

Hand-Written Character Identification from an Image by using Digital Image Processing

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Abstract – Handwritten character extraction from an image is a very task on image processing because handwriting varies from individual to individual. The styles, sizes and its direction make it much progressively complex to interpret the text. The different uses of transcribed text in perusing bank checks, Zip Code recognition and in removing the issue of taking care of archives physically has made it important to secure carefully designed information. This paper introduces the recognition of transcribed characters utilizing android cell phone and direct obtaining of image utilizing Matlab, trailed by the usage of different other Matlab tool kits like I P. The image is procured by android cell phone that make framework progressively convenient and usable on the grounds that present time is have a place with cell phone.

Keywords— Image Processing, Image Acquisition, Image Rendering, Character Extraction, Edge Detection, Android.

I INTRODUCTION

Character identification from an image is very challenging task and it is helpful in various applications. It has been an exceptional field of research since the beginning of software engineering because of it being a characteristic method for associations among PCs and people. All the more absolutely Character identification from an image is the method toward distinguishing and getting characters from the information image and changes over it into ASCII [1][2].

Handwriting identification from an image is divided into offline handwriting recognition and online handwriting recognition [3]. On the off chance that handwriting is filtered and, at that point comprehended by the PC, it is called offline handwriting recognition. On the off chance that, the handwriting is acquired while using touch pad utilizing stylus pen, it is called online handwriting recognition From the classifier point of view, character identification frameworks are ordered into 2 primary classifications for example segmentation (worldwide) and segmentation based (explanatory). The segmentation free otherwise called the comprehensive way to deal with perceive the character without portioning it into subunits or characters. While segmentation based methodology [4]; each word/ligature is sectioned into subunits either uniform or non-uniform and subunits are considered freely.

II. WORKING PRINCIPLE

The handwritten identification can be divided into 6 phases which are image acquisition, pre-processing, segmentation, feature extraction, classification and post processing.

A. Image Acquisition

Image is acquired by using Android Mobile phone . This is raw image. Other devices can be used to get the image.

B. Preprocessing

It is second phase, the raw image is converted into usable form. Pre-processing incorporates five basic steps, in particular, size normalization and focusing, interolating missing focuses, smoothing, incline corection and resampling of points.

C. Segmentation

The valuable part of an image is separated from complete image, this is also called Region of Interest.

D. Feature Extraction

The various Feature extraction method like Principle Component Analysis (PCA), Linear Discriminant Analysis (LDA), Chain Code (CC), Scale Invariant Feature Extraction (SIFT), zoning, Gradient based features, Histogram may be used to separate the features from an image.

III. BLOCK DIAGRAM

We have 6 steps which are image acquisition, pre-processing, segmentation, feature extraction, classification and post processing.

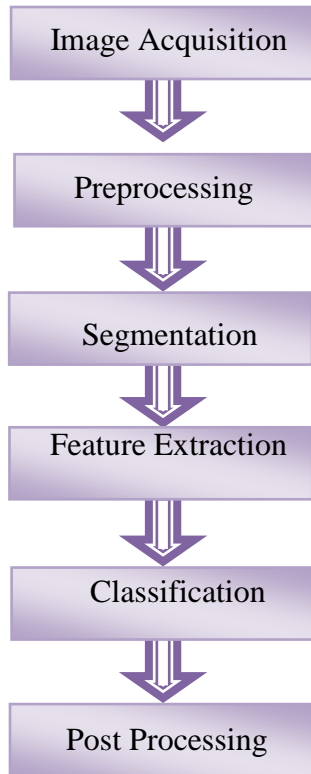


Fig. 2 : Block Diagram of Character Recognition

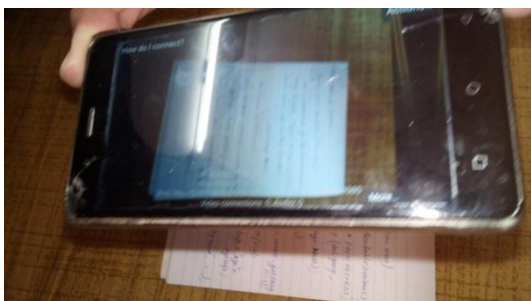
IV. ALGORITHMS

- STEP 1. Start process.
- STEP 2. Image acquisition. (Capturing the image by flat scanner or camera)
- STEP 3. Preprocessing (Finding Region of Interest)
- STEP 4 Segmentation (Separation of characters in blocks)
- STEP 5 Feature Extraction (Finding the characters for matching)
- STEP 6 End of process.

V. METHODOLOGY

Input Image

Here image is captured by Android Mobile Phone. This process live and continuous.



Now desktop/laptop in connect to Android Mobile Phone.

- This cell of codes read the image to MATLAB workspace
- Conversion to gray scale image from RGB image format.

