Design of Bank Cheque Validation System

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Abstract— **The Hand written notes are the most comfortable source, from accreditation to detect a person's uniqueness. Because of the increase in technologies increases the chances of fraudulent in all the hand written documents fields. The proposed methodology verifies a hand written identity on the cheque by identifying and examining the main features in a cheque. It includes complete feature extraction of the account holder's signature authentication, Account number extraction, Cheque number extraction using OCR Technique, identification of bank name using HSV Technique, Amount number extraction using Neural Network Analysis and confirmation of transaction details to the account holder using GSM Module. All these techniques falls through selecting scanned image, converting RGB to Binary, Edge detection, this is then localized and compared with the collected database. The complete feature extraction on the cheque is carried and compared with the collected database, which is the account holder's source of information, is clarified and recognized. A GUI screen is created to show implemented results based on the selection made on the GUI screen and a message box displays the authentication message and implemented in MATLAB. Any validations that are not completely read and correlated are emphasized as invalid and it forwarded to the customer for extra action using GSM module.**

Keywords—Cheque, OCR, HSV, GSM module, Neural Network Analysis, MATLAB, Edge Detection, Localization, GUI Screen

I. INTRODUCTION

This paper mainly concentrating on banking industries, in which cheque leaf is the most reliable source for fake. A cheque is a format of bank to get the money; it can be easily intruded and fakeness in the cheque is more and common, when the method of validation is doubtful. So clearing the fake cheque in a bank, make the world wise loss to the nations in the economy of the individual countries and also improvements in the technology makes the banking sector fraudulent.

The proposed technique verifies the cheque based on stored database to collect the cheque or discard the cheque and if required before crediting the money to the customer. To overcome these bugs, the feature extraction of bank cheque leaf is carried out and compared with the collected database to identify whether the cheque is fake or not.

The proposed method overcomes the conventional method like manual intervention by a trained employee, U.V rays scanner equipment, online and offline method. This system uses the offline method in which complete feature extraction is carried out to identify the cheque fake or not, so it makes the system reliable and it reduces the system design cost.

II. LITERATURE SURVEY

In [1], the proposed method verifies a cheque by identifying and examining the account holder's signature. The signature extraction goes through image acquisition, gray scale image translation, binary image extraction, which is localized, segmented. The implementation involves the image extraction and extracted image is divided into characters are going to be localized. The localized data is compared with the collected database which is already collected from the given database. This method is implemented using offline mode, thereby allowing portability. This paper gives effective sign algorithm and also provides a security by manual checking.

In [2], the proposed method overcomes fraudulency using counterfeit detection pen and UV counterfeit scanner to identify the fake currency. Counterfeit pen contains iodine which represents the paper brightness. Based on the iodine content fakeness can be determined and using U.V scanner to identify fake on exposure of the currency note. This paper includes the method of MATLAB technique to split the picture as red, green and blue color components and name it like r, g and b according to corresponding given image. The combinations of these colors are preferred to identify the fake currency more effectively. Additions to this, authors also apply the more methods to identify the fake currency using Signal to noise ratio (SNR), Mean Square Error (MSE) etc. This paper is mainly concentrated to identify the fake currency notes and to avoid this problem to make the system free from counterfeit.

In [3], Author described a new approach to signature detection that is optical character recognition (OCR) .OCR is a method of converting printed texts into digitized format so that data can be searched electronically and used in machine processes. OCR is one of the offline methods. OCR method includes pre-processing, character extraction, recognition and post-processing. Important block in OCR system is character recognition. From this technique we can avoid the fraudulent

in banking industries and this is based on the symmetric data comparison and the collected database should be correct and free from much noise. OCR method implementation is simple and efficient makes the less system design cost.

In [4], Author introduces a new approach for Indian currency counterfeit detection. The whole system depends on the detailed feature of Indian currency. The technique used is HSV (Hue Saturation Value) this involve Preprocessing stage, feature extraction, recognition and post processing and these steps will be carried using neural network classifier in MATLAB. Here Hue represent distinguished colors, saturation represents amount of white colors added and Value represent intensity value. This approach uses an evaluation algorithm, based on the threshold defined this algorithm makes the system with less error and is simple to implement. The classifier used leads to less computing power and automatic verifier is implemented using this method.

