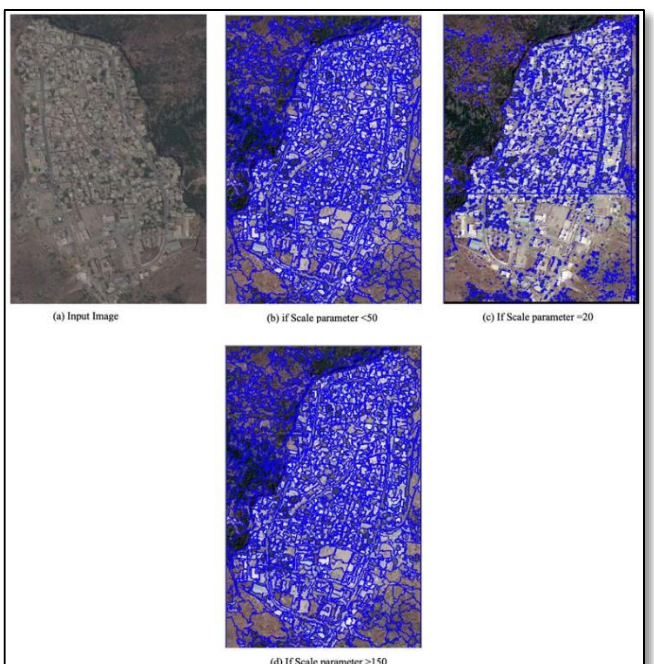
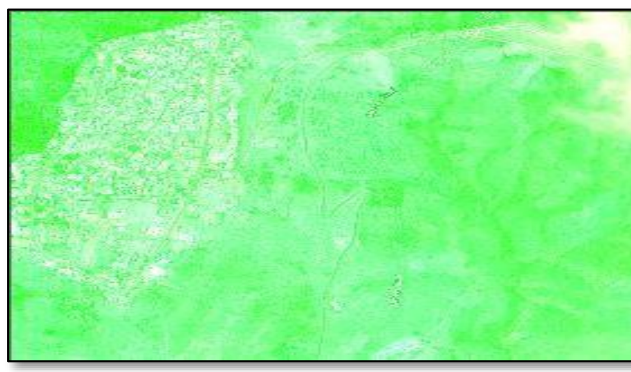


Fig.3. Introduced eCognition tools to Amedi city

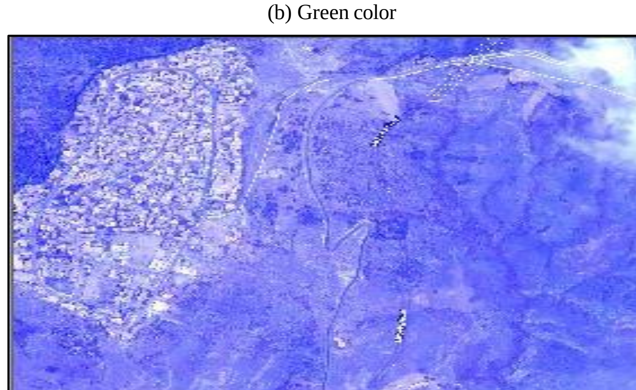
Multi-resolution segmentation and spectral difference segmentation were used with eCognition software as indicated in Figure 3 according to the scale parameter is detects the region of each object above the site.

The experts can decrease the scale parameter the blue grid lines and it is better for detecting the urban area for example; House, car, roads, big building ….etc., and site extraction work was carried out in the MATLAB environment some of the satellite images we see have very different colors than those we're used to seeing with our own eyes. Satellites get images in black and white. Computers allow "false color" to be assigned to those black and white images. Red, green and blue are the three-primary luminous colors. Computer screens in three separate bands can display a single image, each band uses a different one primary color as shown in Figure 4.

(a) Red color



(b) Green color



(c) Blue color

Fig.4. Sample of three primary color of Amedi site images

B. Segmentations Methods

1) Chan-Vese (C-V)

The Chan-Vese algorithm is an example of a model of geometrically active contours. Such models begin with a contour defining an initial segmentation in the image plane, and then we evolve the contour according to some equation of evolution.

