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Ai Based Card-Less Atm Using Facial Recognition

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ABSTRACT: This research paper is about to use face recognition authentication (not ATM cards) for accessing user account along with PIN which is moresecure and reliable than the existing system. By using CNN model(Deep Learning Model) for face recognition, image for personal identification to procure high level of security and accuracy.The process of transaction begins by capturing and matching face patterns. The system will automatically distinguish between reallegitimate traits and fake samples. Comparing of user's face with the database if it matches, then it goes for transaction process. In any kind of fake access attempt the message will be displayed as an unauthorized user.This existing system is likely to be harmed by many security issues such as theft of ATM card, skimming, Lebanese loop etc.The ultimate goal of proposed method is improved accuarcy, efficiency, Clarity and Security.

KEYWORDS: OpenCV, Python, Haarcascades,PIN,Camera

I. INTRODUCTION

In this paper i.e ATM, one such machine which made money transactions easy forcustomers to bank. The other side of this improvement is the enhancement of the culprit's probability to get hisunauthentic share. Traditionally, security is handled by requiring the combination of a physical access card and a PIN or other password in order to access a customer‟s account. This model invites fraudulent attempts through stolen cards, badly-chosen or automatically assigned PINs, cards with little or noencryption schemes, employees with access to nonencrypted customer account information and other points of failure.To overcome such drawbacks the idea of a card-less ATM which uses face recognition for authorization and authentication of user seems quite useful and reliable.

The Project looks at the working of automatic teller machine security model with a physical access card, a PIN, and facial recognition. The ATM to match a live image of a customer‟s face with an image stored in a bank database that is associated with the account number, the damage to be caused by stolen cards and PINs is effectively neutralized. Only when the PIN matches the account and the live image and stored imagematch would a user be considered fully verified.

The Process would effectively become an exercise in pattern matching, which would not require a great deal of time. With appropriate lighting and robust learning software, slight variations could be accounted for in most cases. Further, a positive visual match would cause the live image to be stored in the database so that future transactions would have a broader base from which to compare if the original account image fails to provide a match thereby decreasing false negatives. Automatic face analysis which includes, e.g., facedetection, face recognition, and facial expression recognition has become a very active topic in computer vision research.

For instance, if two members of the same family are at the different location of a country then both of them can have access to the same account anywhere and anytime they want without carrying an ATM card.In this technology, we take user's face-print as a replacement for ATM card.

[1] This paper resents the design of Novel and efficient facial image representation based on local binary pattern (LBP) texture features. LBP is highly efficient for texture feature extraction. This LBP is mainly used for Facial recognition and pattern matchings. The image is divided into various regions from which the LBP feature distributions are extracted and concatenated into an enhanced texture feature vector to be used as a face descriptor. The

performance of the method is assessed in the face recognition problem underdifferent challenges.The LBPNet retains the same topology of Convolutional Neural Network (CNN). The trainable kernels are replaced by the off-the-shelf computer vision descriptor (i.e., LBP). This enhances the LBPNet to achieve a high recognition accuracy without requiring any costly model learning approach on massive data.

[2].Compact binary face descriptor (CBFD) feature learning method for face representation and recognition.Binary feature descriptors such as local binary patterns (LBP) and its variations have been widely used in many face recognition systems due to their excellent robustness and strong discriminative power. A feature mapping to project these pixel difference vectors from high-dimensional binary vectors into low-dimensional binary vectors in an unsupervised manner, there are many methods that can be used as 1) the variance of all binary codes in the training set is maximized, 2) the loss between the original real-valued codes and the learned binary codes is minimized, and 3) binary codes evenly distribute at each learned bin, so that the redundancy information in PDVs is removed and compact binary codes are obtained.

The Coupled CBFD (C-CBFD) method is used by reducing the modality gap of heterogeneous faces at the feature level to make our method applicable to heterogeneous face recognition.

[3] This paper presents a half-face dictionary integration (HFDI) algorithm for representation-based classification. HDFI measures the residuals between an input signal and the reconstructed one, using both the original and the synthesized dual-column (row) half-face training sample set. The HFDI algorithm measures residuals between an input signal and the reconstructed one, using both the original and the synthesized dual-column (row) half-face training samples.

