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Smart ATM using Facial Recognition (Smart ATM)

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Abstract:-The proposed project works to cut down the security issues we have with ATM's and thus, shortening the process of this mundane activity. As the proposed system uses Facial Recognition, the user is able to skip the old security protocols and steps, instead is processed by the new security protocols which function faster. Facial Recognition based ATM System used Embedded Linux Platform and Raspberry Pi. The system is implemented Raspberry Pi board with extended capability of open source Computer Vision software which is used for Image processing operation.

Keywords:- ATM; Raspberry pi; Facial Recognition; Image Processing; Open CV.

I. INTRODUCTION

An automated teller machine (ATM) is a device which carries out financial transactions at anytime and anywhere. It uses multiple small devices for its construction and as a database for storing the information of the customers. The proposed project works to cut down the interactions we have with ATM's and thus, shortening the process of this mundane activity. As the proposed system uses Facial Recognition, the user is able to skip the old security protocols and steps, instead is processed by the new security protocols which function faster.

II. PROPOSED SYSTEM

A. *Design and Implementation of ATM System*

ATM is an electronic device which is used by the banks for financial transactions. There is a card allotted by the respective banks to their customers, which can be used by them to access the ATM inside or outside the bank.

- *ATM Networking*

ATM uses networking, in which ISP (Internet Service Provider) plays an important role for providing connections between the ATM and host processors. When the transactions is done by the customers in their respective ATMs, the information of that customers are saved in the database of the ATM, which is further processed and sent to the host processors of an ATM. The function of these host processors is to authenticate the details of the customers. If these details are matched with the information saved in the ATMs database, the host processor send an approval to the ATM machine which in turn processes the cash transfer.

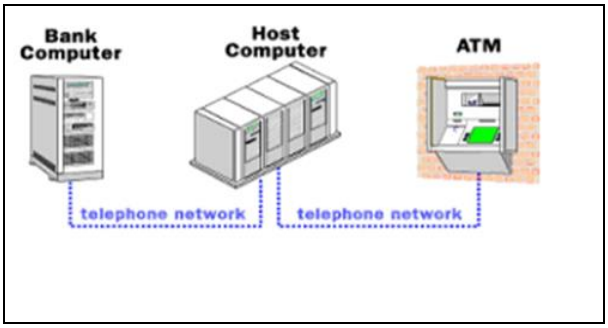

Fig. 1:- ATM Network

- *Working Principle*

The processor plays an important role in an ATM. ATM uses the centralized database system, so that the bank can have all the information about the transactions done by an ATM at any place. Host processor of an ATM acts as a gateway of card holder for an ATM network. When a card holder inserts the card in the ATM and asks for the respective actions to take place like requesting a cash withdrawal, cash deposit, etc, the ATM sends the details to the host processor, which processes all these actions.

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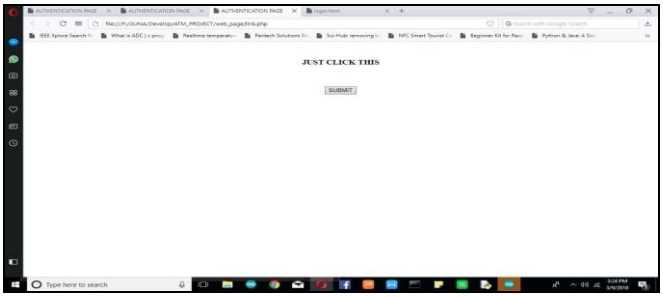

