CHEQUE CLEARANCE SYSTEM USING VARIOUS VALIDATION TECHNIQUES

Dhanalakshmi S
M. Tech Software Engineering
B.S. Abdur Rahman University, Vandalur, Chennai-48, India
sai_dhana6@yahoo.in
Ph no : +919710651784

Kaviya J
M. Tech Software Engineering
B.S.Abdur Rahman University, Vandalur, Chennai-48, India
kaviyapadma@gmail.com
Ph no : +919994733059

Abstract:

Processing cheques manually is been done for decades and more efficient systems are still under research. In this entire processing system, providing a secured transaction with efficient verification is what more important. An instance cheque clearance system is proposed comprising of an unmanned customer and an operator station, and means for providing communication with secure transaction. The customer station includes an OMR scanner to scan a given cheque and a cash dispenser to withdraw the cash. Secure means are provided for enabling the operator to verify the identity of the cheque bearer by recognizing MICR number, Cheque number, Signature and amount through various techniques. This will be later implemented through MATLAB[Matrix Laboratory]. OCR[Optical Character Recognition] is a method of verifying the cheque number,amount and the MICR [Magnetic Ink Character Recognition] number. Our main aim is to detect whether the cheque is valid or not by verifying the signature and account payee which can be validated using binarization .For customer the signature is fed into the process in which the original images are resized to a specified size and there images are converted to binary values which will be compared with the original signature stored in the bank database. A secret pin number is given by the cheque bearer to check drawer for a secure transaction. The validation process is done using java. This pin number is generated from a kit where the secret number for each cheque is has been saved in a PIC microcontroller as well as the bank database. A keypad is connected to an LCD [Liquid Crystal Display] to which the user can type the cheque number and view its corresponding PIN number in the display. Once the PIN number is verified in the cheque station then the amount can be withdrawn or transacted at the same moment by the user.

Keywords – OCR, MICR, Binarization, PIC Microcontroller

I.Introduction

Cheque clearance system comprising an unmanned customer and an operator station, and means for enabling communication and secure transaction. The customer station includes a scanner to scan the given cheque and a cash dispenser to withdraw the cash. The cheque is placed in the scanner and it takes the image of the cheque and it is an input to the MATLAB program.

Optical Character Recognition (**OCR)** [6] , is the mechanical or electronic conversion of scanned images of typewritten, handwritten or printed format text into machine understandable encoded text. The cheque number, amount and MICR number are verified using this OCR technique. Binarization is a process where each pixel in an image is converted into one bit and you assign the value as '1' or '0' depending upon the mean value of all the pixel. If greater then mean value then its '1' otherwise its '0' .The Signature verification [1] using this binarization technique and the result is stored in notepad as 1 or 0 based on the correct sign or wrong.

At first it verifies the signature result, if it is wrong the process is closed there itself. If it is correct, then the java searches in the SQL database for getting the customer details based on the cheque number. It wills automatically checks for the amount present in the persons account who gave the cheque. If that amount is less than the written amount then the process is closed. If the amount in the user account is greater, then it asks to enter the password. He has to enter the correct password that is given by that person and it verifies in the database and if is ok the money can be withdrawn or transferred to some other account.

All these details are present in the same database as customer database and hence the fully processed check details are store in another database for future reference. Secure means are provided for enabling the operator to verify the identity of the cheque bearer by recognizing MICR number, cheque number, signature

recognition, account number, amount recognition through image processing and a secret pin number is given by the cheque bearer to cheque drawer for secure transaction.

II.System design

A.Cheque clearance system design:

The overall interaction and design among the elements of the system is given by a diagram in fig(IIA) which clearly specifies the relationship between various actions performed by an actor respectively.