The goal is to evolve the contour so that it stops at the foreground area boundaries. There are different ways to describe the equation of evolution; for example, the contour that shift with a velocity depending on the local curvature at a given point, or the gradient of the image at that point[25]. In this study we have proposed an active contour process to detect objects in vector-assessed images (like RGB or Multispectral images. We're presenting instances of where our model detects artifacts that are undetectable in any scalar representation. Such as, artifacts in changed channels that have different missing parts are totally identified (like occlusion). Although, in color images, our algorithm can also detect artifacts that are invisible in each path, or in intensity. Lastly, the model is robust about noise demanding no a priori denoising phase[5].

2) Saliency map *estimation*

a) Image Signature (IS)

High frequency the input is an image of an RGB or a gray scale, and the output is a saliency map for eliminating salient areas. Discrete Cosine Transform (DCT) transforms each image unit, and selects the positive DCT coefficient points. Inverse DCT is applied to the positive coefficients of each variable, and the sum is squared by filtering and normalizing the arithmetic mean of these results with Gaussian. The saliency map is achieved by measuring the standardized result as the saliency map [26].

b) Itti-Koch (IK)

This approach is based on human-eye modeling. The source is an RGB image and a saliency map of the source. Next, the RGB image is converted into bands of RG, BY, and Intensity. Then, center surround difference Bilateral filters are applied separately to the RG and BY bands, and their weighted total is measured as color-based saliency indexes. . Likewise, to get an intensity-dependent saliency map, the center surrounds Bilateral filter difference, it is added to the intensity band ,moreover the result of applies to most of the algorithms outputs are given in result sections [26].

c) Graph Based Visual Saliency (GBVS)

Graph Based Visual Saliency consists mainly of three stages of extracting features to feature vectors, creating activation maps from feature vectors and normalizing and merging activation maps to create a single saliency map. The Markov chain representation of the image is used for both the activation and normalization phases. Using the Graph-based Visual Saliency algorithm to assess the accuracy and rapidity of result. It senses both salient objects and their surroundings. As for numerical calculations, it is too expensive. It is easy to implement when it comes to system use. It delivers the result easily and doesn't take much time. In short, GBVS provides the most powerful image result and useful for finding the most interesting part of an image [4].

C. Techniques to Remove Noise

The image taken by the satellite consists of several sources of information and noise, which recalls the noise produced by the sensor during the acquisition, or the noise from digitized photographic material. Any operation that processes any pixel irrespective of the adjacent pixel value results in an undifferentiated rise in the noise level and in the image information. If it is Gaussian noise, uniform noise, salt and pepper noise, the resulting images must be filtered to a corresponding reduction cycle in the noise level [27]. In this study we used salt and pepper noise to the satellite image site.

a) Bilateral Filter

Is filtering to smooths images thus preserve edges, utilizing a nonlinear mix of image values nearby. The method is easy, noniterative and local. A bilateral filter can enforce the perceptual metric underlying the color space of the CIE-Lab, and smooth colors and preserve the edges in a manner adapted to human perception. Bilateral filtering also in contrast to standard filtering does not contain phantom colors in color images across the edges, and decreases phantom colors in the original image. So this paper provides an automated edge detection satellite image algorithm depend on image enhancement using Bilateral Filter for border retention. The objective of the spatial kernel is to smooth the image with Gaussian purpose as its base [28].

Notations: Image value at pixel position p is denoted by $I(p)$. The set $N$is used to denote possible image locations in the spatial domain of a mask. We use $|.|$for the absolute value and $||.||$for the Euclidean distance.

The spatial kernel is the area between the image pixels (Euclidean distance), and the range kernel is the relation of the strength among the two pixels. Space kernel ($W\sigma_s$) is the realization of space proximity calculate is by the equation (1):

$$W\sigma_s = \exp\left(\frac{-||p-q||^2}{2\sigma_s^2}\right) \quad (1)$$

Whereas the range kernel ($W\sigma_s$)means the pixel weighting according to the length of the contrast in pixel intensity with the pixel intensity that is the midpoint of the image analysis, the estimation of the kernel range for any pixel is shown in the equation 2.

$$W\sigma_s = exp\left(\frac{-(|I(p)-I(q)|^2}{2\sigma_s^2}\right) \quad (2)$$

Bilateral Filtering ($W^B(p)$) computation by equation 3 follows:

$$W^B(p) = \frac{1}{W}\sum pq \in N(p)\ G\sigma_s(||p-q||)\ G\sigma_s(|Ip - Iq|)Iq \quad (3)$$

Where I am a gray-level image, $N(p)$ is a p neighborhood, where Ip is the pixel-level intensity value p, where Wp is the normalization factor that ensures pixel-level weights to 1.