Fig. 2:- Authentication Page

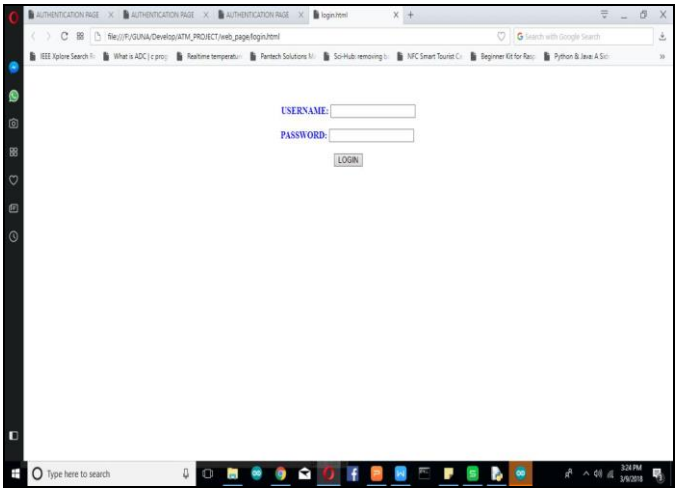

Fig. 3:- Login Page

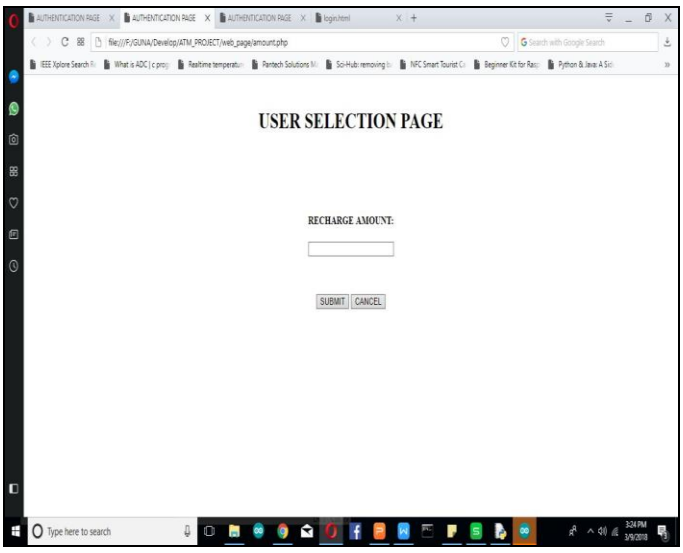

Fig. 4:- Activity Page

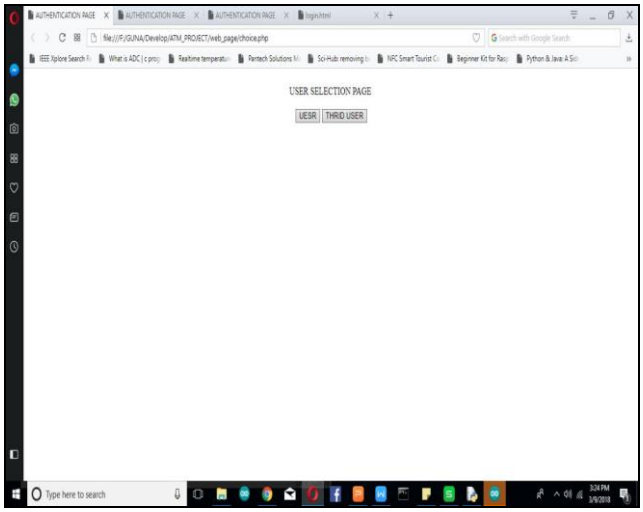

Fig. 5:- Home Page

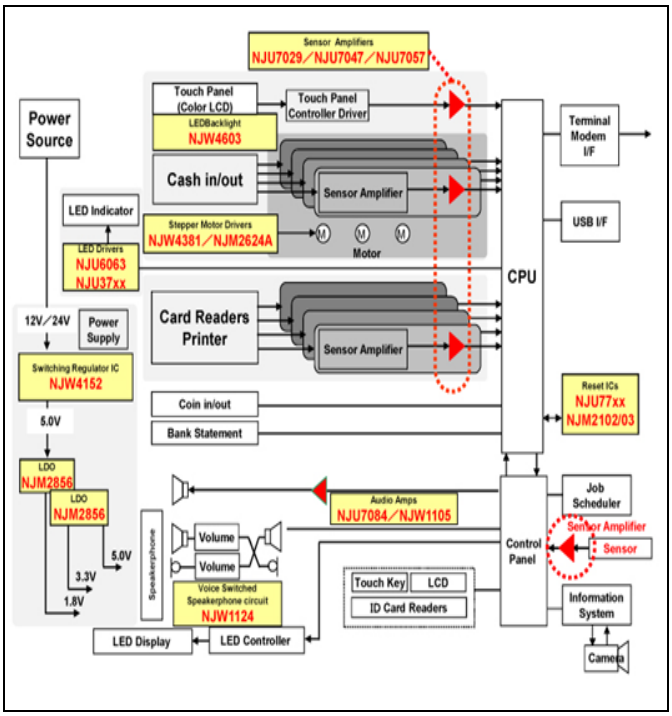

Fig. 6:- Working Principle

- *Implementation*

The system is implemented Raspberry Pi board with extended capability of open source Computer Vision (Open CV) software which is used for Image processing operation. High level security mechanism is provided by the consecutive actions such as to check whether the human face is detected properly or not and also monitoring behavioral activity of person in the ATM cabin.

If the face is not detected properly, user is provided another try. If the system still fails to recognize the user, a security alarm is raised to the control room and bank server. If recognized correctly, the user can proceed to access his/her account.

The camera will get input image of user's face for face recognition. With the help of sensor, we will find if the

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person is in front of machine or not after which the camera will be enabled.

The camera captures multiple instances of the user's face and encodes the data over the system. This data is then shared with the bank's local user credential database for a match.

