



Secure Authentication for Banking Using Face Recognition

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Abstract

With the increasing demand for online banking lack of security in the system has been felt due to a tremendous increase in fraudulent activities. Facial recognition is one of the numerous ways that banks can increase security and accessibility. This paper proposes to inspect the use of facial recognition for login and for banking purposes. The potency of our system is that it provides strong security, username and password verification, face recognition and pin for a successful transaction. Multilevel Security of this system will reduce problems of cyber-crime and maintain the safety of the internet banking system. The end result is a strengthened authentication system that will escalate the confidence of customers in the banking sector.

Keywords

Face Recognition, Banking, Security, MySQL, Open CV

1. Introduction

In the past few years, banking process was done inside the large rooms of building which was brisk task for both the customers and the banking staff but now people are using online banking as opposed of visiting the bank which grant ease for customers to perform transactions. The face recognition becomes the more important topic in computer vision [1]. In this paper, we propose to inspect the use of facial recognition for login and for banking purposes. The main motive of the proposed system is to provide secured banking transactions to the end users [2] and is to limit banking frauds and fraudulent activities.

According to [3], financial institutions must have effective and reliable methods to authenticate their customers. This paper proposes an authentication system that we designed it by combining two parts: - first part is face recognition and the second part is the Banking system. We are using Python language and OpenCV library for designing the face recognition and MySQL for the bank records. In this System, when user is trying to open his/her account firstly it will recognize the user's face



and trying to match that this user is the correct one or fake by matching with faces data stored in the database. Once the face is recognized, further process will carry out like or making transactions. Our main Objective for the proposed system is to develop fully functional face authentication system for secure banking.

2. Methodology

Working of our face authentication system contains three parts: image acquisition, training model and recognition and banking system contains bank databases.

2.1. Image Acquisition

Before any recognition can even be attempted, the system must acquire an image of the subject with sufficient quality [4] to detect and recognize the face. First, we acquire 100 images from webcam of 136×136 pixels per user and then we convert these images into grayscale as it is separating the luminance plane from the chrominance planes. Luminance is also more important for distinguishing visual features in an image.

2.2. Training the Model

After image acquisition, we convert them into matrix and assigned the specific matrix with a label and after that we will create a LBPH face recognizer model and will train it with image matrix with their correlated labels and will save along with the process.

2.3. Recognition

After getting the XML record of the training data set utilizing python. We have used OpenCV which presents a Haar cascade classifier [5], [6]. The Haar cascade classifier and training recognizer will be used for face recognition. The pre-trained model will be provided by the real time frame of the user and the model will predict the label and the confidence score. If the confidence scores are appropriate the user will be authenticated else marked as unknown.

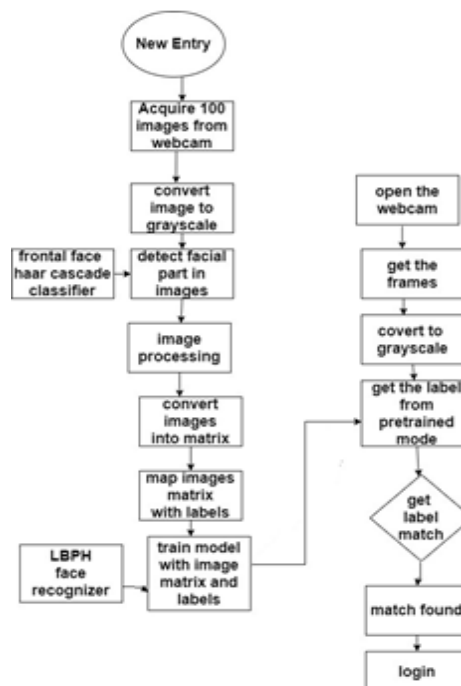


Figure 1. Flowchart of Face Recognition

2.4. Bank Database

We have divided bank database into two tables: first one will hold the account details of the users like account number, username, pin, banking password etc. And the next part will hold the details of transaction that will take place with proper information so the user will be provided with bank statement. We used MySQL for creating bank database [8-18].

