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Third Generation ATM Machine usingAdvanced image processing

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***Abstract*- Automated teller machines (ATMs) are well known devices typically used by individuals to carry out a variety of personal and business financial transactions and/or banking functions. ATMs have become very popular with the general public for their availability and general user friendliness. ATMs are now found in many locations having a regular or high volume of consumer traffic. For example, ATMs are typically found in restaurants, supermarkets, Convenience stores, malls, schools, gas stations, hotels, work locations, banking centers, airports, entertainment establishments, transportation facilities and a myriad of other locations. ATMs are typically available to consumers on a continuous basis such that consumers have the ability to carry week for this purpose we are using face recognition step with haar cascade classifier to find out the features of face.when face is detected then it will give access to do transactions otherwise not allow.**

Keywords: Haar cascade, Automatic Teller Machine, Annaconda (Jupyter IDE), Machine learning,

I.Introduction

A computer-implemented method for cardless use of an automated teller machine (ATM) is provided. The method includes receiving as an input, a user-identified ATM that the user wishes to use. The method also includes generating and transmitting a one-time password (OTP) for the user to enter at the identified ATM. The method further includes receiving and verifying the OTP entered into the ATM, and on successful verification, authorizing access to services available through the ATM, without use of a card. To reduce the threat involved in ATM machines that were installed in remote area, also the issue related to fraudulent sale like misusing others card to withdraw plutocrat and etc. So in order to overcome these challenges, we've developed result that will work the ML & AI to circumscribe card access to only the authorized druggies those are linked by face recognition algorithm.
This method is useful in many fields such as the military, for security, schools, colleges and universities, airlines, banking, online web applications, gaming etc. this system uses powerful python algorithm through which the detection and recognition of face is very easy and efficient.
Surveillance cameras are an essential security precaution in all public places. In a centralised surveillance system, videos collected from

different cameras are stored in a centralised server. If any security threat is caused by the presence of an individual in a particular place, the law enforcing team will have to identify the current location of the particular person involved in the event as early as possible. Though the videos collected from surveillance cameras help to identify the person's presence in a location, checking the person of interest from a large collection of videos is a herculean task if it is done manually, The complexity of the task depends on the number of cameras involved in the surveillance process. Deep Learning-based video analytics can help us to automate this identification task. Deep Learning is a powerful tool to do image classification.

II. Related Work

In reference [1] With the development of social science and technology, people's awareness of the safety of life gradually high, face recognition technology has entered people's lives .This paper designs a face recognition system based on the depth residual network.This system is implemented in both PC and Android. the PC terminal can add voice broadcast function, timely and effectively remind and prevent should be adopted when " danger" appears.The implementation of the Android mobile terminal is achieved by combining the Android and Python harmoniously through the platform of the Python scripting language provided by SL4A.Face recognition in the Android mobile side can be used for identity security authentication, mobile payment and other convenient operation, greatly increased the ease of operation of the system to make up for the PC side to carry inconvenient enough, the experiment proved that the face recognition technology Embedded into the Android terminal has a good recognition effect.

In reference [2], a face detection system using Raspberry Pi was developed. Authors did not approach face recognition implementation due to complexity of the recognition process, since recognition process would need more powerful resources to accomplish better results.

In reference [3], the authors were able to switch from the closed-circuit television CCTV graphical processor to a computer graphical processing unit GPU, and embed the security cameras into the computer GPU.

In reference [4], authors attempted to detect faces in a digital image using various techniques such as skin color segmentation, morphological processing, template matching, Fisher linear discriminant (FLD), and Eigen face decomposition [7].

In reference [5] this paper the author have addressed the problem of face recognition with occlusions in uncontrolled environments. Different from most of the current works, we consider the situation that occlusions exist in both gallery and probe sets. We proposed A novel approach, Dynamic Image-to-Class Warping (DICW), which considers the contextual order of facial components, for the Recognition of occluded faces. We first represent a face image as an ordered sequence, then treat the image matching problem as the Process of finding optimal alignment between a probe sequence and a set of gallery sequences. Finally, we employ the Dynamic Programming technique to compute the Image to-Class distance for classification. Extensive experiments on the FRGC, AR, TFWM And LFW face databases show that DICW achieves promising performance when handling various types of occlusions. In the most Challenging cases where occlusions exist in both gallery and probe sets and only a limited number of gallery images are available for Each subject.