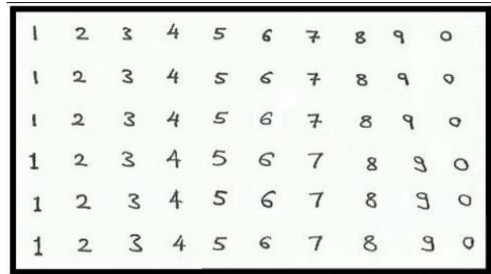


Fig. 3: Handwritten Characters

Edge Detection

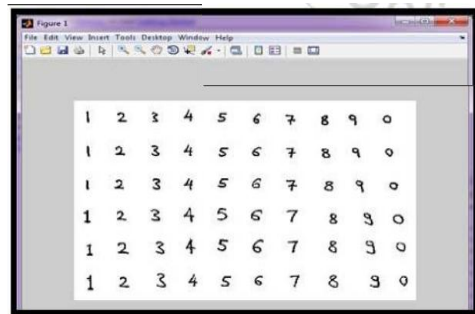


Fig. 4: Edge Detection

Edge discovery of a image altogether reduce the amount of data and filter through futile data, while protecting the significant basic properties in a image. In any case, most of various strategies might be assembled into two classes, gradient and Laplacian. The gradient technique identifies the edges by searching for the most extreme and least in the first derivative of the image. The Laplacian strategy which is being utilized in this test scans for zero crossing in the second derivative of the image to discover edges

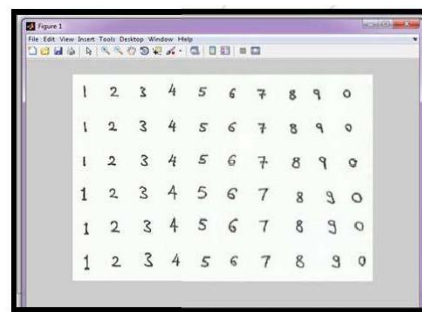


Fig.5: Segmented Hand written Character

Object Location

Select a single number from the TEST image and the program distinguishes the number. On the off chance that choosing more than one number, the program will distinguish a wrong one, so you should choose a single number.

Binarization

Following stage is binarization of gray scale character images in offline character recognition. Binarization procedure changes over a gray scale image into a double image by utilizing the way that characters are normally made out of slight lines of uniform

Feature Extraction

The following part is the component extraction wherein manually written numbers must be edited exclusively and changed over to 7x5 bitmap images at that point (35x1) to be as the perfect numbers for the preparation procedure of the NN i.e reshaping the image. In feature extraction arrange each character is spoken to as a component vector, which turns into its personality. Because of the idea of handwriting with its high level of inconstancy and imprecision acquiring these features, is a troublesome assignment. Feature extraction techniques depend on 3 sorts of features Statistical, Structural, Global changes and minutes. Basic and measurable features seem, by all accounts, to be reciprocal in that they feature various properties of the characters.

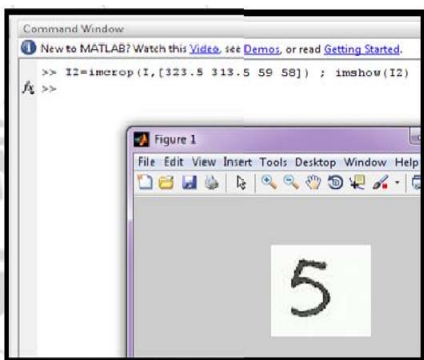


Fig.6: Segmented Hand written Character

VI. MATLAB CODE

1. Capturing Image in Matlab by using Mobile Phone live .

```
url =
'http://192.168.1.106:8080/shot.jpg
';
ss = imread(url);
```

```
fh = image(ss);
while(1)
    ss = imread(url);
    set(fh,'CData',ss);
    drawnow;
end
```

2. Now Image is saved in Matlab.

3.Read Image

```
I = imread('training.bmp'); imshow(I)
```

4. Convert to grayscale image

```
Igray = rgb2gray(I); imshow(Igray)
```

5. Convert to binary image

```
Ibw = im2bw(Igray,graythresh(Igray));
imshow(Ibw)
```

6. Edge detection

```
Iedge = edge(uint8(Ibw)); imshow(Iedge)
```

7. Morphology

Image Dilation

```
se = strel('square',2);
```

```
Iedge2 = imdilate(Iedge, se);
imshow(Iedge2);
```

Image Filling

```
Ifill= imfill(Iedge2,'holes'); imshow(Ifill)
```

8. Blobs analysis

```
[Ilabel num] = bwlabel(Ifill); disp(num);
```

```
Iprops = regionprops(Ilabel); Ibox =
[Iprops.BoundingBox];
```

```
Ibox = reshape(Ibox,[4 50]); imshow(I)
```

9. Plot the Object Location

```
hold on;
for cnt = 1:50
rectangle('position',Ibox(:,cnt),'edgecolor','r')
; end
```

VII CONCLUSION

It is trusted this point by point exchange will be valuable knowledge into different ideas included, and lift further advances in the area. The exact recognition is directly relying upon the idea of the material to be perused and by its quality. From different investigations we have seen that choice of pertinent component extraction and characterization system assumes a significant job in execution of character recognition rate. This survey builds up a total framework that changes over filtered images of manually written characters to

text records. This material fills in as a guide and update for perusers working in the Character Recognition area.

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