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Recognizing and Verifying the Handwritten Fields on Cheques Using Filtering Techniques

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ABSTRACT

In general, bank cheques are used extensively for financial transactions in various organizations. Cheques are always verified manually. The traditional verification process will always include date, signature, legal information, and payment written on the cheques. In this paper, extracting the legal information from captured cheque image is obtained by preprocessing the image, extracting required information and then recognizing and verifying the handwritten fields. Image processing techniques like thinning, median filtering, dilation, and verification techniques are also employed in this approach.

Keywords : OCR, TESSERACT, OPENCV

I. INTRODUCTION

Money transfer is a crucial part of all institutions. There are numerous ways to transfer money like direct cash, online transactions, demand drafts, cheques etc. Out of these, money transfer using cheques is the most widely used method. Every institution or organization perform confidential money transfer using cheques or demand draft. The reason is that use of cheques is more secure as compared to other methods. But even today, details of these cheques are manually entered. For example, in schools, when students deposit their cheques, the officials manually enter their data in an excel sheet. This task tends to be laborious. The same procedure is being followed in banks as well, where thousands of cheques are dealt with each day.

Here a system which can scan a cheque and extract all the necessary information and make a list of all the transactions happening is proposed along with a software that verifies signature using an available database is proposed to be implemented.

In this paper bank name, address, account number, date, amount was extracted from the cheque using different libraries in Python such as OpenCV and tesseract. By using Pandas, the data obtained was stored in the form of excel sheet.

These make use of dynamic information for verification purpose. Online signature verification is carried using pressure-sensitive tablets and webcam that extracts features from a signature. Handwriting Recognition is one of the most active areas of science where deep neural networks are used. To train a model

of a neural network it takes a large dataset. The method of identifying handwriting characters is divided into two systems.

Now a day, automatic bank check processing is an interesting field in banking industry. As a large number of bank checks are still processed manually that involves the manual reading of the checks and inputting their respective values into the computer, this manual procedure involves high cost due to its labor-consuming operation. Handwritten text and signature in the bank check is an important obstacle towards the automation of the bank check processing. So the proposed system has been design to recognize handwritten text and signature from bank check.

In Bangladesh, author's information on bank check is frequently handwritten. Extraction of this information involves detection, localization, tracking, enhancement, and recognition of the text from a given image of bank check. A system that is able to read check automatically would be very helpful, especially if it is fast and accurate. Even if misclassification occurs, the mistake could be detected potentially during the recognition process; however it is more desirable that the system rejects a check in case of doubt so that it can be directed to manual processing from the beginning. All these factors motivated us to carry out an experiment for automatic recognition of handwritten courtesy amount and signature on bank checks.

The recognition of machine-printed documents has been a very successful application. In contrast, it is more difficult for computer systems to read handwritten texts and numbers. In the processing of handwritten fields, computer systems are generally slower and yield less accurate results than humans [2], [5]. Segmentation of the courtesy amount into individual digits is the most critical task in check processing [18]. This includes the separation of touching characters and the merging of character fragments with other pieces. The segmentation of connected numbers is the main bottleneck in the handwritten numeral recognition system [17]. There are studies in the literature on locating the courtesy amount and signature block on bank checks [7-9], [11], [16], and [20]. Several researches have been carried out in the field of character recognition system [12], [14]. However, there are no precise methods to recognize handwritten courtesy amount and signature simultaneously from bank check. For this reason, we attempt to make a system for bank management to make their daily management flexible and faster through automated recognition of handwritten courtesy amount and signature on bank checks.

II.RELATED WORK

Title: Bank Cheque Authentication using Signature

Signing documents is something that most everyone is familiar . In our daily lives we sign everything from personal checks to birthday cards. So it is necessary to determine the authenticity and genuineness which require certification using signatures. Most signature verification schemes till date have required perfect alignment of the signature to the specified axes. However there are situations when the sample to be verified may not be aligned to the required axis. In that situation the current verification schemes could reject the signature even though it may be genuine. Though various techniques are available for verification of cheques before Clearing, there are possibilities of unavoidable errors. Inconsistent handwritten Character's pattern & alignment errors. In order to avoid this, a system that not only flags the cheques to be impounded, but also take it through cross-pattern verification to acclaim the authoritative cheques.The suggested technique aims to make the verification of signatures size and angle invariant. The invariance can be achieved by scaling and rotational manipulations on the target image. We propose a methodology that verifies a cheque by recognizing and analyzing the major details in a cheque, which includes the account holder's signature. It falls through image capturing, gray scale image conversion, Binarization, Edge detection, which is then localized & the signature is

compared. Image captured is converted into a gray scale i\mage which resolute the authoritative regions in the cheque that includes the account bearer's signature. The contour classification ensures the segmentation of the characters on the cheque. It is then localized, and compared with the account holder's source of information and clarified and passed on. Any checks that are not successfully read and matched are highlighted as an exception and immediately forwarded to the client for further action.

