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An Efficient Image Matching algorithm

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***Abstract*— Image matching is an important task. The matching problem is also known as correspondence problem. In an image, matching can be defined as the establishment of the correspondence between various data sets. Many steps of the photogram metric processing chain are linked to matching in one way or another.**

In this paper we proposed a method direct matching for gray scale image. Template image is directly mapped with reference image i.e each corresponding pixel is subtracted from the reference image and saved as difference then sum is compared with Tolerance value and then the minimum value of the sum is taken. Then the coordinates of x and y are saved where the image is matched.

Keywords— image matching, template image, reference image, correspondence.

I. INTRODUCTION

[4] Image matching is an important task to be performed for the correspondence problem. The distinction between different matching primitives is probably the most prominent difference between the various matching algorithms. Digital image matching automatically establishes the correspondence between primitives extracted from two or more digital images depicting at least partly the same scene. For large-size image registration, the main challenges are the. **[3,7]**Maximum-.Likelihood Image Matching methods have been improved using a probabilistic formulation for image matching in terms of maximum-likelihood estimation that can be used for both edge template matching and gray-level image matching.

[2,6] With the help of the transformation parameters achieved at low resolution level, we can apply blockwise SIFT extraction and matching to improve the efficiency.

The intensity value of a gray scale image varies from 0 (pure black) to 255 (pure white), allowing us to have 256 different shades of gray values. In an image, matching can be defined as the establishment of the correspondence between various data sets. The matching problem is also referred to as the correspondence problem. The data sets can represent images, but also maps, or object models. Many steps of the photogrammetric processing chain are linked to matching in one way or another. The objective of Proposed Algorithm is to find the correspondence between two images. In this the object image is searched through the given reference image where it is searched for its geometric location. For a given image T (Template Image) of size N X N, is an object of interest to be searched in reference image of size PXP image that possibly contains that object. Template image is usually sub part or sub image of the reference image. Dimension of Template image is smaller than Reference Image. Proposed Algorithm is working even image has some blurred.

II. PROPOSED ALGORITHM

We are taking two images one is Template while other is reference image. Template image can be sample image or blur sampled image which we are trying to match it with reference image. Proposed algorithm is working for sampled image as well as blur image. Steps of Algorithm are described in below section.

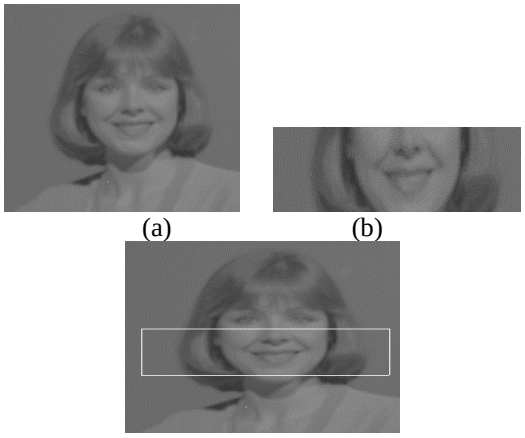
a. Input the reference image with .tiff format.
b. Input the template image with tiff. format.
c. Template image is directly mapped with reference image i.e each corresponding pixel is subtracted from the reference image and saved as difference.
d. Then we take sum of all the differences in a variable sum.
e. The sum is compared with Tolerance value as

```
If (sum) <= 500000 then
        If (min<= sum) then
                min=sum;
                    cx=i;
                        cy=j;
                        end if
end if
```

Tolerance value discussion

1. The tolerance value is taken by doing various experiments on different images.
2. For example, if we are cropping the same image (template image) from the Reference Image then there is no need to take tolerance value or in other words we can say tolerance value zero will work.
3. But if we add some noise or blurring in the template image ,then doing matching, then the value of variable sum will increase up to 500000, that is peak value of the sum, that is why we are taking the tolerance value 500000.

III. RESULT AND DISCUSSION

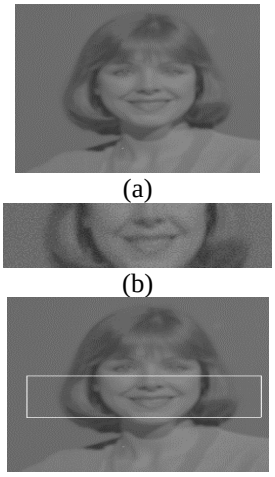


(a) (b)

(c)

Figure 1.1(a) is Reference image; (b) is Template image (extract from reference image) and (c) match result.

In figure 1.1 First template image window placed on left top on reference image and template image pixel value is subtract from reference image correspondence pixel and then difference of correspondence pixels are stored in variables window is moved whole image and where whole pixel sum is 0 then image is matched in reference image And the coordinates of x and y are saved where the image is matched.



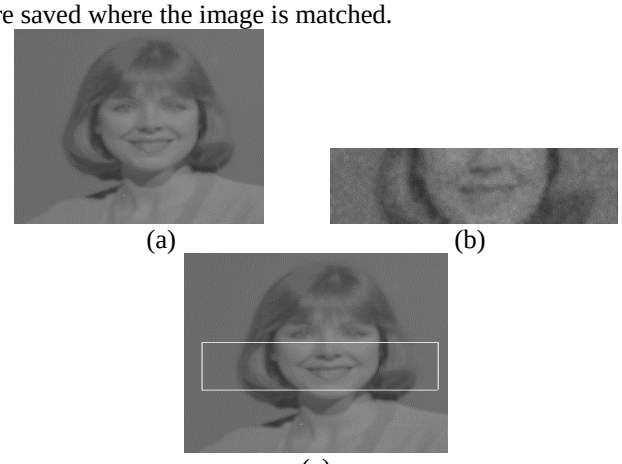
(a)

(b)

(c)

Figure 1.2(a) is Reference image and (b) is Template image (template image with noise) and (c) show the result.

In figure 1.2 First template image window placed on left top on reference image and template image pixel value is subtract from reference image correspondence pixel and then difference of correspondence pixels are stored in sum variables window is moved horizontally and vertically pixel by pixel whole reference image . Template image contain noise so it will be not match exactly. So sum variable compare tolerant value. And then the minimum value of the sum is taken. And the coordinates of x and y are saved where the image is matched.



(a) (b)

(c)

Figure 1.3 (a) is Reference image and (b) is Template image (template image with blur) and (c) show the result.

Figure 1.3 Template image window placed on left top on reference image and template image pixel value is subtract from reference image correspondence pixel and then difference of correspondence pixels are stored in sum variables window is moved horizontally and vertically pixel by pixel whole reference image . Template image contain noise so it will be not match exactly. So sum variable compare tolerant value. And then the minimum value of the sum is taken. And the coordinates of x and y are saved where the image is matched. Our algorithm has obtained best results for image matching.

IV. CONCLUSIONS

The image matching algorithms we have implemented are image matching using finding least value compared with tolerance value. From experiments that are given in result section, it has been observed that normally our proposed algorithm is faster in comparison to the ABM technique. In future more work can be carried out to have adaptive feature selection method. As the number of transformation in gray level or we can say higher number of edges more feature will be selected, so by considering feature selection threshold adaptive FBM algorithm can be made more fast. Our algorithm gives best response in case of noisy images, blur images also. The template image to be matched must be sub image of the reference image.

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