III. SYSTEM DESIGN

The system design of the proposed system involves image processing technique, using these techniques the feature extraction of the scanned cheque image is carried out. The feature extraction of cheque includes signature authentication,
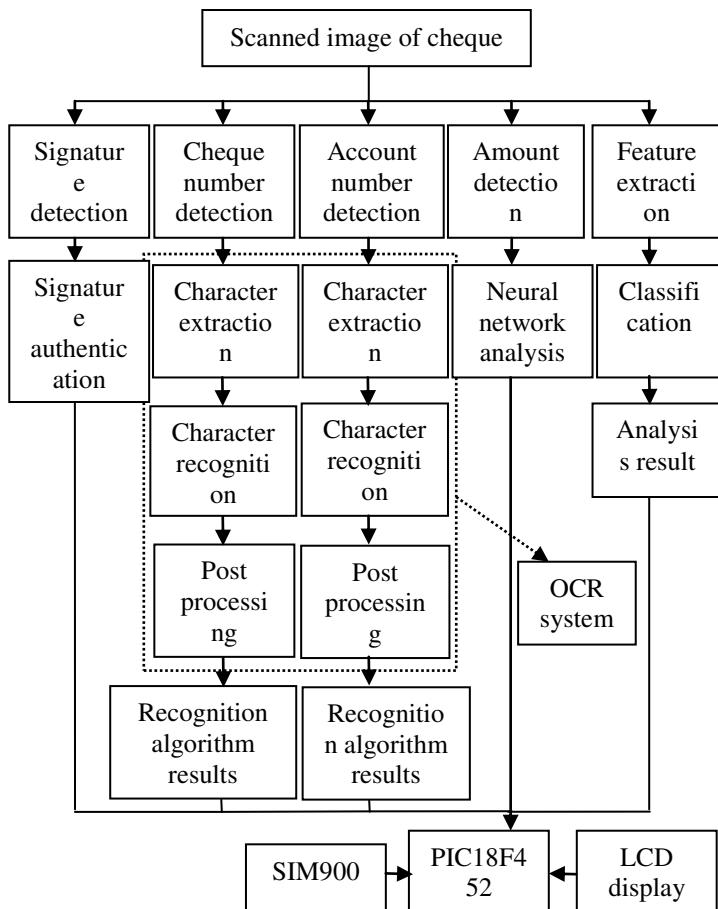
Cheque and Account number extraction, Bank name identification and Amount number extraction.Technique used for the following feature extraction is shown in the Figure 1.

A. Flowchart for proposed system

Flowchart of the proposed system includes feature extraction of the five objective. Flowcode for the proposed system is as shown in the figure 2.
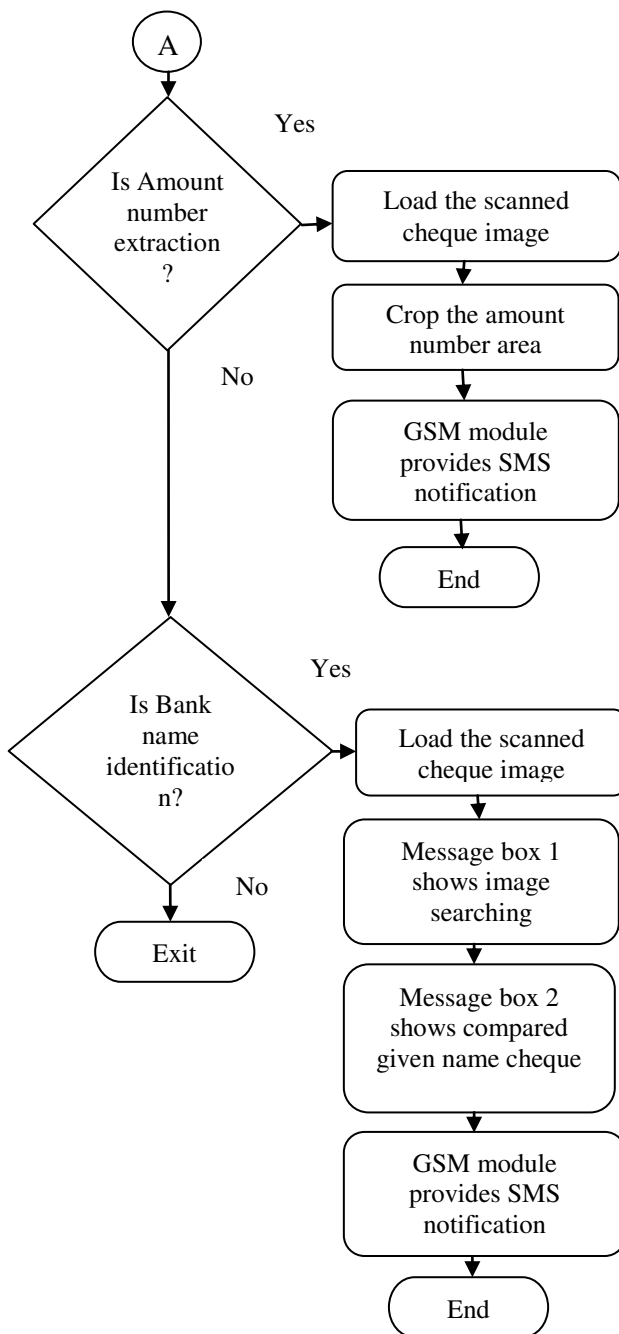

