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OPTICAL CHARACTER RECOGNITION SYSTEM – DEEP LEARNING

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Abstract: Optical character recognition system that which identify the vehicle. The objective which automatic that proves the system image printed automatically and prepare text data which can be editable form for electronic gadget like computer to process them. It is another way to extract and leverage business-critical data. The system detects the captured image or picture then it is extracted using image segmentation or image detection. Optical recognition technique is usually maintaining the character recognition. This system process is fully implemented in python language and perform is tested on fully real images. It is fully experimental and recognize the image plate and real image. Detect the real image which is structured and unstructured data which predefined data model or image and which is formed into a data structure which pre-placed into data storage. These resulting data can use in different algorithm and database which stores and display the output of a printed data that recognize and detect the real images. These algorithms which implements specification of any particular data information that execution by Python language which uses character recognition system.

Keywords – Deep learning, Character segmentation, Character recognition, Machine learning, Optical Detection, Pre-processor.

I. INTRODUCTION

The Optical character recognition was introduced for detection of images which captured by un-clustering data. However, it resulted much interested with the improvement of digitalized camera and electronic captured images to increases the improvement of each capability of system. It is very simple to automatic extract from image to recognition of each character from image. It consists of camera or a frame grabber that has to be grab from a data of clustering and non-clustering formation, find the location of image and extract the data from a character recognition tool which translate or transferred into a small pixel into a numerically characters. This system mainly used to detect and prevent a criminal activity and for a highly security purpose area. The Recognition System uses the context of optical character recognition to scan the characters. In other words, NPR takes the image of a vehicle as the input and outlines as the license plate Number.

II. ARCHITECTURE DESIGN

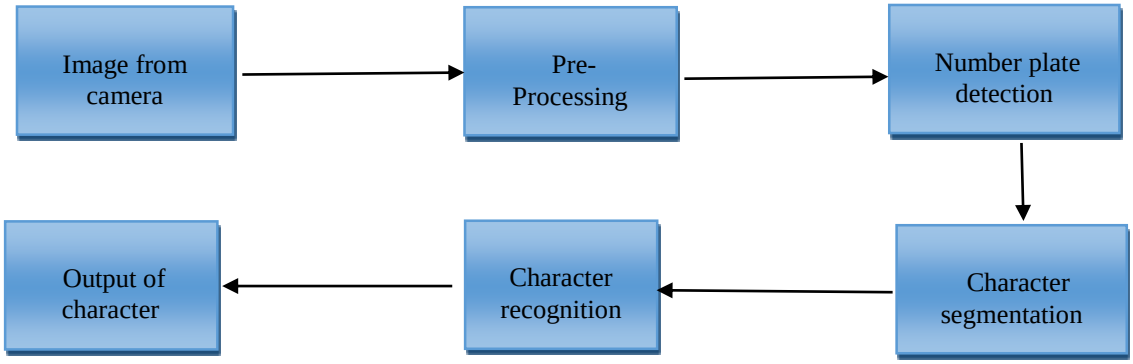

Fig 1. Typical OCR Process

III. DESCRIPTION

3.1. Image Acquisition

These is the first stage in OCR system, the image is captured using a camera. The constraint image should be captured in a way that the selected input image from both front and rear image's view with the image recognition.

3.2. Optical Detection

The next stage that follows is the recognition/ recognition phase that does several functions such as resizing of the image to a feasible aspect ratio. As well as converting the colored image into a grey scale image. These optical detection searches an input image in order to identify specific features that contain the number. The picture can be found anywhere within an image, it is impractical to check all the pixels of the image in order to locate the number plate. Therefore, we only focus on those pixels that have the number plate.

3.2.1. Edge Based Detection

These algorithms operate on the principal that the number plate is located in an area which is usually composed of black and white or black and yellow. The characters on the plate are organized in one row, or a few rows resulting in frequent changes in the horizontal intensity. This provides the reason for detecting the horizontal changes in pixel intensity, since the rows that contain the number plate are expected to exhibit many sharp variations. The major disadvantage with edge-based methods is that they alone can hardly be applied to complex images. This is because the edge-based approach is too sensitive to unwanted edges, which may also show a high edge magnitude or variance.