D. Image Histogram

The processing of histograms is the act of reshaping an image by changing its histogram. Popular uses of histogram processing include standardization by which one renders an image's histogram as flat as desirable [28]. The histogram of an image typically corresponds to a histogram of the pixel intensity values in an image processing sense. This histogram is a graph displaying the number of pixels in an image at a particular value of intensity included in that image.

For an 8-bit grayscale image there are 256 separate possible intensities, such that the histogram will reflect 256 numbers graphically. Image spread around all grayscale numbers. Color representations and brightness may also be taken from histograms at each level reflecting the pixel count. The actual performance of the procedure depends on the execution, it may simply be an image of the necessary histogram in a suitable image format, or it may be a type-specific data file detailing the histogram information. A Histogram has two axes the x axis and the y axis.

- The x axis contains intensity level.
- The y axis contains frequency count.

The x axis of the histogram shows the range of pixel values. Since it is an 8-bit gray scale image that means it has 256 levels of gray or shades of gray in it. That is why the range of x axis starts from 0 and end at 255, whereas, on the y axis, is the count of these intensities. The different heights of the bar show different frequency of occurrence of data, for a histogram of the dark image is always on the left side as black is the first value and white is the last value, in contrast, the corresponding histogram of the light image will be on the right side.

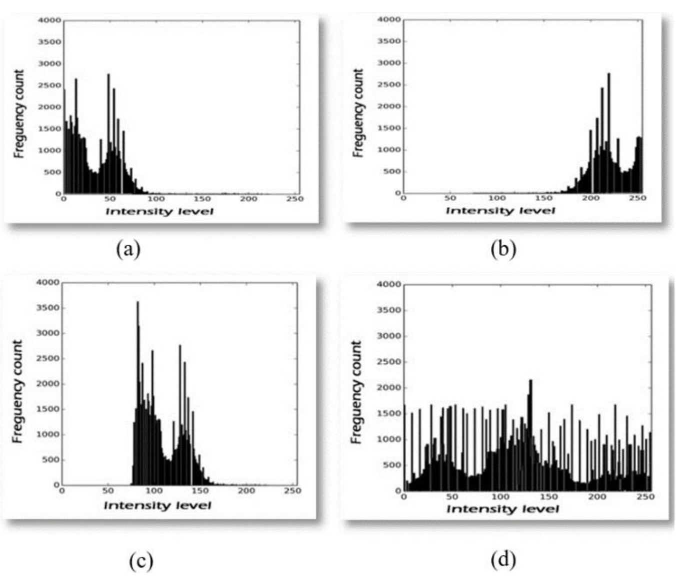


Fig.5. Different Intensity Levels of Histogram Image (a) Histogram of dark image, (b) Histogram if light image, (c) Histogram of low-contrast image, and (d) Histogram of high-contrast image.

On the other hand, in the case for a histogram of the low-contrast image the intensity of pixels is not formally distributed, while, a histogram of the high-contrast image has the uniform distribution of intensity level which provides the best results [29], as shown in Figure 5.

IV. Experimental Results

The system proposed has been tested using an experimental collection of satellite images. The system was developed using MATLAB R 2019a and ECognition Developer has been tested with 4 GB RAM on core i7 processor. Throughout the experiments several test images were used and the outcome of the best sample images Figure 6 is projected in this part. The image acquired in this research is satellite images that were re-dimensioned to resolution: 300 x 300 pixels. We are collecting data from L3Harris Geospatial, providing a broad range of commercially available highest resolution satellite imagery. For this work we used site and regions object from the image (Amedi Site Geological Survey).

Fig.6. Best input image

A. Enhancement Algorithm Results

Results of noise reduction based on Bilateral Filter with corresponding Salt & Pepper noise.