Fig 1: Block Diagram for Proposed System
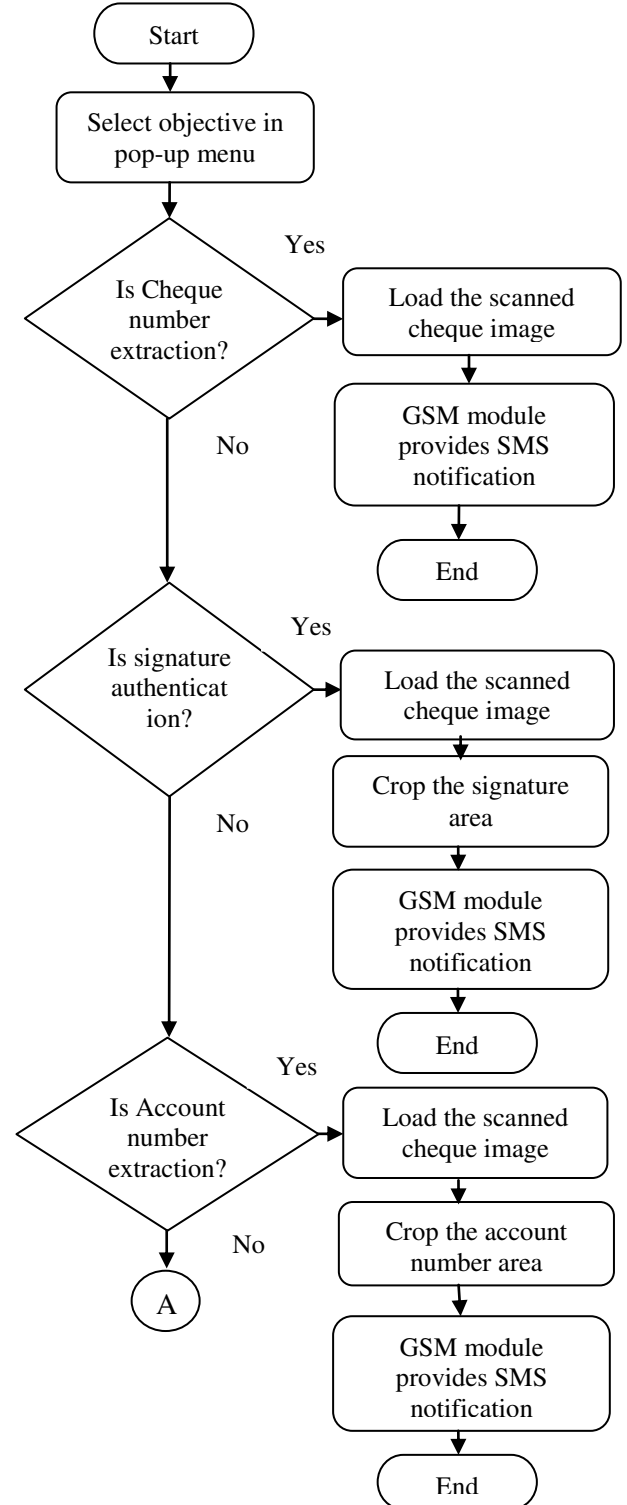
Fig 2: Flowchart for Proposed System

B. Algorithm steps for Proposed System

Algorithm steps are divided into five part to accomplish the five objective of the system and they are as follows

- Cheque Number Extraction
  o Load the scanned cheque image after selecting the objective in the pop-up menu.
  o On selecting the image, based on the OCR Technique the cheque number on the cheque is extracted.
  o The extracted each character in the cheque number area on the cheque is compared with the created database of the numbers.
  o Comparison is done to whether the extracted number is in correlation with the database. To authenticate the cheque number.
  o The extracted cheque number is appeared in SMS notification in the GUI created. The same will be received in the GSM module.

- Signature Authentication
  o Load the scanned cheque image after selecting the objective in the pop-up menu.
  o On selecting the image, signature area is cropped to apply the OCR Technique.
  o Based on the database, signature is compared to obtain the valid signature.
  o The database contains cheque with both valid and invalid signature.
  o A dialog box with message "Valid Signature" or "Invalid Signature" is shown and same will be appeared in the SMS notification area and in the GSM module.

