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Bank Locker Security System using Face Detection

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ABSTRACT: In the present work, a smart locker has been designed for banking sector. The main feature of this work is to check the user expression, if normal or abnormal and then open the locker if face is normal otherwise send notification. The smart lock program will compare your image with the data already stored in the database. After checking the authenticity of the user, in case the user face is abnormal then locker will not open and give notification.

KEYWORDS: face detection, secure bank locker, HaarCascade algorithm.

I. INTRODUCTION

In today's high-speed world, security plays significant role. People are now more concern of their belongings like valuable documents, jewellerys, and many more material. The next safest place to keep all such valuable is bank. With the advancement in technology there are many system designed to keep bank lockers safe. Face recognition is the task of identifying an already detected object as a known or unknown face. Face Recognition on the other hand is to decide if the "face" is someone known, or unknown, for this purpose a database of faces in order to validate this input face and open locker.

II. RELATED WORK

In [1] author proposed an effective monitoring and controlling system for bank locker rooms which is completely autonomous. The security system is designed to detect the illegal entrance in the bank locker room areas that commonly happens in cases of the robberies. The major concern with current manually supervised security system is that if the robbery occurs then the banks are not been able to identify the robbers due to lack of proof. The system will focus on the safety of the bank locker rooms in an effective way by detecting and controlling unauthorized motion. The proposed security system will save the images whenever the motion will be detected that can be used in future for investigation. The system will communicate the image data continuously to the remote location control rooms using web based monitoring through local area network (LAN) and can also send the warning text short message service (SMS) to the operator using GSM technique. [2] The main feature of this work is it keeps track of time, date and number of access of locker by a user in the bank. The smart lock program will compare your image and fingerprint with the data already stored in the database. After checking the authenticity of the user, the microcontroller (Arduino) will give signal to the lock and it will open. It also gives a message when the number of permissible access turns increases in a given duration. [3] This study presents a security system for transporting or storing valuable while restricting unauthorized access. The system consists of Memory Module, PIR sensor, fingerprint security, Encoder-Decoder, RF module, GPS and GSM module etc to provide the maximum level of security. The proposed security system can be a major uplift in transporting important documents, money or ornaments from one place to another especially for banks in transporting valuables as the proposed security system is designed in such a way that the vault can only be opened by an authorized person, in specific places, using proper credentials, hence providing maximum security. [4] The main purpose of this paper is to design and implement a system based on a Password and a Radio Frequency Identification RFID. This system is basically a password and an RFID based access-control system which permits only an authentic

person to unlock. For doing this, the system will activate and authenticate the user. We have applied a security system via a passive type of RFID and a PASSWORD based on Atmega16 microcontroller. The RFID reader reads the ID number form RFID tag. Then enter the password from a Keypad, if the ID number of the tag and the password are correct, then the will unlock. The aim of constructing this system is to put in place a formidable locker security system with low cost and free of errors.

III. OBJECTIVE OF PROJECT

A. *Maintaining the Security of Bank Lockers:*

- Now a days bank robbery cases are increasing, so this application is for locker safety purpose.
- In current applications, it uses pin authentication to open locker. But this is not secure.
- As per the RBI guidelines, banks have no liability for loss of valuables in lockers. Which clearly states that during any mishap like: bank robbery, sudden fire or any natural calamity banks are not liable to pay their customers any compensation.
- Detect the face and check the facial expressions. If normal face detect, locker will open otherwise notification is Generated. Any bank locker holder/user can use this application effectively.

IV. DESCRIPTION OF PROJECT

Recently to detect, identify recognize the Human action is so difficult. So, we are going to implement a proposed model using HaarCascade algorithm. It provides security for Recognizing Human Actions Based On Machine Learning in Bank Locker. To increase the flexibility between user and system(bank locker). Give safety to locker by using facial expression.

A. *A Brief Description:*

- Automation of the banking locker system with enhanced security features has been done. We have incorporated multiple levels of security such as face recognition and authentication together to bolster the security access to the locker.
- When a person wants to access his locker, initially at the main door of locker his face will be captured by the camera installed at the main gate. This image will be given to the PC where the Met lab software will compare this image with the authentic image stored in the PC.
- If authenticate, then only using the gate control the door will be open otherwise it will remain close buzz the alarm. After entering in the locker section, at locker the person has to enter his confidential password provided by the bank.