In order to analyze the efficiency of the segmentation image enhancement algorithm, experiments were performed with images introduced by 0.8 per cent salt and pepper noise.

In addition, the contrast has been modified randomly on all the noisy images as indicated in Figure 7.

(a) Original Image

(b)Salt & Pepper Noise

(c) Output image with degree of smoothing =117.7196

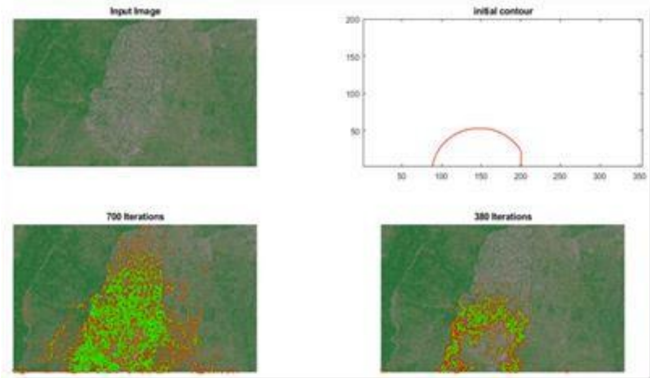
Fig.7. Satellite imaging experiments display the effects of the original image, and bilateral enhancement result which preserves the edge.

B. Segmentation Results

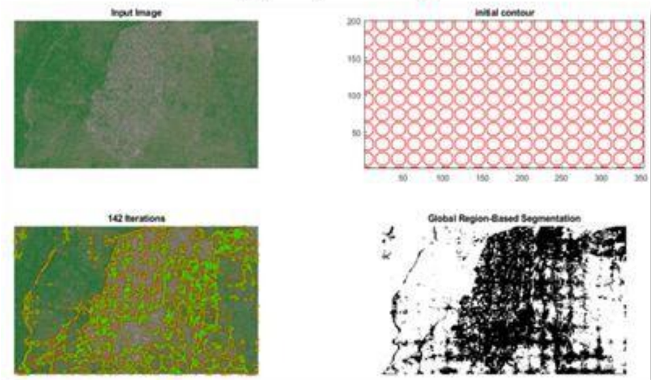
Edge detection issues on satellite images the implementation of the segmentation algorithm was evaluated utilizing the C-V model segmentation results and the saliency approach implementing the enhancement algorithm.

1. Chan-Vese model results

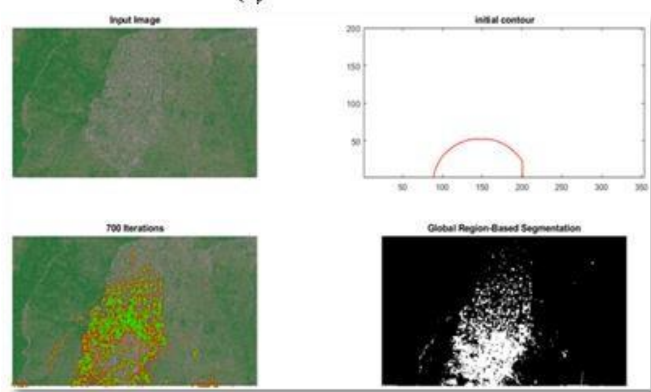
- Results of Active contour on a noisy image based on (Vector ,Chan) method with the corresponding histogram.



(a) Preprocessing



(b) 'Chan' method



(c) 'Vector' method

Fig.8. Chan-Vese algorithm observed by chan with vector methods

Display good anti-noise capability for vector image of active contours without edge. Creating a noisy image from MATLAB first. To the original image two forms of noises were introduced. To this noisy image, the 'chan' method is not good enough. It displays the outcome as follows. Using the Vector form, i.e. Chan-Vese vector-image algorithm. As we know, their initial positions are lying to active contour. Thus a different mask will lead to another segmentation. Here with built-in mask = 'whole' is used, and tests are stronger and quicker. The effects of segmentation along with the effect of enhancement technique as shown in above Figure 8.