In reference [6] ,We have extensively evaluated SFCA and compared it with other state of-art methods. The approach to the evaluation ex-periments with SFCA, using the same datasets used in evaluating other state-of-the-art methods, is meant to ensure its robustness and demon- strate that SFCA achieves improved accuracy in face recognition under variations in ambient lighting, pose, expression, face size, occlusion and distance from the camera. The results demonstrate that when

the size of the dataset is small or medium (i.e., the number of subjects is not greater than one hundred), SFCA is able to deal successfully with these condition.

III. Proposed methodlogy

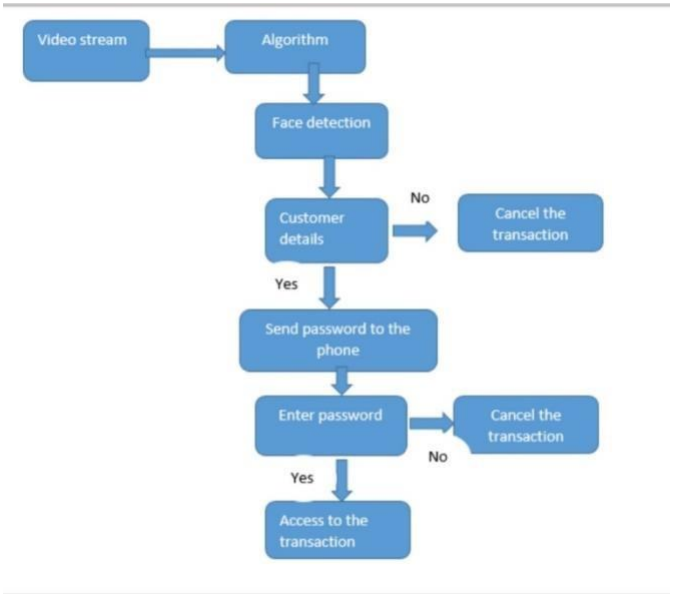


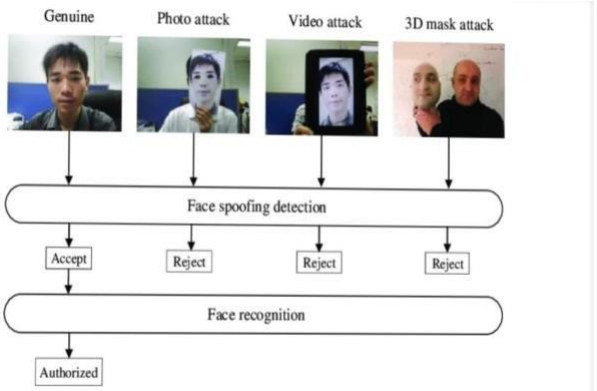
Fig 1 :Architecture of proposed model

IV.FACIAL RECOGNITION SYSTEM

A facial acknowledgment framework is an innovation Equipped for distinguishing or confirming an individual From an advanced picture or a video outline from a video

Source. There are various strategies in which facial Acknowledgment frameworks work, however for the most Part, they work by looking at chosen facial highlights from A given picture with faces inside a database. Intelligence which can uniquely identify a person by analyzing patterns based on the facial textures and shape of the individual. Although initially a form of computer application, it has seen wider uses on mobile platforms and other forms of technology, such as robotics, in recent times. It is typically used in security systems as access control, and can be compared with other biometrics such as fingerprinting or eye iris recognition systems.