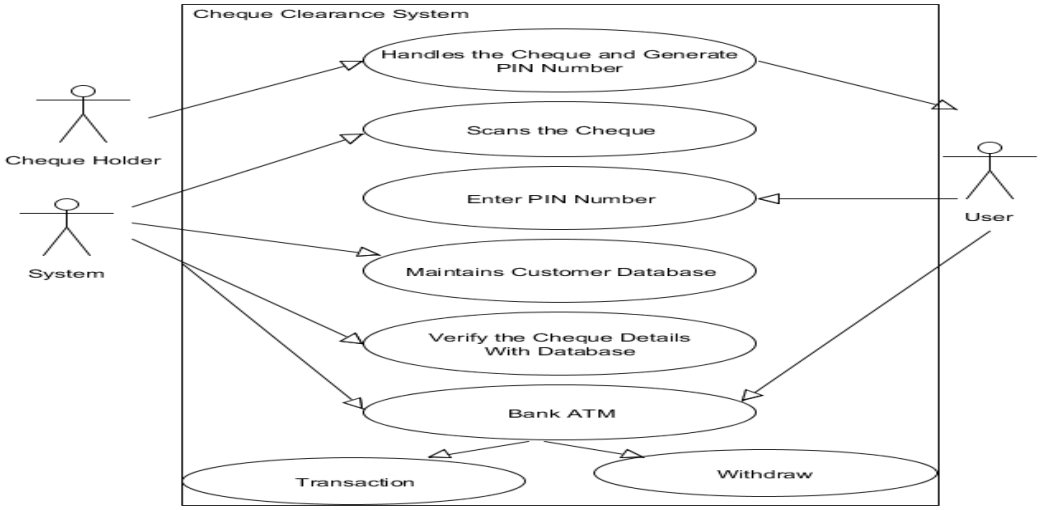


Figure II.A Cheque Clearance System

B. Architecture diagram

The overall system working is given by an architectural diagram in fig(II.B) that gives the work flow of cheque verification,validation and amount transaction in a secured manner.

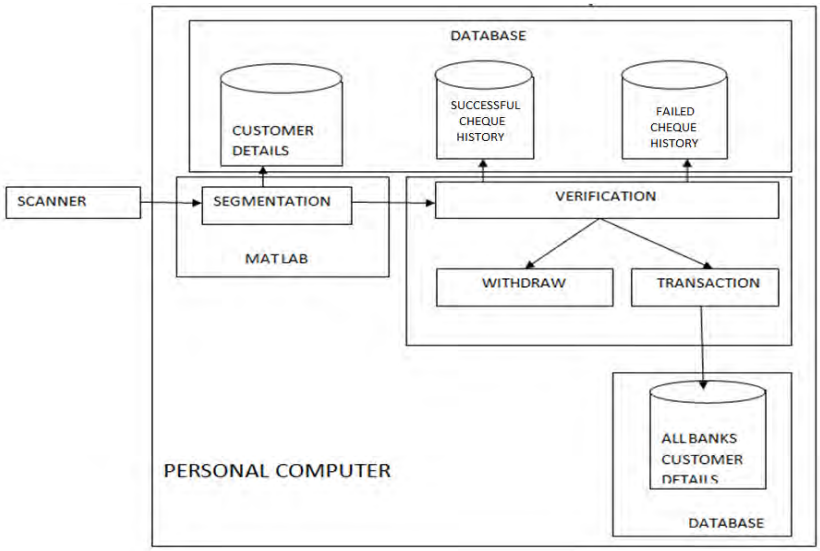


Figure II.B Architectural Diagram For Cheque Station

III. System Implementation

A. Cheque Clearance System

It performs the process of cropping the desired field to process the cheque [5]. The cheque is placed in the scanner and it takes the image of the cheque and it is an input to the MATLAB program[4]. In that the image processing is done where various techniques are applied by taking the pixel value of the following fields (i.e.) the MICR number, cheque number, amount and signature are segmented and it is taken for processing.

In order to view the values clearly it is complemented from black to white[3]. The cheque number, MICR number and the amount are separately written in a notepad for further processing. The java is used for further processing and that program takes the input from these notepads.

The Signature verification is also done in the MATLAB[1][7] and the result is stored in notepad as 1 or 0 based on the correct sign or wrong. It verifies the signature result from the already stored signature database. If the signature matches the database then it displays genuine for further processing .If it is wrong it displays that the signature is forged and the process gets closed there itself.

B. Pin Generation Kit

The cheque lender will type the cheque number using keypad and enter key is pressed which will display the secret Pin Number in the LCD display. Before using this kit for Pin generation, PIC (**Peripheral Interface Controller)** Micro Controller is programmed in such a way that it stores user cheque numbers and its corresponding Pin Number which will also be stored in the bank's database that is used while processing cheques in a secured manner.