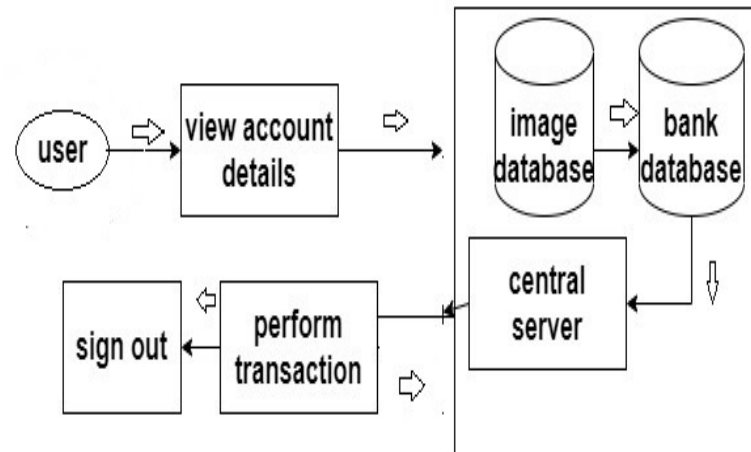


Figure 2. Database Transaction Sequence

3. System Architecture and Implementation

3.1. Entity Relationship

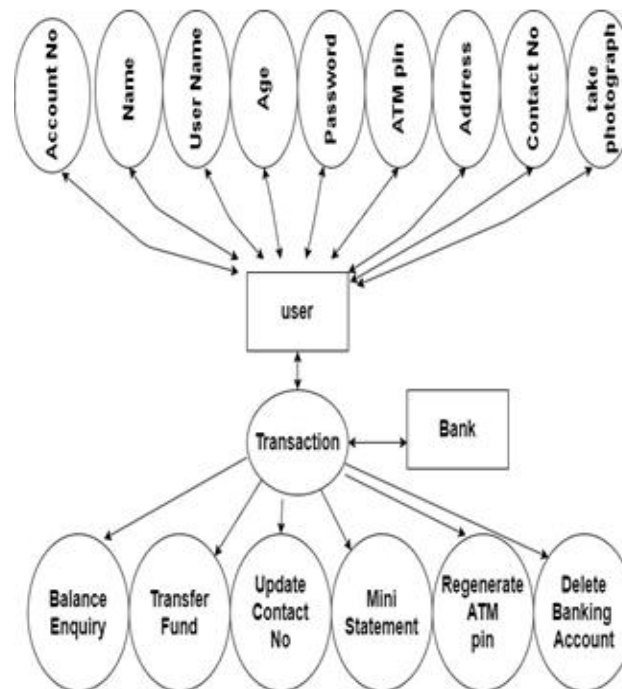


Figure 3. UML Diagram of Proposed System

3.4. Implementation

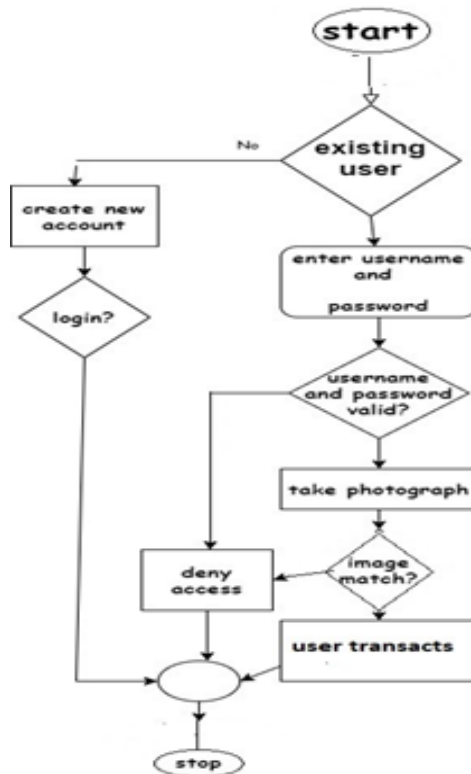


Figure 4. Flowchart of Implementation

3.3. Working

- Firstly, user has to create a new account.
- Now user has to enter username and password and if does not matched, error will be generated and access will be denied.
- Now user's real time face will go through recognition process.
- If user is recognized, according to their corresponding username the user will be logged in otherwise the access is denied.
- After login user get permit to use services.

4. System Elements

4.1. Account Creation

New users using the application for the first time can create a new account by filling out a form [7] that requires basic information required like account number, password, username, contact number etc. And upload their photos through webcam and then confirming this will upload the bank database and images database and then the user can login.

4.2. Login into Account

After completing all procedure in creating an account now the user has to fill the username or account number column and web camera will be open and capture the user's image and matches with images from database and if it recognizes the user then it grants the access of his/her account otherwise it will be marked as unknown user.

4.3. Services

When user successfully logged in into his/her account, then services interface appears which includes Balance enquiry in which user can check the amount in his/her account, Mini Statement is a service which tells the user about his/her recent transactions made to their account, Transfer Funds is a service by which user can make online transactions rapid and secure, Regenerate ATM pin is a service from which user can reset its forgotten pin or the pin he/she wants to change etc.

5. Results

Our proposed system provides multilevel security, username and password verification, face recognition and a pin for successful transaction. Users have three chances from which access is denied. The system uses two reliable databases for user authentication and two databases are Bank database and Image database. The efficiency of our proposed system can be evaluated on the basis of accuracy rate and response time.

Testing is done 600 times out of which 575 times system authenticated as genuine user and the rest 25 times known user were recognized as unknown, so the accuracy rate comes out to be 94.1%. The average time taken for acquiring 100 frames per user is 30 seconds, for training the model per user is 19 seconds, to recognize user is 3 seconds and to make a successful transaction is less than 3 seconds.

The screenshot shows a web browser window titled "Create a new account". The main heading is "CREATE NEW BANKING ACCOUNT" in white text on a red background. Below this, there are two columns of input fields. The left column contains: "Account No. *", "Name *", "UserName *", and "Age *". The right column contains: "Password *", "ATM pin *", "Address", and "Contact NO. *". Each field is a light blue rectangular box. Below the input fields, there are four red buttons with white text: "Upload face Id", "Confirm", "Back to main", and "Quit". At the bottom center of the form, there is a red text string: "***our PRIORITY is your SECURITY***".