Although the precision of the facial recognition method . It's also recently become popular as a method for commercial recognition and marketing. Many uses include advanced human-computer interaction, video surveillance, automatic image indexing and, among others, video storage. Throughout human beings, it is the temporal lobe of the brain that is responsible for facial recognition. The temporal lobe neurons react to certain facial features and store them gradually contributing to facial recognition.In machine learning systems, the machines are often fed a huge bank of images which the system absorbs and stores. When matching a face it tries to match it with the images stored using face recognition algorithm. According to a new research by a community of MIT researchers, the computers recognize the picture randomly and correctly, and were often able to identify a face even when it was tilted from the middle at an angle of about 45 degrees, to the left or to the right.



IV. 1.2 HAAR-CASCADE ALGORITHM

Haar Cascade is an AI object identification calculation used to distinguish protests in a picture or video and dependent on the idea of highlights proposed by Paul Viola and Michael Jones in their paper "Fast Object Detection utilizing a Boosted Cascade of Simple Features" in 2001. A Haar-like element thinks about contiguous rectangular locales at a particular area in a recognition window, summarizes the pixel forces in every district and figures the distinction between these holes. This qualification is then used to arrange subsections of an image. For instance, let us state we have a

picture database with human countenances. It is a typical perception that among all faces the area of the eyes is darker than the district of the cheeks. Thus a typical Haar include for face discovery is a lot of two contiguous square shapes that lie over the eye and the cheek district. The situation of these square shapes is characterized by a discovery window that demonstrates like a jumping box to the objective item (the face right now). It is an AI based methodology where a course work is prepared from a great deal of positive and negative pictures. It is then used to recognize questions in different pictures. The calculation has four phases:It is notable for having the option to recognize faces and body parts in a picture, however can be prepared to distinguish practically any article. Initial step is to gather the Haar Features. A Haar feature thinks about adjoining rectangular areas at a particular area in a location window, summarizes the pixel forces in every ascertains the contrast between these aggregates

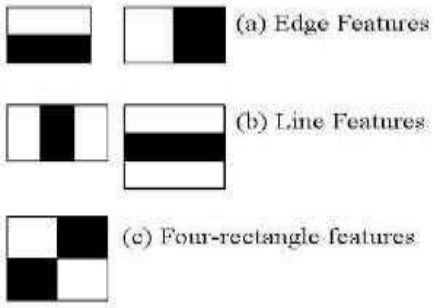


Fig -2: Haar Features

Yet, among every one of these highlights we determined, the greater part of them are unessential. For instance, consider the picture underneath. Top column shows two great highlights. The primary component chosen appears to concentrate on the property that the district of the eyes is frequently darker than the locale of the nose and cheeks. The subsequent component chosen depends on the property that the eyes are darker than the extension of the nose. In any case, similar windows applying on cheeks or some other spot is superfluous.

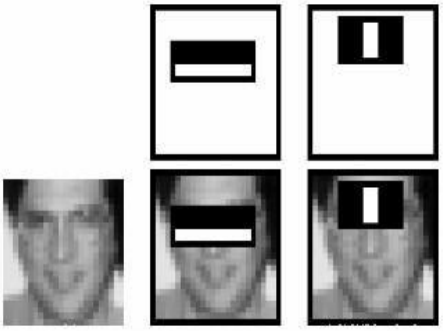


Fig -3: Recognition using Haar Cascade

So how would we select the best highlights out of 160000+ highlights? This is practiced utilizing an idea called Adaboost which both chooses the best highlights and prepares the classifiers that utilization them. This calculation builds a "solid" classifier as a straight blend of weighted basic "frail" classifiers. The procedure is as per the following.During the identification stage, a window of the objective size is moved over the information picture, and for every subsection of the picture and Haar highlights are determined. You can see this in real life in the video underneath. This distinction is then contrasted with a scholarly limit that isolates non-objects from objects. Since each Haar highlight is just a "feeble classifier" (its recognition quality is somewhat superior to irregular speculating) countless Haar highlights are important to portray an item with adequate precision and are hence composed into course classifiers to frame a solid classifier.