Title: Static signature recognition system for user authentication based two level cog, hough transform and neural network

This paper propose signature recognition system based on centre of gravity,hough transform and neural network for offline signature. Similar to other biometric measures, signatures have inherent variability and so pose a difficult recognition problem.. In this paper, signature is preprocessed through binarization, cutting edges and thinning which provides more accurate platform for feature extraction methods. We have computed centre of gravity in two level by considering centre of gravity of all the characters separately instead of taking one common centre of gravity for entire signature and finally we would be able to built a system for signature recognition by taking mean values of all the centre of gravity values of various characters present in the signature. Morphological operations are applied on these signature images with Hough transform to determine regular shape which assists in authentication process. The values extracted from this Hough space is used in the feed forward neural network which is trained using back-propagation algorithm. After the different training stages efficiency found above more than 95%

III.PROPOSED SYSTEM

In this paper, extracting the legal information from captured cheque image is obtained by preprocessing the image, extracting required information and then recognizing and verifying the handwritten fields. Image processing techniques like thinning, median filtering, dilation, and verification techniques are also employed in this approach.

ADVANTAGES:

- ✓ Reduce time
- ✓ In a less time you can extract more information.

3.1 MODULES DESCRIPTION

Pandas: pandas is an open source, BSD-licensed library providing high-performance, easy-to-use data structures and data analysis tools for the Python programming language.

Numpy: NumPy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays. It is the fundamental package for scientific computing with Python.

OCR (Optical Character Recognition):

OCR is a technology that identifies text within an image and is used to detect text from scanned documents. OCR processes an image by discovering and identifying characters. It will export the text or convert the characters to editable text directly in the image. Advanced OCR can export the size, format and layout of the text on a page.

TESSERACT

Python-tesseract is a Python method for Optical Character Recognition (OCR). This is used to acknowledge and interpret the text in the images. It can read several of the types of images that Pillow, Leptonica's imaging libraries support, including jpeg, png, gif, tiff. If script is used, the detected text will be printed by Python-tesseract rather than written into a register.

OPENCV

OpenCV stands for Open source computer vision. It is a library of programming functions that aims at real-time computer vision. It consists of more than 2500 algorithms which supports computer vision

applications. It has C++, Python, MATLAB and JAVA interfaces and supports Windows, Linux, macOS and it also runs on various mobile operating systems such as Android, iOS, BlackBerry.

The proposed system is designed for automatic detection and recognition of courtesy amount and signature from bank check. The system consists of five modules: (i) Image Preprocessing (ii) Extraction of courtesy amount and signature (iii) Binarization of courtesy amount and signature (iv) Segmentation of digits (v) Recognition using artificial neural network. Figure 2 shows the overall systemarchitecture.

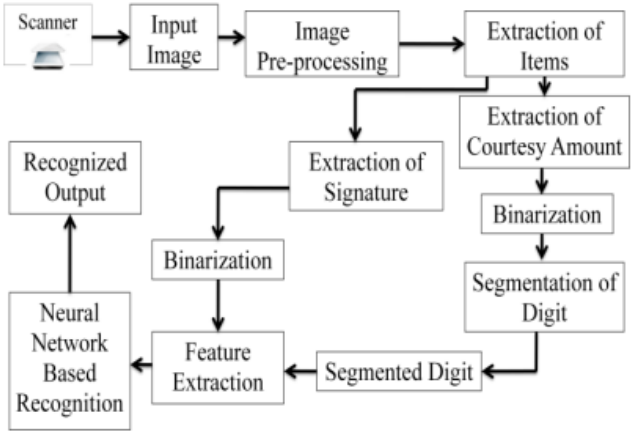

Fig 1: Block Diagram of the proposed system

IV. RESULTS AND DISCUSSION

```
import pytesseract
pytesseract.pytesseract.tesseract_cmd=r'C:\\Program Files\\Tesseract-OCR\\tesseract.exe'
```

```
import PIL
from PIL import ImageDraw
im=PIL.Image.open('SBI_cheque.jpg')
im
```

