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Change Detection Approach for Images Using Image Fusion and C-means Clustering Algorithm

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Abstract: ***This paper focuses change detection approach for images based on image fusion technique and C-means clustering algorithm. The image fusion technique is applicable to determine image differences by using complementary information images. The C-means clustering algorithm is introduced for classifying changed and unchanged regions in between two images. The information about spatial context and C-means clustering algorithm has purpose of enhancing the changed information and of reducing noise information of images. Experiments based on image fusion technique and C-means clustering algorithm that gives a better performance for input images to shows change detection approach.***

Keywords: Clustering, c-means algorithm, change detection, image fusion.

I. INTRODUCTION

An image change detections is a process to determine how two different images of same scene taken at different time. The change detection is highly applicable for no of applications like remote sensing [2], medical diagnosis [3] and video surveillance [4]. With the development of remote sensing, medical diagnosis and video surveillance technology the change detection in between images becomes more and more important task.

II. PROPOSED SYSTEM

The proposed system for image change detection is divided into three steps; first process is preprocessing of an inputted images; second step in which we producing difference image between the multi temporal images; and third processing step which is to analysis of the difference image. The preprocessing task mainly includes geometric corrections and reduction of noise of images. In the second step includes, two inputted images are compared pixel by pixel to determine the difference image [1].

For producing the difference image a subtraction operator and a ratio operator are well-known techniques. For differencing, changes are calculated by subtracting the intensity values pixel by pixel between the two inputted temporal images. For rationing technique, the changes are detected by applying a pixel by pixel ratio operator for considered two temporal images.

III. System Architecture

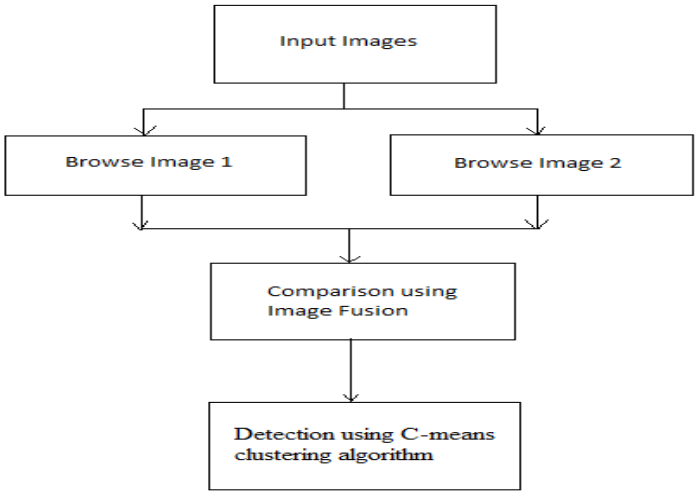

Fig. 1 System Architecture

Fig. 1 depicts process flow for proposed system to change detection. First we need to browse two input images taken at different time; the process of image fusion is applied for comparison between inputted images to determine two images are different or same. If two images found different then it calculates mismatches pixel count and also the modified part of pixels. The main aim is in last process that exact change detection using c-means algorithm [1].

IV. Experimental Results

For the experiment we have considered two radar images taken at different time for the change detection. The designed graphical user interface helps to browse two images for change detection. The image fusion technique implemented to compare the images pixel by pixel to generate results that images are same of different. If the images are found different then it calculates exactly number of mismatches for inputted images; also it calculates exact modified rectangular part of pixels. Finally the systems that detect exact areas of change in images by and performing XOR operation between two image pixels. The areas which differ between two images have been identified by drawing red rectangular portion of pixel image. Following figures helps to illustrate the obtained experimental results.