V. PROBLEM STATEMENT

Automated Teller Machines are widely used nowadays by people. But It’s hard to carry their ATM card everywhere, people may Forget to have their ATM card or avoid atm card scams . The ATM card may get damaged and users can have a situation where They can’t get access to their money. In our proposal, use of biometrics for authentication instead of PIN and ATM card is Encouraged. Here, The Face ID is preferred to high priority, as the combination of these biometrics proved to be the best among the Identification and

verification techniques. The implementation of ATM machines comes with the issue of being accessed by Illegitimate users with valid authentication code. The users are verified by comparing the image taken in front of the ATM machine, To the images which are present in the. If the user is legitimate the new image is used to train the model for further accuracy. This System uses openCV to process the image being obtained and Haar Cascade Classifier to detect the faces in the image.

V. 1.1 BLOCK DIAGRAM

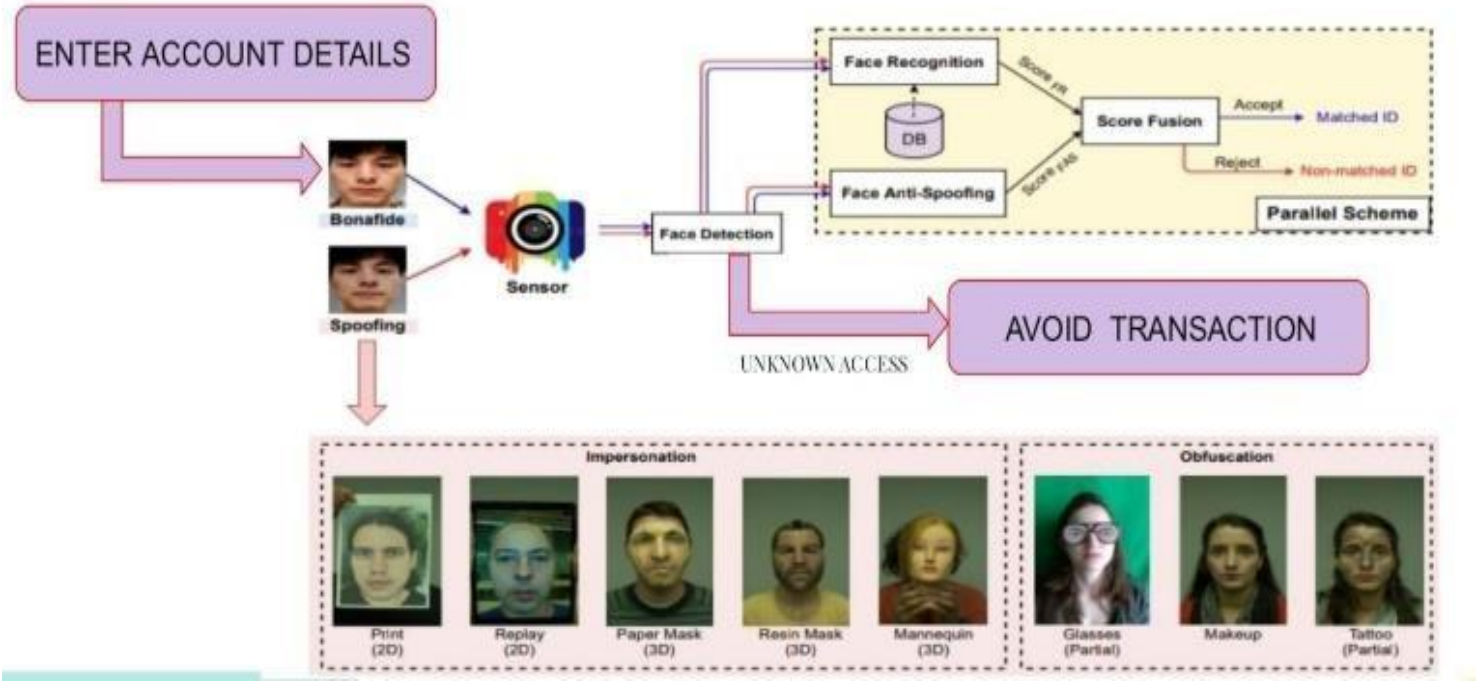


Figure 4 : block diagram

V.1.2 DATA FLOW DIAGRAM

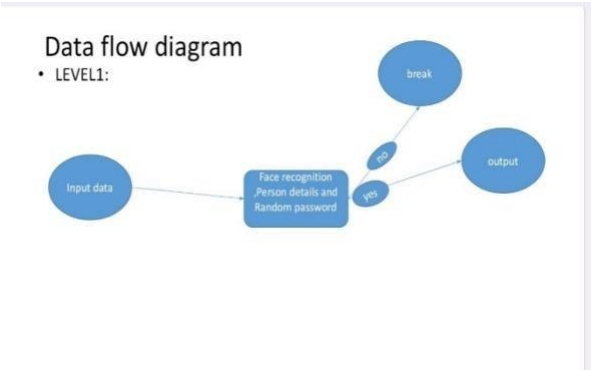


Figure 5 : data flow diagram level 1

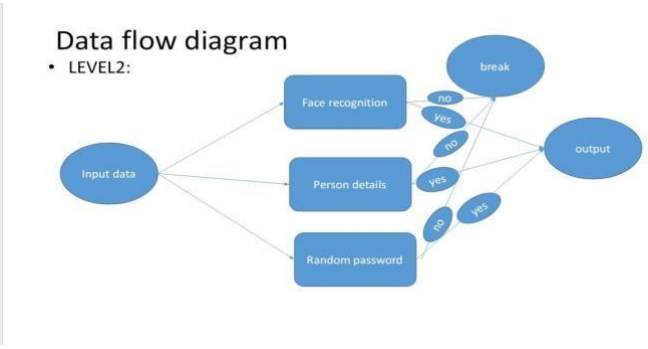


Figure 5.1 : data flow diagram level 2

VI .DIGITAL IMAGE PROCESSING: The identification of objects in an image and this process would probably start with image processing techniques such as noise removal, followed by (low-level) feature extraction to locate lines, regions and possibly areas with certain textures.The clever bit is to interpret collections of these shapes as single objects, e.g. cars on a road, boxes on a conveyor belt or cancerous cells on a microscope slide. One reason this is an AI problem is that an object can appear very different when viewed from different angles or under