Fig 2. Results Screenshot

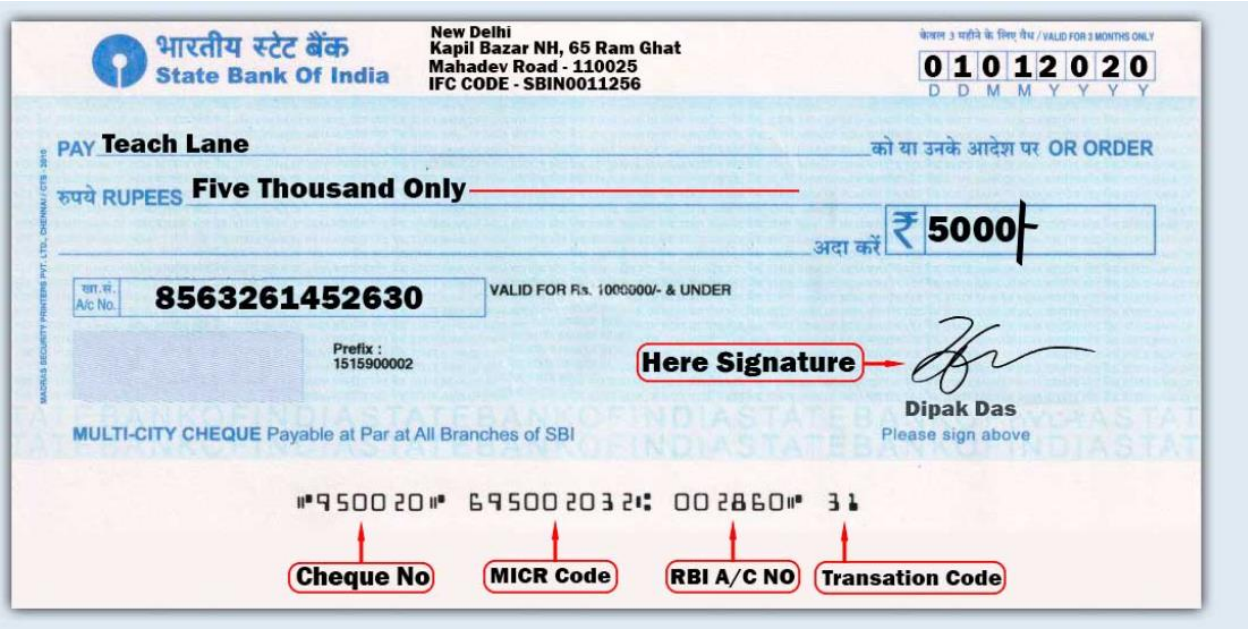

Fig 3. Results Screenshot

```
import pytesseract
img = cv2.imread("SBI_cheque.jpg")
text= pytesseract.image_to_string(img)
print(text)
```

```
urd te aap Kapil Savar NH, 65 Ram Ghat sii al ad li



State Bank Of India  Mahadey Road: 110025, 0 1 0 12 0 2 0
. pay Teach Lane ‘ Al Ol Sach HA TW OR ORDER

sua Rupees Five Thousand Only

arn a saw = 000
anal 8563261452630 VALID FOR Fis. 1000000/- & UNDER

‘516800002 Here Signature

Dipak Das
MULTI-CITY CHEQUE Payable at Par at All Branches of SBI Please sign above
```

Fig 4. Results Screenshot

```
import pytesseract
img = cv2.imread("SBI_cheque.jpg")
gray= cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
cv2.imshow("gray",gray)
cv2.waitKey(0)
text= pytesseract.image_to_string(gray)
print(text)
```

```
s New Dethi
UR eee aes Kapil Bazar NH, 65 Ram Ghat
State Bank Of India Wahadey Road, 110025,

(01012020
. payTeach Lane

DOMM YY YY
abs 4 paula ngs x __#l a FAH Be WH OR ORDER
=a Rupees Five Thousand Only —
```

Fig 5. Results Screenshot

```
____ wet at z 5000 |
ae oe tae Oe }
8563261452630 i a Ris. 1000000/- & UNDER
Prefix : 5
1515900002 Here Signature
Dipak Das
MULTI-CITY CHEQUE Payable at Par at All Branches of SBI

Please sign above
wQsoo20" 695002032 OO2H60"" 3:

(Cheque No)


(MICR Code) (RBI A/C NO) (Transation Code)
```