3.2.2. Texture Based Detection

Texture based approach is detecting and locating those regions that contain texts from a given image. However, text variations related to size, style, orientation, and alignment, as well as low contrast and complex backgrounds make the problem of automatic text detection extremely challenging. Texture-based algorithms mainly use image transformation to analyze the texture information. The most common image transformation techniques include Gabor filters, Hough transform and wavelet transform. These techniques directly analyze texture information without limitation of the number plate direction and size. Texture-based methods are known to perform well even with noisy, degraded, textured, or complex texts and backgrounds, however they are usually time consuming as texture classification is inherently computationally dense.

3.3. Color level processing

Color-based are based on the principal that different countries have different colors on their number plates. Color level processing obtains the number plate by locating the specific colors on the number plate. Color-based information of also plays an important role in image detection, where the unique color or color combination between the license plates and vehicle bodies are considered as the key feature to locate. This technique uses color features for image detection. However, this method is sensitive to the license plate color and brightness and needs much processing time.

3.4. CHARACTER SEGMENTATION

Character segmentation is another technique, that which define partitions images and data of lines or words into individual characters and single tokens. It is an operation that seeks to decompose an image of a sequence of character into sub

images of individual symbols. Character segmentation is an operation that seeks to decompose an image of a sequence of characters into sub-images of individual symbols.

3.4.1. Recursive Segmentation:

This approach uses the windowing techniques that classify the character, based on a prototype character. The system exhaustively searches all possible cut points in the image until all characters are matched against a prototype library within a given threshold.

3.4.2. Shortest Path Segmentation:

This method combines dynamic programming and neural net recognition for finding the best segmentation from the many obtained for the given word.

IV. SAMPLE CODE

4.1.Main.py

```
Import cv1
def main():
showvalue = true:
   KNNclusterValuePlates = imgPlatesValue + OrginialsceneValue
if :
    showimgScene = True
print " listOfPossibleValue"\n
else:
       return
  imgOriginalScene  = cv2.imread("h.jpg")
       return
   listOfPossiblePlates = DetectPlates.detectPlatesInScene(imgOriginalScene)
   listOfPossiblePlates = DetectChars.detectCharsInPlates(listOfPossiblePlates)
   cv2.imshow("imgOriginalScene", imgOriginalScene)
 try:
    showimgOrginalScene = True
 print "ImgOrginialscenecharacter",error\n
except:
  showimgOrginialScene = false
print "ImgOrginialscene"\n
return
```

4.2. Preprocess.py

```
def preprocess(imgOriginal):
imgGrayscale = extractValue(imgOriginal)
imgMaxContrastGrayscale = maximizeContrast(imgGrayscale)
height, width = imgGrayscale.shape
imgBlurred = np.uint8)
imgBlurred=cv2.GaussianBlur(imgMaxContrastGrayscale,GAUSSIAN_SMOOTH_FILTER_SIZE, 0)
```

```
imgThresh=cv2.adaptiveThreshold(imgBlurred,255.0,cv2.ADAPTIVE_THRESH_GAUSSIAN_C,cv2.THRESH_BINARY_INV
,ADAPTIVE_THRESH_BLOCK_SIZE,ADAPTIVE_THRESH_WEIGHT)
  return
```

4.3. PossibleChar.py

```
 def __init__(self, _contour):
        self.contour = _contour
        self.boundingRect = cv2.boundingRect(self.contour)
        [intX, intY, intWidth, intHeight] = self.boundingRect
        self.intBoundingRectX = intX
        self.intBoundingRectY = intY
        self.intBoundingRectWidth = intWidth
        self.intBoundingRectHeight = intHeight
        self.intBoundingRectArea = self.intBoundingRectWidth * self.intBoundingRectHeight
        self.intCenterX = (self.intBoundingRectX + self.intBoundingRectX + self.intBoundingRectWidth) / 2
        self.intCenterY = (self.intBoundingRectY / float(self.intBoundingRectHeight)
    # end constructor
# end class
```

V. RESULT

5.1. Image Acquisition:

Fig 2. Image Acquisition

The first step is the image acquisition stage where image captured through photographic camera and extract to a pre-processor image

5.2. Pre-processes image:

Fig 3. Pre-processes

Here pre-processor image which convert orginal image(color image) into a Threshold image, it may detect the alphabetic character into a systematic language

5.3. Character segmentation:

In character segmentation defines, partition images into a lines or tokens into single (individual) characters. It is an operation that which seeks image of tokens into sub images or symbols