different lighting. Another problem is deciding what features belong to what object and which are background or shadows etc. The human visual system performs these tasks mostly unconsciously but a computer requires skilful programming and lots of processing power to approach human performance. Manipulation of data in the form of an image through several possible techniques. An image is usually interpreted as a two-dimensional array of brightness values, and is most familiarly represented by such patterns as those of a photographic print, slide, television screen, or movie screen. An image can be processed optically or digitally with a computer.

VI. 1.1 IMAGE

An image is a two-dimensional picture, which has a similar appearance to some subject usually a physical object or a person.Image is a two-dimensional, such as a photograph, screen display, and as well as a three-dimensional, such as a statue. They may be captured by optical devices—such as cameras, mirrors, lenses, telescopes, microscopes, etc. and natural objects and phenomena, such as the human eye or water surfaces.The word image is also used in the broader sense of any two-dimensional figure such as a map, a graph, a pie chart, or an abstract painting. In this wider sense, images can also be rendered manually, such as by drawing, painting, carving, rendered automatically by printing or computer graphics technology, or developed by a combination of methods, especially in a pseudo-photograph.An Image is a rectangular grid of pixels. It has a definite height and a definite width counted in pixels. Each pixel is square and has a fixed size on a given display. However different computer monitors may use different sized pixels. The pixels that constitute an image are ordered as a grid (columns and rows); each pixel consists of numbers representing magnitudes of brightness and colour.