Figure 5. Creating a New Account Interface

account	name	username	password	amount	address	contact	pin
123456789	ayush	ayushj21	jainjain	27333	579/1	8858774485	121002
123	yus	yusj21	jaia	30000	85998	8937	899
4410001002	nischay	nischayg21	92117711	60000	faridabad	8860856616	9211
123456	garv	garv21	garv21	9450	adangpur	9205928812	121001
525233152	shruti	shrutijain	password	40000	banglore,828	9810975858	121002

Figure 6. Account Details



Figure 7. Login Interface





Figure 8. Unknown User



Figure 9. Account Services

Conclusion

Nowadays demand of online banking is spiking constantly with which cyber-crime, online scams, banking frauds are also increasing. Our proposed system uses face recognition features to make net banking systems more secure for authentication as the facial id cannot be hacked or stolen. This system is a well-built method of authentication and verification as it is uniquely bound to individuals, it will build customer pleasure and lonesome the utilization of money. Multilevel Security of this system will reduce problems of the cyber-crime and maintain the safety of internet banking system.

References

- [1]. A. Ahmed, J. Guo, F. Ali, et al., "LBPH based improved face recognition at low resolution," in International Conference on Artificial Intelligence and Big Data (ICAIBD), June 2018 .
- [2]. S. Dumbre, S. Kulkarni, D. Deshpande, et al., "Face Detection and Recognition for Bank Transaction", Journal of Emerging Technologies and Innovative Research (JETIR), vol.3, no. 5, May 2016.
- [3]. G. Fosse, S. Leo, C. S. Rodriguez, et al., "FEBRABAN survey on Banking Technology", Technical Report, pp.1-48, 2017.
- [4]. T. E. Boult, W. Scheirer. " Long-Range Facial Image Acquisition and Quality," in Advances in Pattern Recognition, London: Springer London, pp.169-192, 2009.
- [5]. V. Garg, K. Garg, "Face Recognition Using Haar Cascade Classifier", Journal of Emerging Technologies and Innovative Research (JETIR), vol.3, no.12, pp.140-142, Dec 2016.
- [6]. Z. Xiang, H. Tan, and W. Ye, "The excellent properties of a dense grid-based HOG feature on face recognition compared to Gabor and LBP," IEEE Access, vol. 6, pp. 29306–29319, March 2018.
- [7]. A.A. Falaye , O .OSHO, I. Alabi, et al., "Secure authentication for mobile banking using facial recognition," IOSR J. Comput. Eng., vol. 10, no. 3, pp. 51–59, 2013.
- [8]. P. Singhal, P. Sharma, and B. Hazela, "End-to-end message authentication using CoAP over IoT," in International Conference on Innovative Computing and Communications, Singapore: Springer Singapore, pp. 279–288, 2019.
- [9]. P. Singhal, P. Sharma, & S. Rizvi, "Thwarting Sybil Attack by CAM Method in WSN using Cooja Simulator Framework, "International Journal of Engineering & Technology, vol.7, no.4.19, pp.589-595 ,2018.
- [10]. A. Singh and P. Singh," Object Detection," Journal of Management and Service Science, vol.1, no.2, pp. 1-20, 2021.
- [11]. P. Singhal, P. Singh, and A. Vidyarthi," Interpretation and localization of Thorax diseases using DCNN in Chest X-Ray," Journal of Informatics Electrical and Electronics Engineering, vol.1, no. 1, pp. 1-7, 2020.
- [12]. M. Vinny, P. Singh, "Review on the Artificial Brain Technology: BlueBrain" Journal of Informatics Electrical and Electronics Engineering, vol.1, no.1, pp. 1-11, 2019.
- [13]. A. Sahani, P. Singh, and A. Kumar," Introduction to Blockchain," Journal of Informatics Electrical and Electronics Engineering, vol.1, no.1, pp. 1-9, April 2020.
- [14]. M. Misra, P. Singh," Energy Optimization for Smart Housing Systems," Journal of Informatics Electrical and Electronics Engineering, vol.1, no.1, pp. 1-6 April 2020.
- [15]. N. Srivastava, U. Kumar and P. Singh," Software and Performance Testing Tools," Journal of Informatics Electrical and Electronics Engineering, vol. 2, no.1, pp. 1-12, Jan 2021.
- [16]. F. Abbasi and P. Singh, "Cryptography: Security and Integrity of Data," Journal of Management and Service Science, vol.1, no.2, pp. 1-9, 2021.
- [17]. F. Abbasi and P. Singh," Quantum Cryptography: The Future of Internet and Security Analysis," Journal of Management and Service Science, vol.1, no.1, pp. 1-12, 2021.
- [18]. S.K. Tomar and P. Singh, "Cyber Security Methodologies and Attacks," Journal of Management and Ser-vice Science, vol.1, no.1, pp. 1-8, 2021.