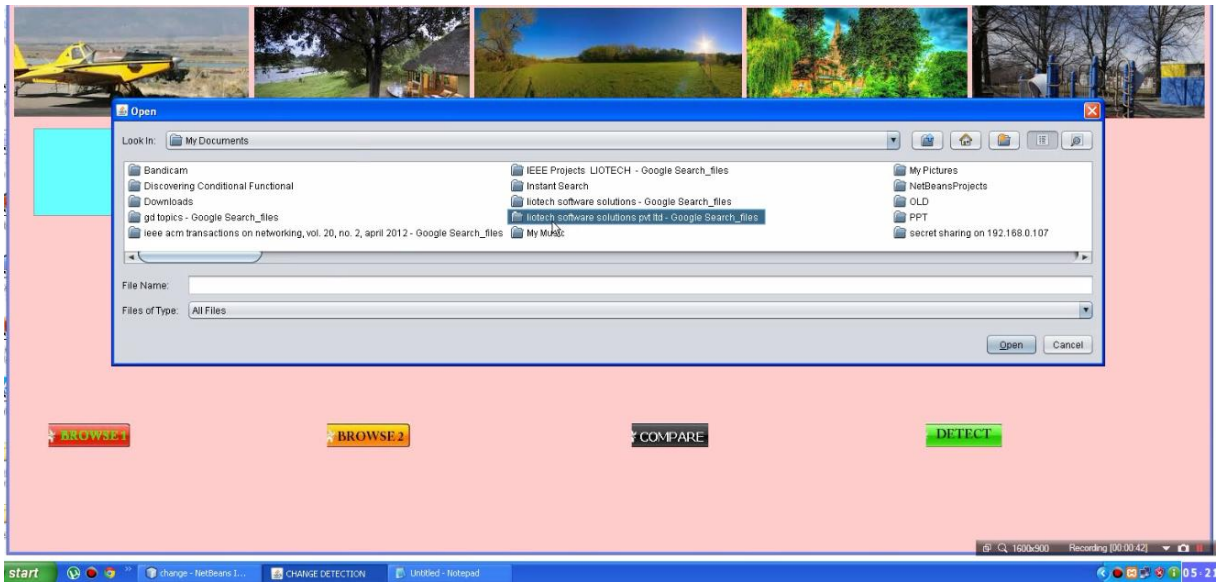

Fig2. Browsing of inputted images

Fig. 2 depict graphical user interface to browse input images to process for comparisons and change detection.

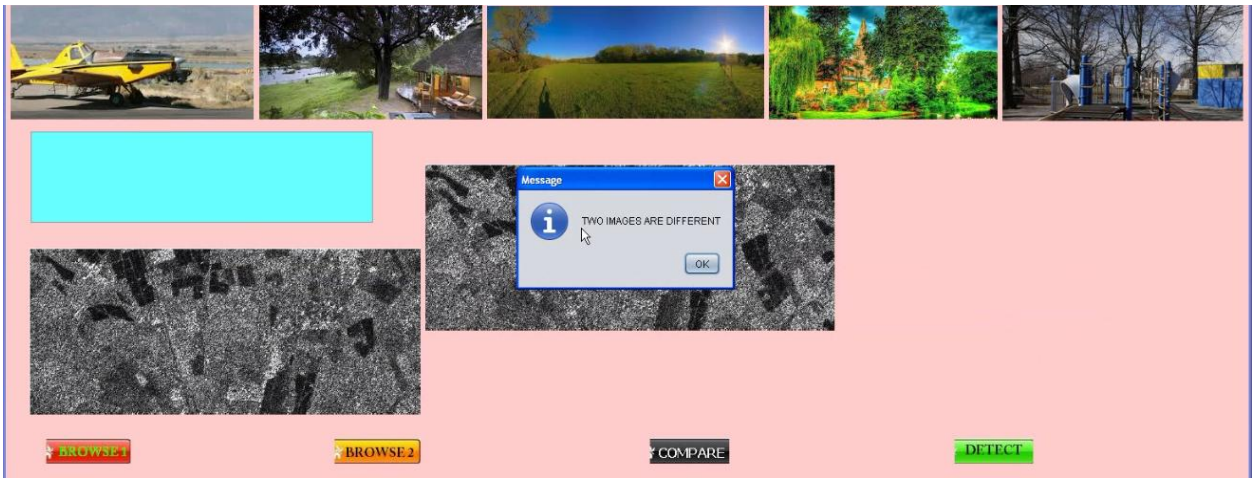

Fig3. Comparison of images

Fig. 3 shows comparison of two input images and gives result in message box as they are same or different as shown in Fig. 3 as "TWO IMAGES ARE DIFFERENT".

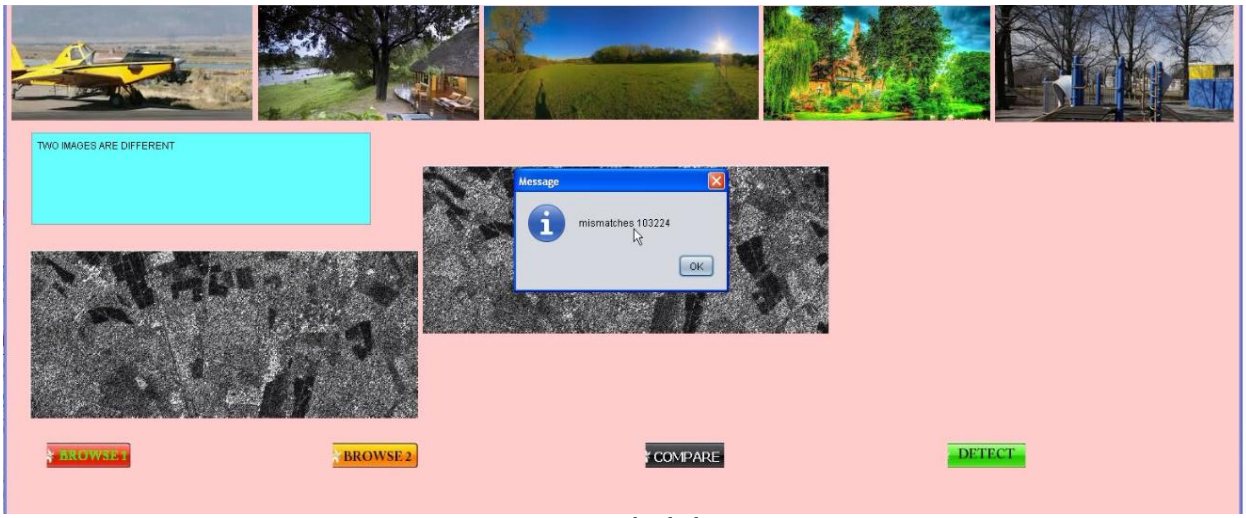

Fig4. Mismatch calculation

Fig. 4 shows the mismatches calculation and number of pixels that found in mismatches for input images as shown in Fig. 4 as "mismatches 103224".

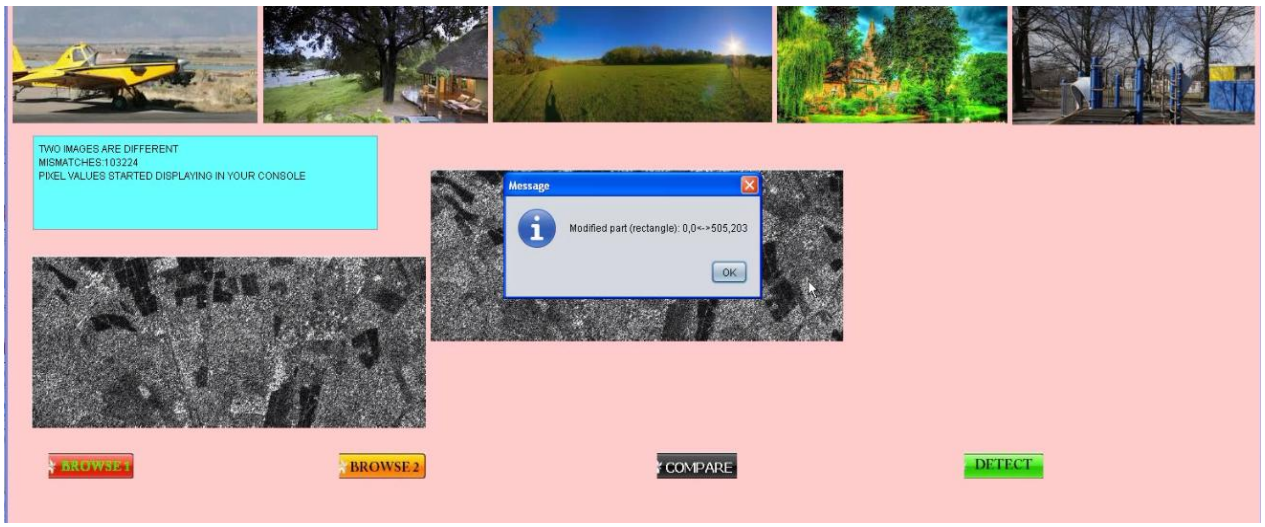

Fig. 5 Modified part generation

Fig. 5 shows the calculation for exact modified rectangular part of pixels as shown in Fig. 5 as "Modified part (rectangle) 0,0<->505,203"

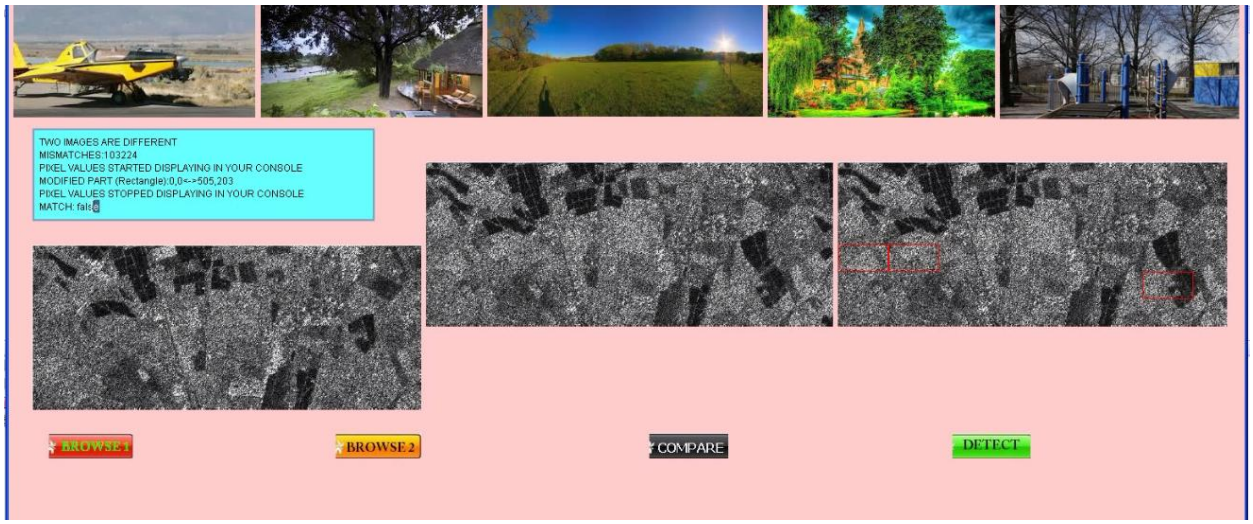

Fig. 6 Images changed detection

Final result change detection shown in Fig. 6 in which differ between two images has been detected and defined by drawing red rectangular portion of pixels in image.

V. CONCLUSION

From the obtained experimental results we conclude that the image fusion and c-means algorithm gives better performance for image change detection. For the experiment the system is tested for two different images for change detection. The system gives results that inputted images are different and also calculates mismatches pixels. Also, the system detects and identified that exact area where two images are different. From the experiment we conclude that our system works satisfactory for image change detection.

The work can extended to detect changed region more exactly by using techniques like RFLICM and also, increase the efficiency by using fuzzy clustering algorithms.

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