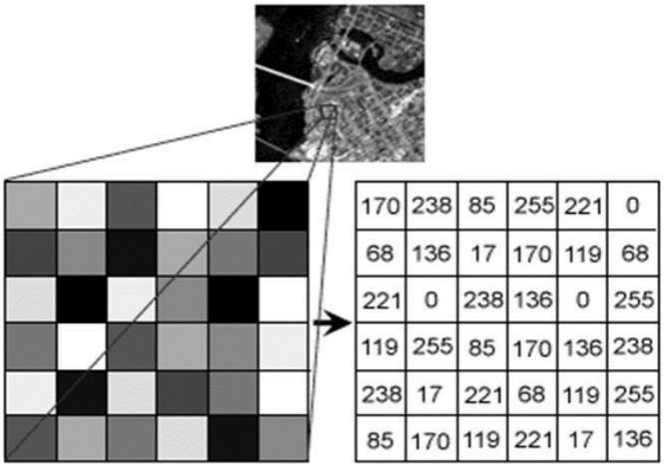


Fig.6: Gray Scale Image Pixel Value Analysis

Each pixel has a colour. The colour is a 32-bit integer. The first eight bits determine the redness of the pixel, the next eight bits the greenness, the next eight bits the blueness, and the remaining eight bits the transparency of the pixel.

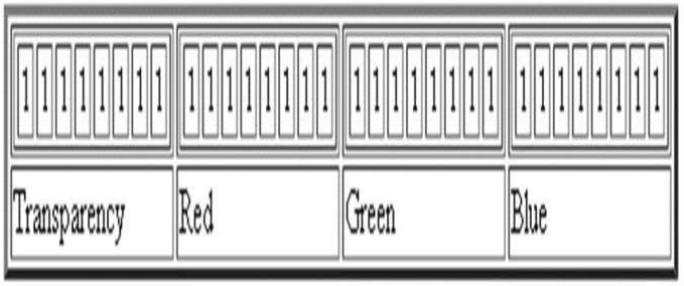


Fig6.1: BIT Transferred for Red, Green and Blue plane (24bit=8bit red;8-bit green;8bit blue)

VII. Image compression:

Digital image compression addresses the problem of reducing the amount of data required to represent a digital image. The underlying basis of

the reduction process is removal of redundant data. From the mathematical viewpoint, this amounts to transforming a 2d pixel array into a statically uncorrelated data set. The data redundancy is not an abstract concept but a mathematically quantifiable entity. If n1 and n2 denote the number of information-carrying units in two data sets that represent the same information, the relative data redundancy [2] of the first data set (the one characterized by n1) can be defined as,

$$RD = 1- 1/CR$$

- Where called as compression ratio [2]. It is defined as

$$CR = n1/n2$$

In image compression, three basic data redundancies can be identified and exploited: coding redundancy, interpixel redundancy, and psychovisual redundancy. Image compression is achieved when one or more of these redundancies are reduced or eliminated. The image compression is mainly used for image transmission and storage. Image transmission applications are in broadcast television; remote sensing via satellite, air-craft, radar, or sonar; teleconferencing; computer communications; and facsimile transmission. Image storage is required most commonly for educational and business documents, medical images that arise in computer tomography (ct), magnetic resonance imaging (mri) and digital radiology, motion pictures, satellite images, weather maps, geological surveys, and so on.

VIII. RESULT AND DISCUSSION

Biometric	Accuracy	Performance
Face	Medium	Medium

Cost	Stability
Medium	Medium

Using face recognition technology for ATM machine access is a promising approach to enhance security and convenience. In this project, we utilized the Haar Cascade algorithm to detect and recognize the faces of authorized users, allowing them to access their account without the need for a physical card.

The project result showed that the Haar Cascade algorithm was successful in detecting and recognizing faces with a high level of accuracy. We trained the algorithm using a large dataset of facial images to improve its recognition performance. The trained model was then integrated into the ATM machine, allowing users to access their accounts by simply looking at the camera.

The benefits of this approach include increased security, as it eliminates the risk of unauthorized access by stolen or lost cards, and convenience, as users no longer need to carry physical cards. It also reduces the risk of transmission of pathogens through physical contact with the ATM machine**.**

IX. CONCLUSION AND FUTURESCOPE:

The main theme of the project is to give full security for the transaction of money.then it will give more secure using random password and face detection based using haar and deep learning with the open-source computer vision in real time applications.for the next generation we can assign the all requirement in ATM machine using hardware part.

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