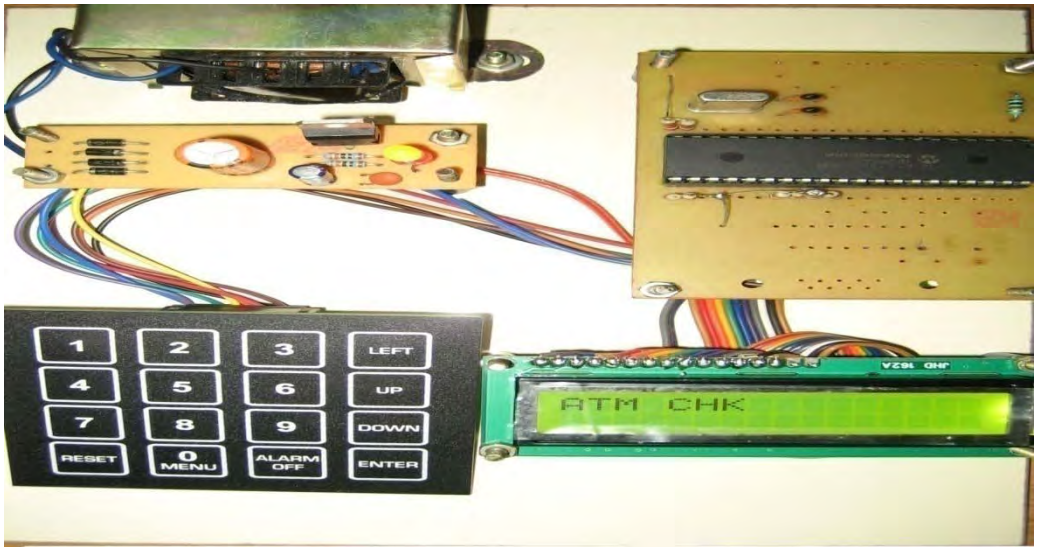


Figure III.B Pin Number Generation Kit

IV.Application Description

A.MySQL

We use SQL database to prepare a database for the bank customer to have a clear view of their transaction and process. We create four database for the cheque processing purpose. They are, first one is customer database which is used to store the detail of the respective bank customer alone. And the Second database is cheque_account which is used to store the unique pin code generated by the kit for each and every cheque for the security purpose. The Third database is failed_check_history which is mainly used to store the failed cheque which will occure due to the signature un match. The fourth database is successed_check_history which is used to store the successed cheque which are proceed successfully to avoid the cheque repetition and malpractice.

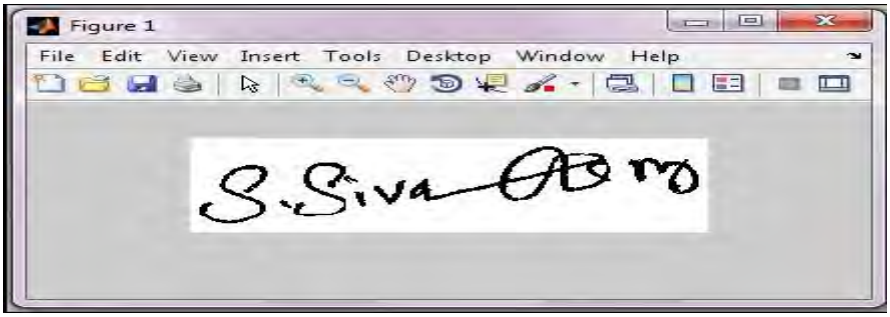
B. JAVA

The java platform is used in this project to present the bank details in the best way. The java is mainly used to show the money transaction and the changes in the customers database after each and every process and for all type of message displaying. The MATLAB will process the cheque and will store all the details of the cheque in the notepad which will be used by the java. The java get the values from the notepad and will perform the operations like entering the pin number, transacting the money which will debit and credit the amount in the respective databases.

V.Validation Techniques

A. Binarization:

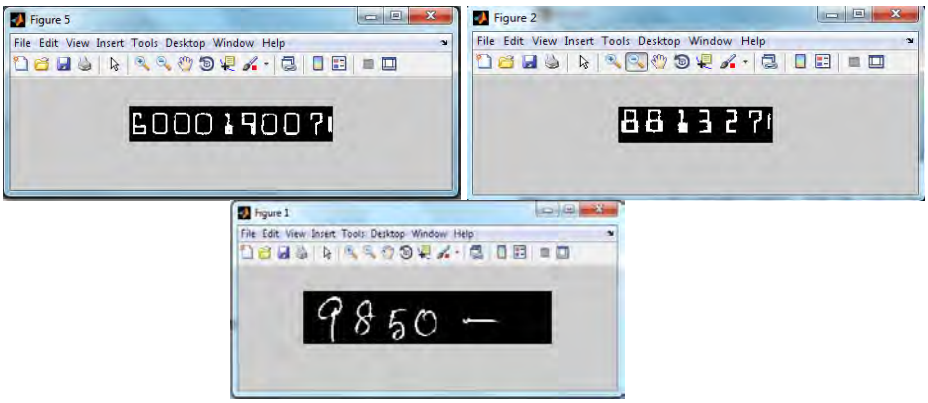
In verification of cheques, various techniques are followed in which binarization is used efficiently here[1].