B. *Motivation:*

- Bank robbery cases are increasing and in current applications, it uses pin authentication to open locker which is not secure.
- In banking sector most, advanced technologies are not being used. Bank safety is an important issue at present.
- Automation of locker system improves user interaction and makes it more reliable to use and handle.

V. COMPONENTS USED IN PROJECT

A. *Web Cam:*

For capturing image of the user, webcam is used in this project. After capturing image, it is sent to computer via USB data cable. Webcam operates on voltage rating of 5V and current rating of 0.35 A.

B. *Software Requirements:*

- An updated Windows 7 and onwards with active firewall.
- Python IDE.
- MySQL 5.5.

- Web Server.

C. Hardware Requirements:

- System: Pentium IV 2.4 GHz.
- Hard Disk: 40GB.
- Floppy Drive: 1.44mb.
- Monitor: 15 VGA Color.
- Ram: 512 Mb.

VI. FLOWCHART

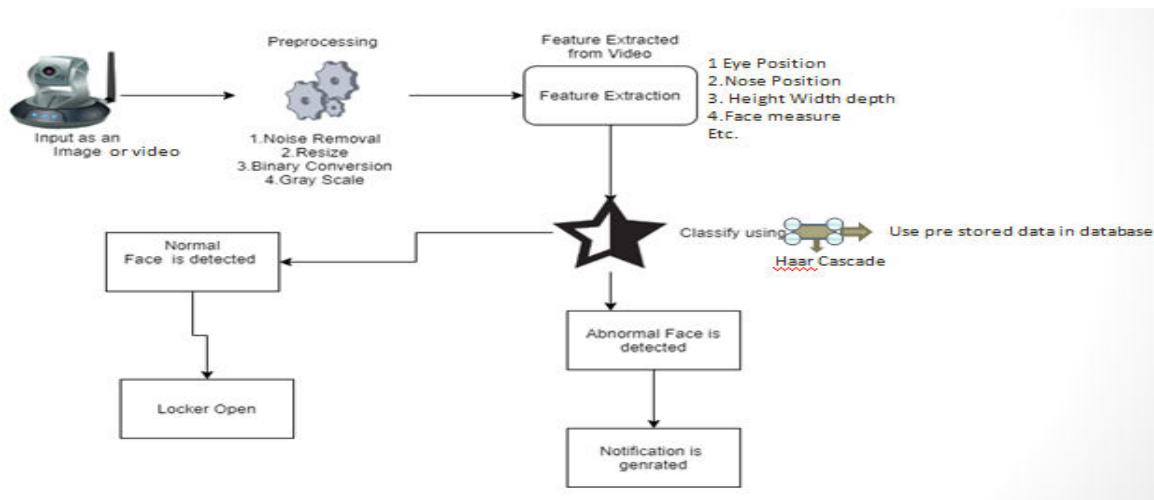


Fig.1. Flowchart

A. Flow of process:

- First the system takes the input as an image or video. It captures the number of frames as input. The number of frames increases the efficiency.
- Then this input is undergo a processing section in which certain operations are performed like noise removal, resizing, binary conversion, grey scaling.
- In resizing it takes only face data of that user and convert it to binary format without any noise, as the algorithm takes only binary input.
- These data then pass to the feature extraction part. In Feature extraction certain parameters are extracted from input. These parameters are Eye position, nose position, height, width, depth, face measures etc.
- Now extracted features pass to face detection algorithm to identify and verify the correct user.
- If normal face detect then control passes to the locker and locker open for the user.
- If abnormal face detected then notification is generated and locker does not open or display unauthorized user.

VII. TECHNOLOGY USED IN THE PROJECT

B. Face Recognition using HaarCascade Algorithm:

- Face Recognition Technology It is driven by computer application for the purpose of automatic identification and verification of a person from an image or video. This is done when comparison of live image and facial database is done.

- The Haarcascade algorithm is so powerful and can capture the live image of objects and humans.
- With the help of face detection it is so easy to improve security of any system.
- The system will focus on the safety of the bank locker rooms in an effective way by detecting and controlling unauthorized motion.

C. Authentication:

- If the user registered successfully in the system and validate the face data while registering then user validation and authentication will process correctly.
- Below image shows the Authentication of valid user.



Fig.2. Validation of User

- If the unknown user is trying to access the locker and scan image instead of face then system shows unknown person identify error on screen.
- User has to be present there while scanning his face otherwise locker will not open.
- It will also show the percentage of matching with user's face data and the face data stored in database while registering.
- Here the haarcascade algorithm works perfectly fine and identify the valid user.
- If anyone trying to access the locker with image or any duplicate facial data then it will identify and error message will generate.
- Below image shows the identification of unauthorized user.

