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Outlook DATAQUEST

BANK LOCKER SECURITY SYSTEM WITH TWO WAY AUTHENTICATION AND SAFETY MEASURES

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Abstract – The main aim of this paper is to solve the issues encountered in the old banking system while reproducing a brand new innovative smart system that can provide convenience to the institution. In this paper, a smart device will be developed which can recognize the identity of everyone eventually record down the data into database system.

Index Terms - Arduino; Alarm Notifications; Gas Leakage Detection; Fire Detection; Home Security.

I. INTRODUCTION

Usually, when a person visits a bank, there is a security guard employed by the bank to make sure that the person entering the locker is legitimate and is accessing his locker only. But the present arrangement has a few loopholes and requires manpower. The idea is to create a device that can detect the face of the person and match it with the database. In case of a mismatch, it can send a notification to the concerned person and authorities.

In the paper, we have developed a bank locker security system that establishes that only registered users will be allowed to open and make an entrance in the locker, and if any unregistered user enters the locker an alarm or notification will be sent to manager's phone through an Android app. Enrolled users photograph will be already captured and secured in the database. We further designed websites and created databases. Capturing of photos and sending it to database is all done through Arduino. In the last step, an Android app Telegram account is created to receive notification and alert the manager for any mishap. Programming languages like Python and create databases. application. In verification mode, the system validates a person's identity by comparing the captured biometric characteristic with the actual individual's biometric template, which is already stored in the system database. This model

will be a major contribution to the field of Home Security and for banking sectors.

Prior research has been done in this field, and many new advancements are made every day. Some of the available interfaces are as follows:

K. Balasubramanian et al. [1] proposed home automation and security system that can remotely monitor the home appliances and alert owner on presence of intruder or thief and occurrence of fire at home. This includes motion detection and person detection.

Dey S. et al. [2] worked with web-based home security system making use of Arduino microcontroller with Wi-Fi switch. Router was used to provide an internet protocol address through an Ethernet module to the device.

P. Vigneswari et al. [3] deduced a smart automated surveillance system. When a person enters the room, the camera is switched on and it captures pictures of the person entering. The user is made aware of this by sending short message service through global system for mobile modem.

Sharma R. K. et al. [4] made use of Android-based home security. An android application, which interprets the message and in return answers with SMS that lights up the LED. Through GSM modem, the signal goes to mobile as an SMS alert. The android application instantly initiates a pop-up notification, informing regarding interruption in the house. Authors have also added a facial recognition system here as an extra security feature.

Anwar S. et al. [5] proposed an IoT based smart home security system with alarm and gate access control using smartphone. A PIR motion sensor and camera module were used to detect motion in front of the camera and capture images respectively. Many features like view video stream

through mobile phone, voice alert and LCD monitor was added in the system.

Kodali R. K. et al. [6] made use of IoT based//Home Security. They sent alert to the user through the Internet if there is an occurrence of any trespass. This alert contained voice-calls through the Internet.

II. METHODOLOGY

The proposed face recognition system overcomes certain limitations of the existing system. It is based on extracting the dominating features of a set of human faces stored in the database and performing mathematical operations on the values corresponding to them. Hence when a new image is fed into the system for recognition the main features are extracted and computed to find the distance between the input image and the stored images. Thus, some variations in the new face image to be recognized can be tolerated. Haar classifier is used which is a machine learning object detection algorithm. So when the image is fed into the system it selects the features in three types: - Edge, Line and Rectangular.

| | | | |
|---|---|---|----|
| | | | |
| | 0 | 0 | 0. |
| | . | . | 8 |
| | 2 | 6 | |
| 0 | 0 | 0 | 0. |
| . | . | . | 6 |
| 2 | 3 | 8 | |
| 0 | | 0 | 0. |
| . | | . | 8 |
| 2 | | 6 | |
| 0 | | 0 | 0. |
| . | | . | 9 |
| 2 | | 8 | |

Ideal Haar-feature

Pixel intensities

0: white

1: black

0.56

The closer the value to 1, the more likely we have found a Haar-feature!!! (of course, we will never get 0 or 1: there are thresholds)

these are real values
detected on an image

▲ for ideal Haar-feature is 1

▲ For the real image: $0.74 \cdot 18 =$

A. System Hardware

The hardware components used in the systems are Arduino Uno Board which is a microcontroller used to operate all the components. Fingerprint Sensor a biometric used to sense the fingerprint of the person. DC Motor is used to open the locker. LCD Display used to display the message in the system.