Fig 6. Results Screenshot

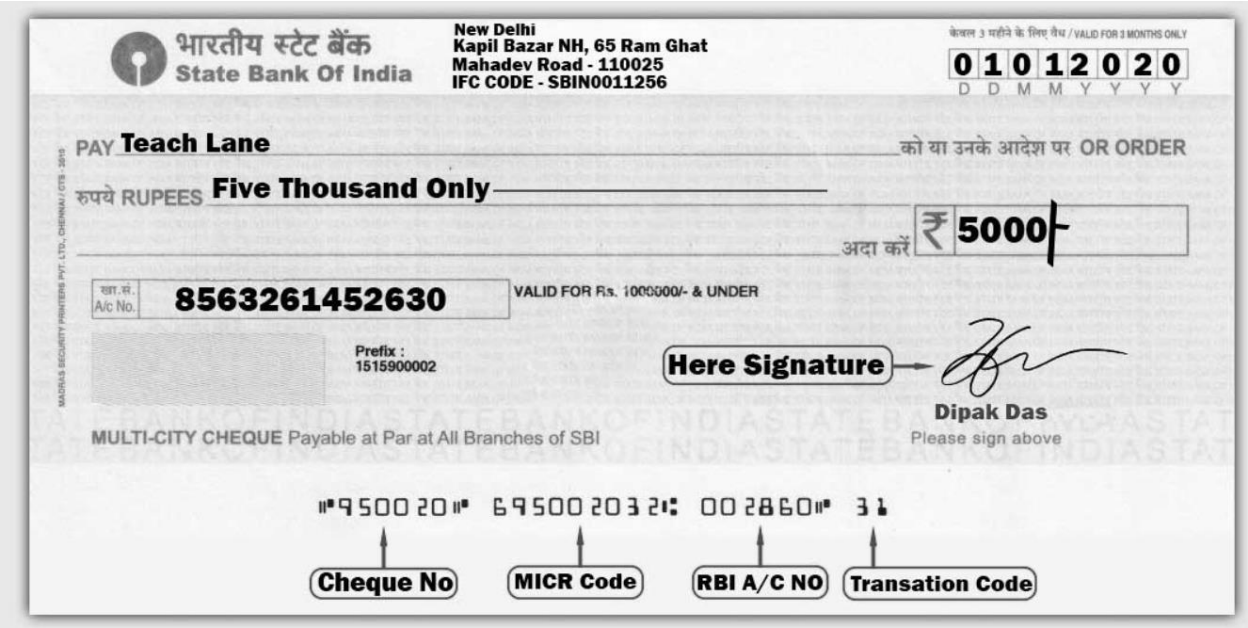

Fig 7. Results Screenshot

```
import pandas as pd

mydictionary = {'Bank_Name': ['State Bank Of India'],
'Address': ['Kapil Bazar NH65'],
'Pay_Amount': [5000],
'A/C_NO': [8563261452630],
'IFC_CODE': ['SBINOD11256'],
'Signature': ['Dipak Das']}

#create dataframe
Details = pd.DataFrame(mydictionary)
print('Original DataFrame\n--------------')
print(Details)
Details.to_csv('ChequeDetails.csv')
```

```
Original DataFrame
--------------
             Bank_Name           Address  Pay_Amount         A/C_NO  \
0  State Bank Of India  Kapil Bazar NH65        5000  8563261452630

      IFC_CODE  Signature
0  SBINOD11256  Dipak Das
```

Fig 8. Results Screenshot

```
# Improting Image class from PIL module
from PIL import Image

# Opens a image in RGB mode
im = Image.open('signature.jpg')
im
```


```
import pytesseract
import cv2
sig_img = cv2.imread("signature.jpg")
sig_text= pytesseract.image_to_string(sig_img)
print(sig_text)
```

```
Dipak Das
```

Fig 9. Results Screenshot

V. CONCLUSION

The objective of the above work presented in this paper is to make an automated system which will extract information from cheques, validate the information and keep record of all the information present that can be used by financial institutes to reduce human efforts in verification of signature which is done manually as well as it will keep a record of all the transactions.

VI. FUTURE WORK

In this paper bank name, address, account number, date, amount was extracted from the cheque using different libraries in Python such as OpenCV and tesseract. By using Pandas, the data obtained was stored in the form of excel sheet.

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