Usage of a set of virtual half-face samples for the purpose of training face data augmentation. The aim is to obtain high-fidelity collaborative representation of a test sample. In this half-face integrated dictionary, each original training vector is replaced by an integrated dual-column (row) half-face matrix. Second, to reduce the redundancy between the original dictionary and the extended half-face dictionary, to elimination strategy to gain the most robust training and competitive fusion method is to weighs the reconstruction residuals from different dictionaries for robust face classification.

[4].The conventional pipeline consists of four staages of detection is that detect, align ,represent, classify. This paper presents the representations of coupling the accurate model-based alignment with the large face image database generalize to faces in unconstrained environments, even with a simple classifier. The method highly reaches an accuracy of 97.35% on the Labeled Faces in the Wild (LFW) dataset, thus reducing the error of the current state of the art by more than 27%, closely approaching manual human-level performance.

[5].The paper looks like the Face recognition has made extraordinary progress owing to the advancement of deep convolutional neural networks (CNNs). The main task of face recognition, including facial verification and identification, involves face feature and texture discrimination. The softmax loss of deep CNNs usually lacks the power of discrimination. To Overcome, recently several loss functions such as center loss, large margin softmax loss, and angular softmax loss have been proposed. All these improved losses share the same idea and maximizing inter-class variance and minimizing intra-class variance.

The Markov Cluster (MCL) Algorithm is an unsupervised cluster algorithm for graphs based on simulation of stochastic flow in graphs. The Novel loss function, likely large margin cosine loss (LMCL), is to realize this idea from a different perspective.reformulate the softmax loss as a cosine loss by L2 normalizing both features and weight vectors to remove radial variations, based on which a cosine margin term is introduced to further maximize the decision margin in the angular space. As a result, the minimum intra-class variance and maximum inter-class variance are achieved by virtue of normalization and cosine decision margin maximization.

Therefore the model trained with LMCL as CosFace. Extensive experimental evaluations are conducted on the most popular public-domain face recognition datasets such as MegaFace Challenge, Youtube Faces (YTF) and Labeled Face in the Wild (LFW). The state-of-the-art performance on these benchmarks, which confirms the effectiveness of our proposed approach.

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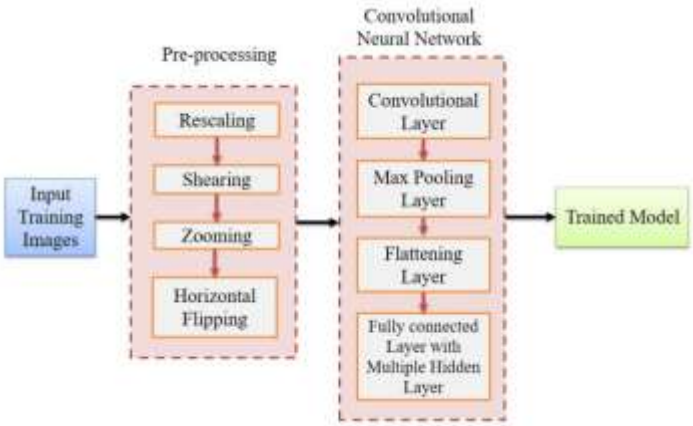
II. PROCESSING

Pre-Processing

Data preprocessing is the process of transforming raw data into an understandable format. The quality of the data should be checked before applying machine learning or data mining algorithms. The process to remove incorrect data, incomplete data and inaccurate data from the datasets, and it also replaces the missing values. The method initiallycollect the user's face images. It will capture each user's face 50 times and all the 50 images are stored in aseparate folder. The collected face images of users are used for Training purposes and validation purposes. After data collection, the user's face images are pre-processed by using preprocessing techniques such as zooming, shearing, rescaling and horizontal flipping. These pre-processed data are then feeded into our Convolutional Neural Network model. Training Process is conducted by using Convolutional Neural Network and the trained model is saved as a file for testing purpose.It will train the image data more than 100 times to reach the 97% accuracy. After training we are able to classify the users faces in real-time by using the trained model. Once the user's image is predicted, then their banking details are collected and then the machine asks for the 4 digit secret pin from the user to continue the transaction**.**

If their face and 4 digit pin number are matched, then they are able to make transactions, if it is not matched then they can't make transactions in the ATM.After training we are able to classify the users faces in real-time by using the trained model.

Once the user's image is predicted, then their banking details are collected and then the machine asks for the 4 digit secret pin from the user to continue the transaction. If their face and 4 digit pin number is matched, then they are able to make transactions, if it is not matched then they aren't able to make transactions in the ATM.