2. Saliency results

- Results of Salient features based on Image Signature (LAB, RGB) Method

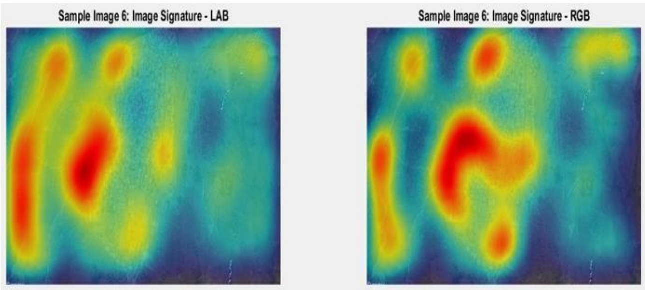


Fig.9. Results of original image by applying salient features

In Figure 9 above the Salient features in the adjacent image are defined. After adapting the algorithm to the original image, we have the points highlighted which the algorithm explicitly focuses on. The algorithm thus represented the Salient features in a specific manner, such that one could concentrate on the positions and detect the same values from the original image.

- Results of Itti Koch based Blurring and global center bias method

(a) (b)

Fig.10. (a) Enhanced input image, (b) Final blurring, with executing global center bias

The discrepancy between the filtering results and the center differential Bilateral filtered image is calculated and used as the weights used to calculate the filtered image weighted average. The average is the saliency index, based on the orientation. Finally, it determines the final saliency map as the weighted average of all saliency maps that have been obtained before. The degree of final blur and level of center bias are two very marginal factors that significantly affect the accuracy of saliency algorithms measured for prediction. The last step is smoothing by applying executing global center bias as shown in Figure 10.

- Results of retrieval Saliency detection based on GBVS , and Itti Koch map overlayered

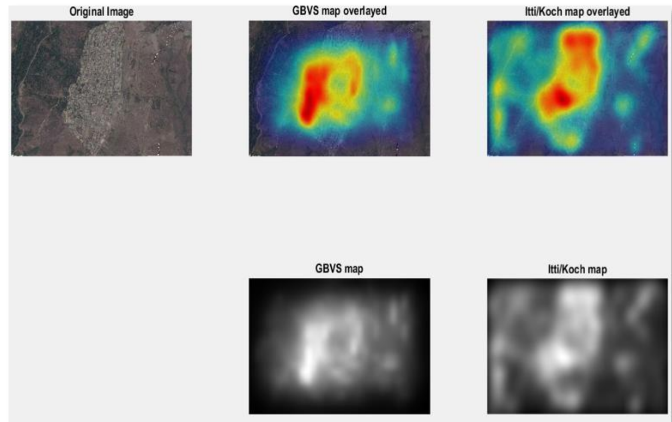


Fig.11. Different results of original image by applying saliency algorithms

Figure 11 illustrates that using the GBVS, and Itti Koch overlayered algorithm, the original image can be shown in different sections of salient features. The original image has the multiple features that allow it to be centered and looked through. The algorithm thus described the Salient features in a different way, so that one could focus on the locations and detect the exact values from the original image.

C. Image Histogram Results

- This process of segmentation is based on the gray-level histogram, as shown in Figure 12.
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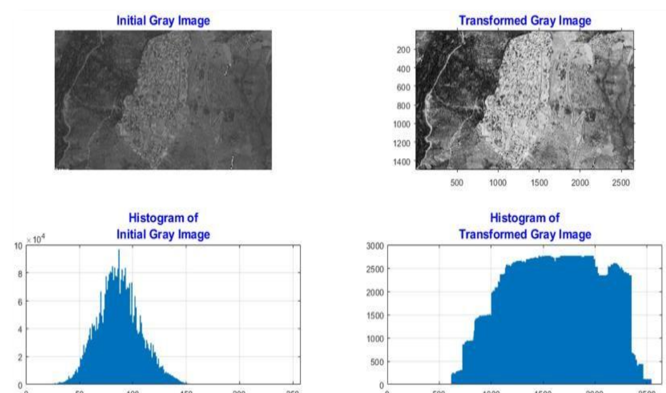

Fig.12. Results of initial gray image with the corresponding histogram

- This process of segmentation is based on the RGB histogram, as shown in Figure 13.