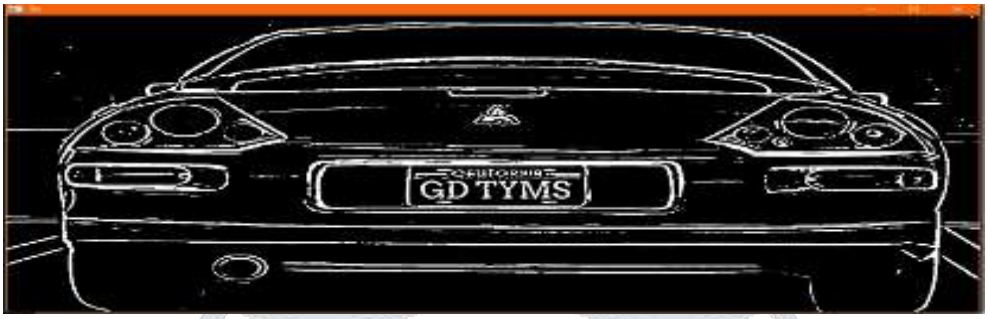

Fig 4. character segmentation

5.4. Character recognition:

In these technique, it will process of detect and recognize characters or tokens from input given images which converts into a its equivalent language as ASCII code.

Fig 5. Character recognition

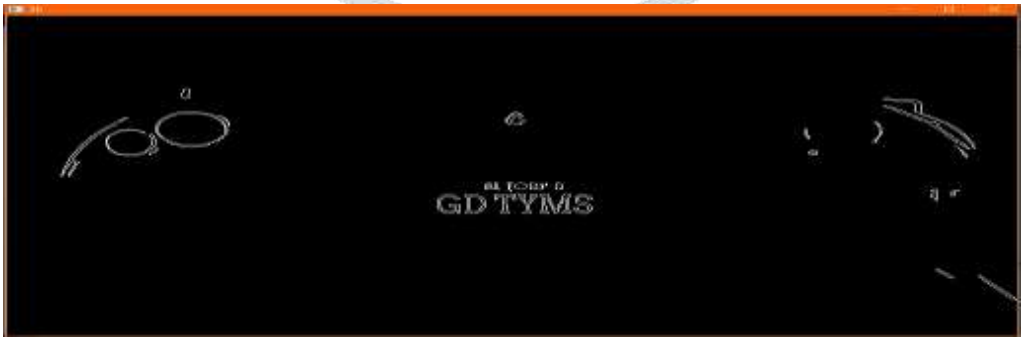

Fig 6. Character recognition

5.5. Output:

Fig 7. Output image

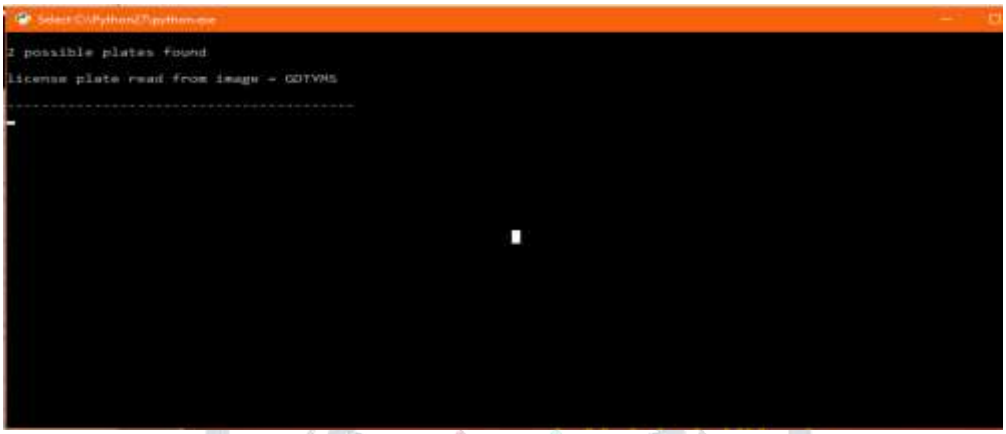

Fig 8. Output image

Thus, above images are final output.

VI. CONCLUSION

It is a requirement by law in most countries that every vehicle must have a vehicle registration number. A registration is image required plastic plate attached to a motor vehicle for official identification process. The vehicle registration plates are placed at the back or at the front of the vehicle. An OCR system provides for means that allow for vehicle number plates to be captured and stored automatically without much need of human intervention. Thus, recognition system works in four main stages namely:

- Image acquisition : - capturing of the vehicle image that contains the number plate.
- Image detection : - identification of where the number plate exists within the image.
- Character segmentation : - dividing of the plate image into individual characters.
- Character recognition : - which detect the image and recognize letter from input and convert into understand language.

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