- Account Number Extraction
  o Load the scanned cheque image after selecting the objective in the pop-up menu.
  o On selecting the scanned image, Account number is cropped in the cheque.
  o Based on the OCR technique the Comparison is done on the database available. If the account number is in exact correlation with the available database, then message box with Account number is appeared.
  o The same will be displayed in the SMS notification area and in the GSM module.

- Amount Number Extraction
  o Load the scanned cheque image after selecting the objective in the pop-up menu.
  o On selecting the given image, Amount number in the cheque is extracted.
  o The extracted number is trained, to verify the exact owner writing style to identify is the written handwriting is fake or not.
  o Then Asymmetric correlation with the database is done and this technique of comparison is called Neural Network Analysis.
  o A message is appeared in the SMS notification area and in the GSM module.

- Bank Name Identification

  o Load the scanned cheque image after selecting the objective in the pop-up menu.

  o On selecting the right image in the database, based on the Hue Saturation Value (HSV) technique, the bank name identification is done.

  o In the HSV, first it searches the query image directory. From the directory query image Histogram is compared with the selected image histogram to identify the colors the cheque.

  o Based on the color threshold, bank name is identified. The 3D histogram of the query and selected image is shown in the figure window.

  o The identified bank name is shown in the SMS notification area and in the GSM module.

IV. RESULTS AND ANALYSIS

This section presents the results of proposed system work and their simulated results obtained in MATLAB.

The entire system design has been coded in both MATLAB and Embedded C language.

The figures 3 to 9 shows the Snapshots of the simulated results based on the selected objective in the pop-up menu. The snapshot image consists of GUI screen which contains image axes where it hold the scanned image and pop-up menu to select the objective of the system and LOAD and EXIT button and text box contains SMS notification area. For each objective a separate snapshot is shown in the following figures.
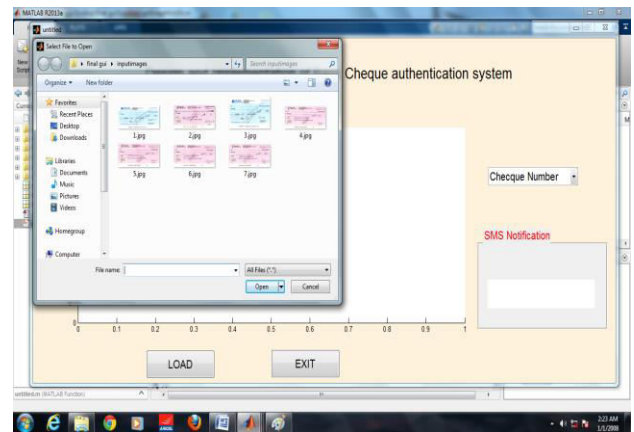

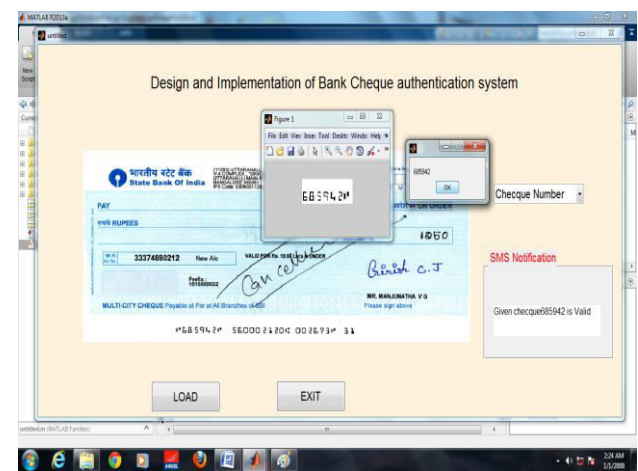Fig 4: Selection of scanned cheque image
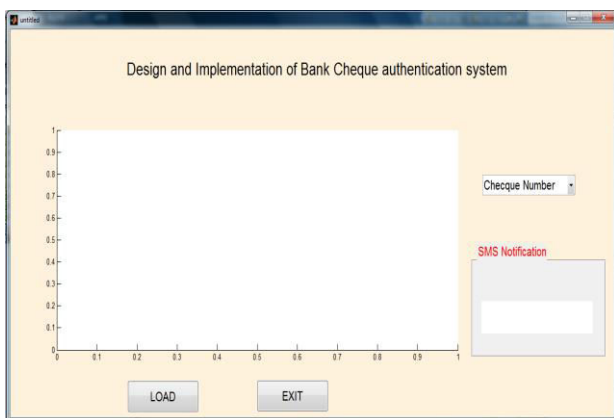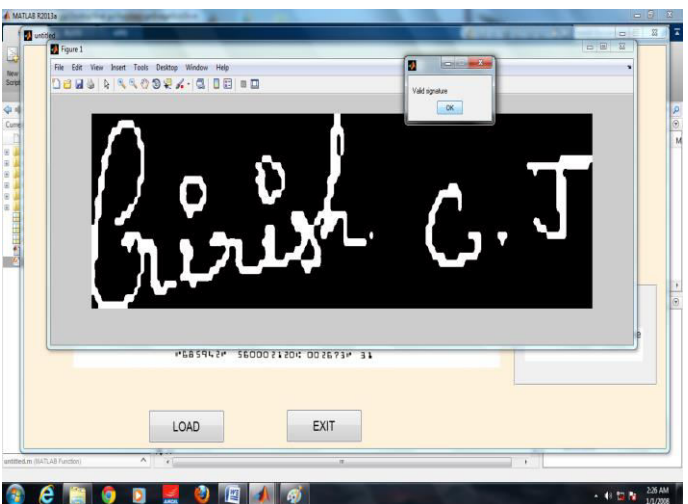