B. Block Diagram

In this block diagram as shown in Fig 1, we can see the Arduino Uno microcontroller plays an important role in functioning the bank locker security system, where it controls the functioning of all the modules connected to it. The Arduino sends signals to LCD which displays the letters, keypads, passwords, and is connected to the buzzer which notifies signal for alerting in case of theft or unauthorized access. Fingerprint sensor will sense the authorized persons finger to unlock the locker, DC motor is used to open the door of the locker with help of signals sent by Arduino Uno, the opening and closing of the door is controlled by the microcontroller. Smoke sensor and Fire sensor is connected to microcontroller to safeguard the surrounding environment from fire and alerting the people in the bank and water sprinkler is connected to Arduino to send signal to for safeguard the bank locker. Camera is connected to personal computer which is installed on the locker to identify and match the person trying to unlock the locker by matching the persons eyes and face features through the authorized details stored in the bank, if the details match, then the door will be unlocked. Locker in the bank works with the help of Arduino Uno. The whole system works on the Power supplied to it and the python program code.

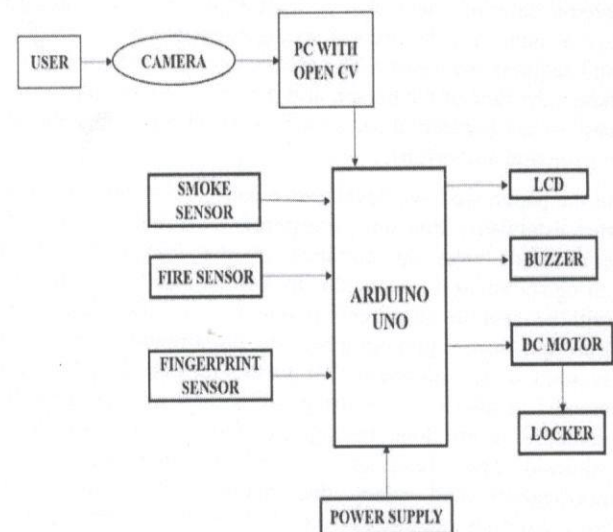
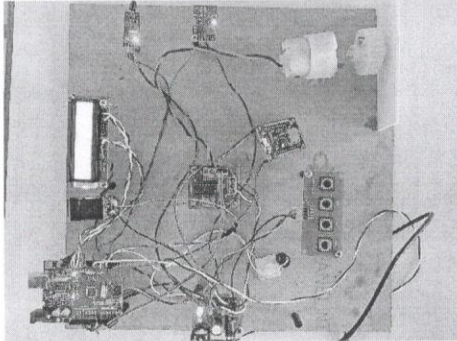


Fig.1: System Block diagram

1. Fingerprint Authentication:

Fingerprints remain constant throughout life. In over 140 years of fingerprint comparison worldwide, no two fingerprints ever been found to be alike, not even those of identical twins. technology is also easy. Might not work in industrial applications since it requires clean hands. Fingerprint



identification involves comparing the pattern of ridges and furrows on the fingertips, as well as the minutiae points (ridge characteristics that occur when a ridge splits into two or ends) of a specimen print with a database of prints on file. Good fingerprint scanners are installed in PDAs like the iPAQ Pocket PC, so scanner.

2. Face Recognition:

Of the various biometric identification methods, face recognition is one of the most flexible. It also shows promise to search through masses of people who spent only seconds in front of a "scanner" - that is, an ordinary digital camera. Face recognition systems work by systematically analysing specific features that are common to everyone's face - the distance between the eyes, width of the nose, of cheekbones, jaw line, chin and so forth. These position numerical quantities are then combined in a single code that uniquely identifies each person.

III. RESULTS

The test arrangement of proposed framework shown in Fig 2. The results of all sensors can be seen in LCD display. If the unregistered person tries to access the locker then message notification will be sent to the manager and owner of the locker through telegram app as shown in the Fig 3. And if gas and fire are detected, alert will be notified by the buzzer.

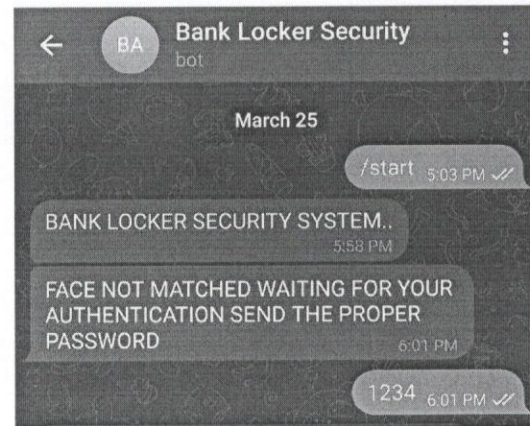


Fig 2: Experimental Setup and Notification Send to The Android App

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