V.A. Verification of signature

B. Optical Character Recognition:

Using this technique various parameters in bank cheques such as MICR number, cheque number, amount are processed and is displayed in a characterized format[5].



V.B. Applying OCR technique for MICR number, cheque number and amount

C. GUI for processed cheques using MATLAB

Using MATLAB all parameters of cheque such as signature, MICR number, cheque number & amount has been processed and represented as a GUI inside. A cheque image is loaded where each and every parameter has been processed individually. If the signature of the cheque is wrong then it shows “Forged” in the GUI of that particular cheque likewise if signature of the cheque is correct then it shows “Genuine” .

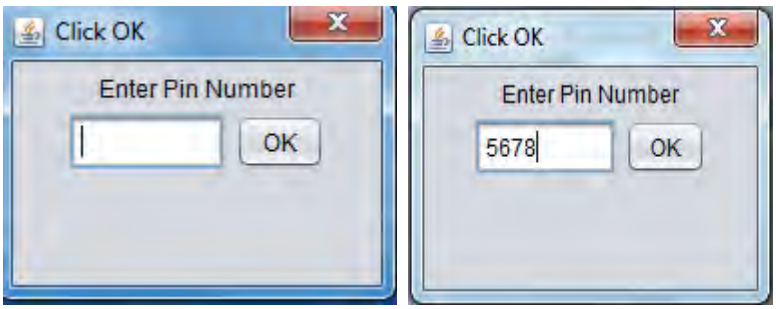
Here the cropped MICR number, cheque number and amount is loaded while loading the cheque image where all three parameters are internally checked using OCR technique and the verified numbers that corresponds to the parameters are displayed in the GUI.

V.C.(i) GUI For correct signature

V.C.(ii) GUI For wrong signature

D.Pin Number Verification:

After verifying all the cheque parameters in the station the system requires for a Pin number in which the user have to type the number that is provided by the cheque holder.



V.D. Pin number entered In processing station

VI. TRANSACTION

After the pin number is specified the system checks whether the cheque number and corresponding pin number matches as stored in the database. If everything is verified and validated to be correct then system specifies the user to select either “withdraw cash” or “transact cash” and acts correspondingly.

VII.FUTURE WORKS

In this paper, we have implemented pin generation kit which is designed as an separate hardware component but in later stage this can be developed as an application which can be accessed in smart phones along with OTP (One Time Password). Efficiency in reading the numbers using OCR technique can be improvised if banks provide cheque having digitized format of amount specification.

REFERENCES

[1] Kekre H B , V A Bharadi, A A Ambardekar, Thadomal, Bandra, Signature Recognition by Novel and Simple Contour Technique, National Conference of Communication and Signal Processing 2007 (NCCSP 2007), Mumbai, India, 2007.
[2] Refeal Palacios, Amar Gupta, Patricks S.Wang, Hand Written Bank Check Recognition of Courtesy Amounts, International Journal of Image and Graphics,Vol. 4, No. 2, pp.1-20, 2004.
[3] Sofiene Haboubi, Samia Snoussi Maddouri, Extraction of Handwritten areas from colored image of bank cheque by Hybrid Method, International Workshop on Frontiers in Handwriting, 2002.
[4] Qizhi Xu, Louisa Lam, Ching Y. Suen, " A Knowledge-based segmentation System for Handwritten Dates on bank Cheques", Proceedings of the Sixth International Conference on Document Analysis and Recognition, 0-7695-1263-1, 2001.
[5] Alessandro L. Koerich, Lee Luan Ling, " A System for Automatic Extraction of the User-Entered Data from Bank Cheques", International Symposium on Computer Graphics, Image Processing, and Vision, pp.270, 1998.
[6] J.Blodgett, "Beyond cheque image statements: A new strategy for the 1990s", Advance Imaging, Vol.9, pp. 73- 75, 1994.
[7] Justino, E.J.R.; El Yacoubi, A.; Bortolozzi, F.; Sabourin, R, “An off-line signature verification system using hidden Markov mode land cross-validation”, Brazilian Symposium on Computer Graphics and Image Processing, 2000.