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Training

If their face and 4 digit pin number are matched, then they are able to make transactions, if it is not matched then they can't make transactions in the ATM.After training we are able to classify the users faces in real-time by using the trained model. Once the user's image ispredicted, then their banking details are collected and then the machine asks for the 4 digit secret pin from the user to continue the transaction. If their face and 4 digit pin numberis matched, then they are able to maketransactions, if it is not matched then they aren't able to make transactions in the ATM.

III. EXPERIMENTATION

A. Securing customers Through Facial Recognition Authentication

ATM usage usually, works on two-factor authentication requiring something have and something you know or you are. To use an ATM presently, demands having a card that has to be authenticated by PIN as a second factor authentication. To aid memory, some users write their PINs in diaries or store them on some other unprotected devices. The moment the card is accessible,PIN is guessed or obtained through other means such as social engineering, shoulder surfing or outright collection under duress. Recently, Biometric ATMs are introduced to be usedalong with card. This will definitely impact on the amount frauds if fully implemented.

B. Secure Atm By Facial Recognition Technology (Image Processing)

Face recognition is basically the task of recognizing a person based on its facial image. It has become very popular in the last twodecades, mainly because of the new methods developed and the high quality of the current videos/cameras. **Face recognition** is different of face detection i.e Face Detection has the objective of finding the faces (location and size) in an image and probably extract them to be used by the face recognition algorithm. Face Recognition with the facial images already extracted, cropped, resized and usually converted to grayscale, the face recognition algorithm is responsible for finding characteristics which best describe the image. The face recognition systems can operate basically in two modes and they are Verification or authentication of a facial image: it basically compares the input facial image with the facial image related to the user which is requiring the authentication. It is basically a 1x1 comparison. Identification or facial recognition: it basically compares the input facial image with all facial images from a dataset with the aim to find the user that matches that face. It is basically a 1xN comparison.

To use an ATM with facial recognition system, all you need is walk to the atm. its digital

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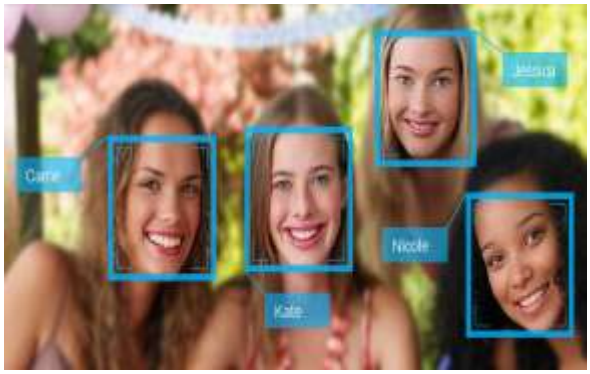
camera is on 24hours a day, and its computer will automatically initiate a face recognition procedure. To provide a secured transaction the webcamera which had already fixed in the ATM machine will take a snap of the person who is going to credit the amount from the ATM. Then the captured image of the person will be compared with the account holder image in the respective bank database. If the user image gets matched with the anyone of the image in the database means then automatically it will allow the user to perform any operations like withdraw or transaction in the ATM. whenever the computer detects a human face in camera obtains a picture of your face, the computer compares the image of your face to the images of registered customers in its database .If your face (as seen by the ATMs camera) matches the picture of the in the data base you areautomatically recognized by the machineare all finite, discrete quantities, we call the image a digital image.



Face Recognition of multiple faces in an image

There are two different methods for facial recognition. They are Geometric or template based. The template-based methods can be constructed using statistical tools like Support Vector Machines, Principal Component Analysis, Linear Discriminant Analysis, Kernel methods or Trace Transforms. The geometric feature based methods analyse local facial features and their geometric relationship. It is also known as a **feature-based method.**

C. Computer Vision

Computer vision is a field of artificial intelligence (AI) that enables computers and systems that gives a meaningful information from digital images, videos and other visual inputs.Computer vision and facial recognition are the two branches of AI. By using AI, computers can have the ability to think like human brain. Machine learning uses algorithmic models that enable a computer to teach itself about the context of visual data. Machine learning is the technology that drives a result from the large dataset. If enough data is fed through the model, the computer will "look" at the data and teach itself to tell one image from another. