An Algorithm Used for the Enhancement in Detection and Determination of Duplicated Regions in Copy-Move Image Forgery

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Abstract— In this paper we have studied the various techniques used to improve the key point localization and detection of duplicated regions in same image. These techniques create an enduring image by copying the certain portion of an image and pasting it to the different location of the same image. The key points in this image cloning are that the content is copied from the same image so the noise components, texture and patterns are compatible with the same image. The most important thing is the discovery of similar parts in the same image and then it becomes more complex to make clusters of those parts. We have presented Scale Invariant Feature Transform (SIFT) technique to determine the feature matches in the image.

Keywords: SIFT, MIFT, Key point Localization, Image Cloning

I. INTRODUCTION

The image cloning and the key points matching in the image processing have become a fundamental base in various hurdles in the computer vision, object recognition, visual motion analysis and stereo correspondence. This paper presents the features of an image possessing various properties that make them best suited to match the different images of an object or scenario. The detected features in the image are invariant to scaling of the image and image rotation and a bit invariant to change in illumination of the image and from the view point of camera. These features are completely localized and placed in the spatial and frequency domains, which reduces the chances of affecting the image from clutter, noise or distortion. There are several features that can be extracted from an image with efficient algorithms and these features are very much in character to the image which permits the single feature to match exactly from a large database of features that provides the base for object detection.

In this study we have taken a review of the SIFT technique used to detect the copied content in an image. We will try to improve the detection and make changes in the algorithm or will employ any alternate and efficient technique for the enhancement in detection of the duplicate regions in an image. In this paper we will study the copy-move detection stratagem by means of extraction of key point features by taking precision and accuracy into the consideration. First of all we will employ MIFT (Mirror Reflection Invariant features) technique to detect similar regions in the image. The MIFT is somewhat similar to SIFT but MIFT is invariant to mirror reflection transformations which makes it superior over SIFT. The next step to be followed is to extract the accurate key points through MIFT and refine all the parameters by extracting additional key point matches in the duplicated region. Finally, for the extraction of duplicated region, the MIFT features are used along with the hysteresis thresholding and morphological operators which reduces the false positives and negatives. The performance of the proposed methodology is evaluated by making a number of experiments using real images from a large database.

II. METHODOLOGY

The following steps are followed to extract the similar keypoints and duplicate regions of the image:

A. Scale-space extrema detection:
The first stage of computation searches over all scales and image locations. It is implemented efficiently by using a difference-of-Gaussian function to identify potential interest points that are invariant to scale and orientation.

B. Keypoint localization:
At each candidate location, a detailed model is fit to determine location and scale. Keypoints are selected based on measures of their stability.

C. Orientation assignment:
One or more orientations are assigned to each keypoint location based on local image gradient directions. All future operations are performed on image data that has been transformed relative to the assigned orientation, scale, and location for each feature, thereby providing invariance to these transformations.

D. Keypoint descriptor:
The local image gradients are measured at the selected scale in the region around each keypoint. These are transformed into a representation that allows for significant levels of local shape distortion and change in illumination.

E. Keypoint matching:
The nearest neighbor is defined as the keypoint with minimum Euclidean distance for the invariant descriptor vector.

III. RESULTS AND ANALYSIS

We have worked on a real image and taken it as an input for determining the keypoints in it. After recognizing the keypoints the keypoint is matched through SIFT.
After the localization of keypoints, these keypoints were needed to match in the same image. We have matched these keypoints with the help of SIFT technique.

IV. PROBLEM STATEMENT AND FUTURE WORK

SIFT is not suitable when reflection is present in the image. The number of false matching is large due to this technique in the reflected areas. Although, it does not yield to relevant results when the duplicated region is very small and is moved a number of times. The MIFT technique can be used as an alternate for the SIFT as it provides the better result than this and enhances the detection of duplicated regions in the same image. Moreover, it does not provide the false matching even when there is reflection in the image.

V. CONCLUSION

The SIFT technique is not employable for the precision in the results when the reflected keypoints are needed to detect and matched. In our research work, the MIFT technique will be introduced for exact match and to omit the false matching of the keypoints in the same image.

REFERENCES