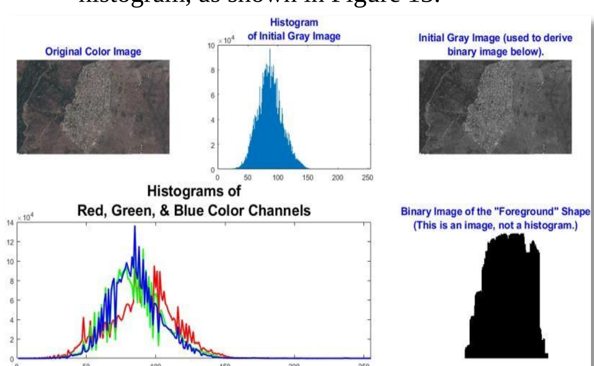

Fig.13. Results of initial RGB image with the corresponding histogram

- This process of segmentation is based on the Binary-HSV histogram, as shown in Figure 14.

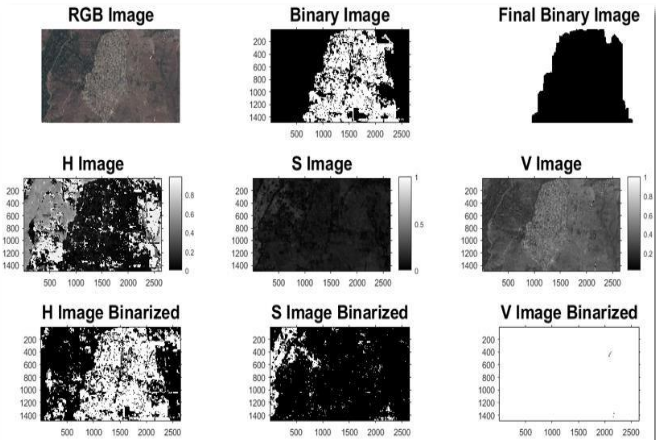

Fig14. Results of initial binary-HSV image with the corresponding histogram

V. CONCLUSION

To sum up, we suggested an original approach for segmentation of satellite images in this paper. Different solutions to difficult satellite images are introduced and applied based on two methods of segmentation, C-V modeling and saliency. An algorithm has been designed to detect contours in images valued by vectors which can or cannot involve edges of gradients.

By utilizing all of the contour details the image vector factors can be found with a highly accreted Contour that is superior to the contours of a single vector image dimension. The approach has all the advantages of the Chan-Vese (CV) algorithm, which including robustness before noisy data and automatic contour detection. We have certain approaches and we use them to extract our deliberate outcomes from the target that we want or want depending on the circumstance. If we speak about Itti-Koch (IK) method is most time consuming to process.

The next more rapid algorithm is 10 times slower than the next one. It's nearly 100 times lighter than the others algorithm. Image Signature (IS) algorithms the fastest , although we have been used GBVS because it's easy to use, plus it's simpler plus quicker. It also succeeded in presenting around 80% of GBVS 's prominent portion in this paper. Complexities of the algorithms can depend on the size of the image and number of salient regions.

The comparative algorithms and their saliency detection efficiency are clarified, the precisions of the area identified is shown. The robustness of the approach is due in particular to the correct site circulation function specification and correct features. Histogram Processing is an efficient method for enhancing the image; four techniques were tested on a low contrast image. We detected the approach proposed for a region in Amedi. In addition, you can also see better edge detection on the image from the tests showed that the algorithm proposed could identify sites with different shapes and colors.

Other limitation of the work completed is still the threshold value is reachable. If the threshold increases, only the area of extraction, which was priory less prevalent, would grow. This would only increase the number of objects in the image, but how many objects are required and adequate for the full interpretation of the image, which is also subjective in terms of resolution, viewing angle, image objects, etc...

The future scope of this research can be proposed as the saliency-based segmentation of the satellite image can be helpful in the psycho-visual analysis of the satellite image as it distinguishes the foreground and the background on the basis of the human vision system and can eventually be helpful in many other civil applications where a full interpretation of the high-resolution satellite image is needed. The ability of intelligent image interpretation systems can be improved by guiding the machine on where to look and what objects are required to view the image in a manner that human minds can interpret. In this way, if segmenting an image in a way where only concentrates image objects cannot yield any better outcomes, because the satellite image usually has several objects, and nearly any object may or may not contribute to the perception of the image. So if strategies for imitating the human vision method by identifying objects are used in this manner, it can be effective in understanding the image as a human mind.

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