Fig 5: Cheque Number Extraction
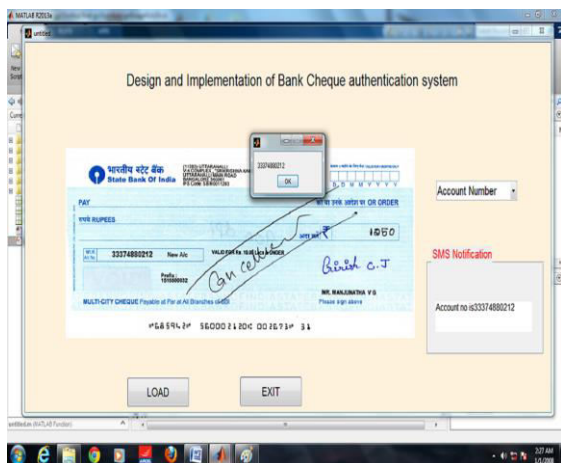

Fig 3: Main GUI screen
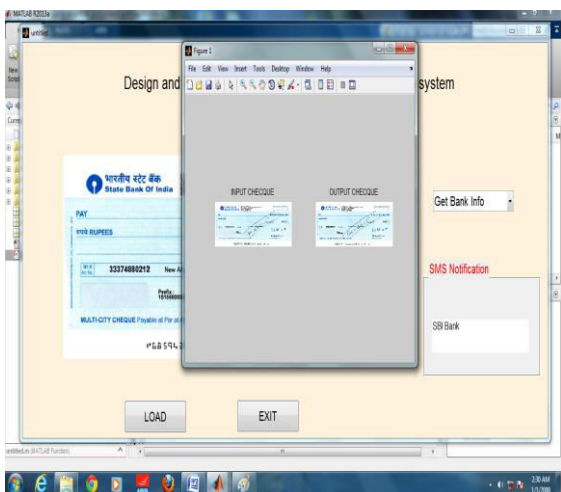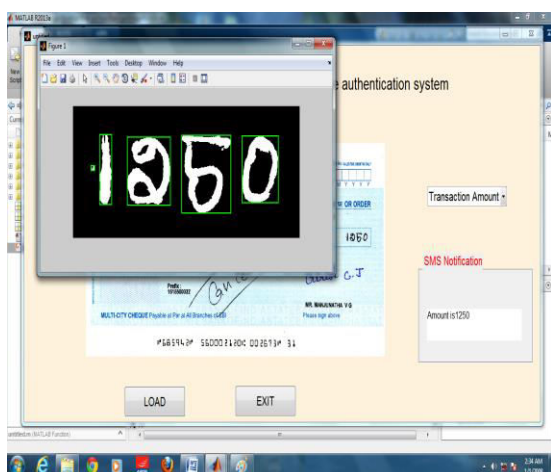
Fig 7: Account Number Extraction

Fig 8: Bank Name Identification

Fig 9: Amount Number Extraction

V. CONCLUSION

In the proposed work, bank cheque validation system is designed and implemented using MATLAB and PIC Microcontroller (PIC18F452). So it concluded that, we can avoid the fraudulency in banking industries concerning the cheque as the major factor, in which complete major feature extraction of the cheque is carried out as a objective to identify the fakeness as well to provide the authentication information to the customer using the GSM module and on the GUI screen for the bank employee.

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