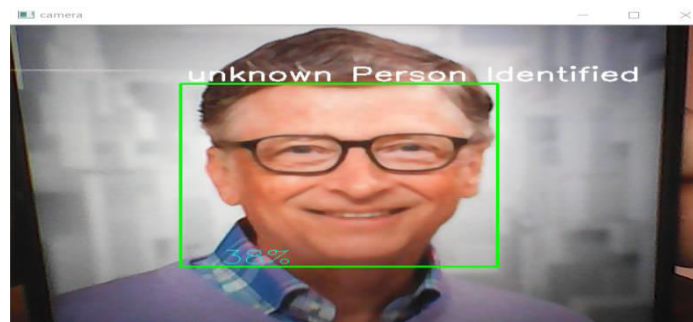


Fig.3. Unauthorized User

VIII. PROJECT DIAGRAMS

The various Diagrams used in the projects are displayed below.

D. Use Case Diagram:

- There are two actors user and system.
- User have access to only five modules, those are login/registration, camera to detect the face, locker, notification, logout.
- System has access to all the modules as it is main actor.

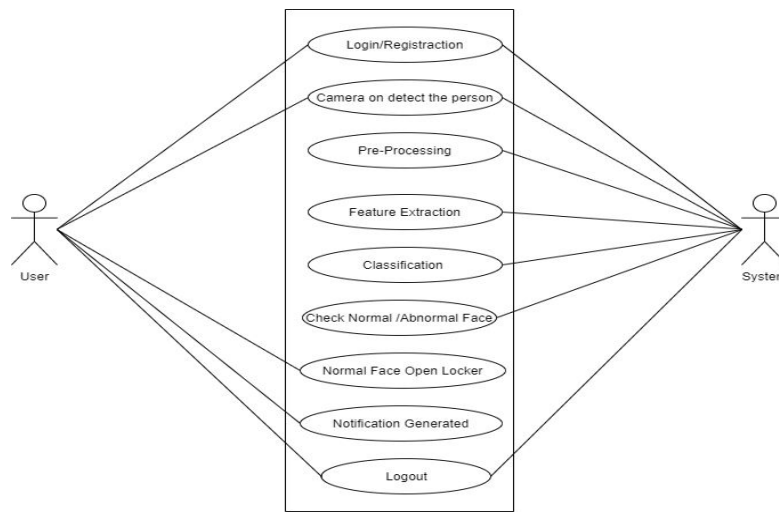


Fig.4. Use Case Diagram

E. Activity Diagram:

- Activity diagram shows the flow of process.
- There are certain conditions shown in the diagram known as entry points.
-

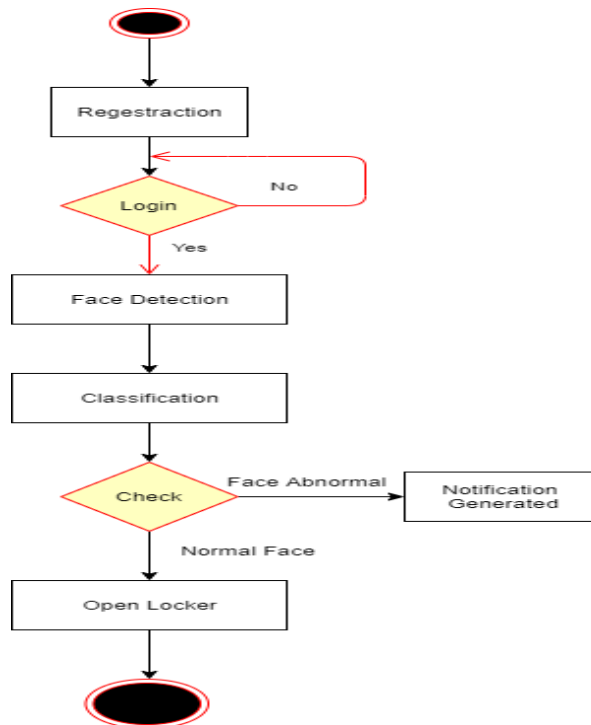


Fig.5. Activity Diagram

IX. CONCLUSION

In this project we are using image processing face recognition detect the face and give face authentication to locker. In this project the user face is normal the locker is open. And user face is abnormal then notification is generated and locker is not open. And we use Haarcacade algorithm for classify the dataset of normal and abnormal faces.



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