If match is found, the system sends the signal to the ATM drivers for a successful authentication of the user along with the required information fetched from the local user database. This information is then used by the ATM to connect the user to his/her bank account.

It should be noted that the system works with the local user database and doesn't have direct access to the bank's central server, thus evading the problem of system hijacking for credential theft.

III. SYSTEM WORKFLOW

The asynchronous transfer mode (ATM) protocol architecture is designed to support the transfer of data with a range of guarantees for quality of service. The user data is divided into small, fixed-length packets, called cells, and transported over virtual connections. ATM operates over high data rate physical circuits, and the simple structure of ATM cells allows switching to be performed in hardware, which improves the speed and efficiency of ATM switches.

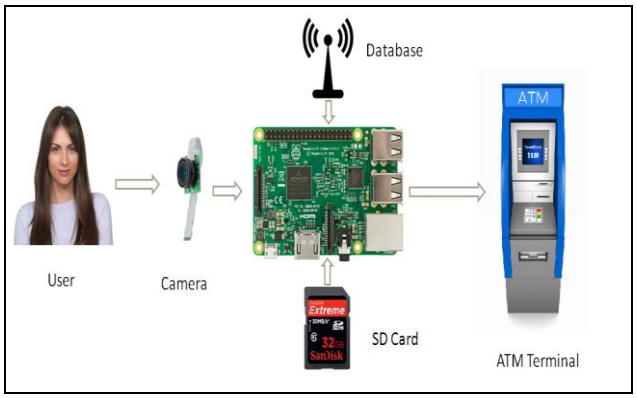

Fig. 7:- Architecture of ATM

A. *Raspberry Pi Module*

The Raspberry Pi is a module that is operated by a generic USB computer keyboard and mouse. It may also be used with USB storage, USB to MIDI converters, and virtually any other device/component with USB capabilities.

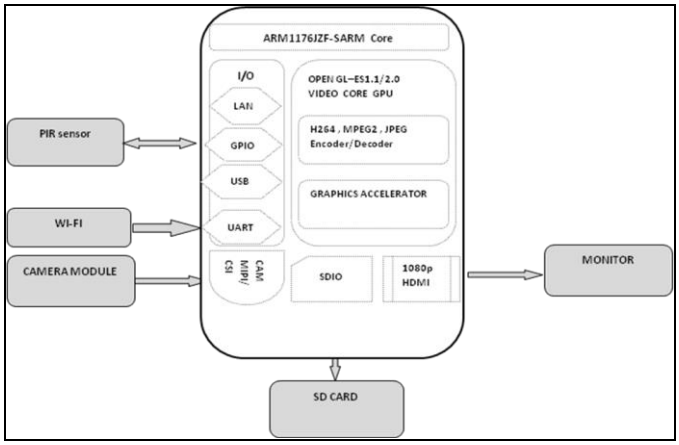

Fig. 8:- System Architecture of Raspberry Pi Module

B. *Block Diagram*

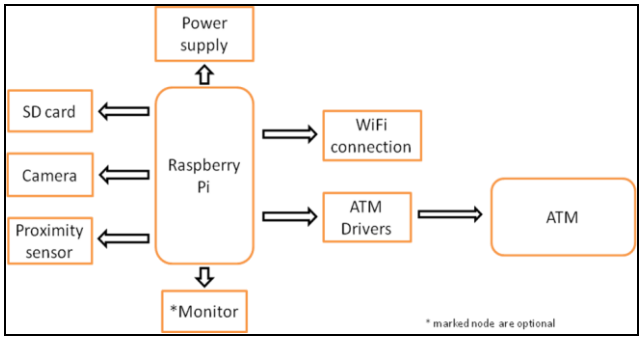

Fig. 9:- Block Diagram

C. *Workflow Diagram*

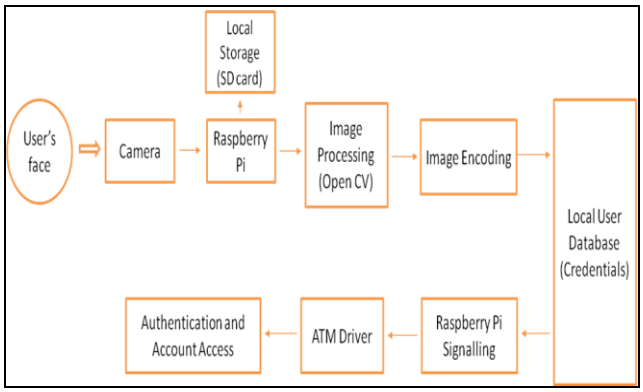

Fig. 10:- Workflow Diagram

D. *Working Modules*

- *Camera*

The camera is the input source for the proposed system. The camera used is a simple mobile camera. The camera used provides decent images in the required specification. Camera with very high or low output is discarded as option due to larger processing and transmission time.

- *Raspberry Pi*

The Raspberry Pi is a sequence of small single-board computers that is used for simple programming and hardware interaction. The system contains Raspberry Pi board as the main processor. The SD card is used to contain the dedicated

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operating system which is compatible with the Raspberry Pi board. The Human face is captured by the camera which can be directly interfaced with the Raspberry Pi board.

- *Image Processor*

Open CV (Open Source Computer Vision Library) is used as a software in this project for image processing and machine learning perspective.

- *Open CV*

These algorithms can be used to detect and recognize faces, identify objects, classify human actions in videos, track camera movements, track moving objects, extract 3D models of objects, produce 3D point clouds from stereo cameras, stitch images together to produce a high resolution image of an entire scene, find similar images from an image database, remove red eyes from images taken using flash, follow eye movements, recognize scenery and establish markers to overlay it with augmented reality, etc.

IV. HARDWARE & SOFTWARE REQUIREMENTS

- Raspberry Pi
- Mobile Camera
- PIR sensor
- Raspbian Jessie OS
- Language : Python
- Open CV
- HTML, PHP.

V. CONCLUSION

In conclusion, we have described a Privacy Techniques and shown that this can be a practical and advanced approach which can be used in our upcoming generation. We have described this technique which can be used in the security of financial transactions done by using an ATM. It is also described that how the data in the system is being secured by using facial recognition technique.

VI. ACKNOWLEDGEMENT

This paper is the report of ATM transactions and its security which is completed from the various researches regarding the security in ATM. I acknowledge and express my profound sense of gratitude and thanks to everybody who have been a source of inspiration during the completion of this paper.

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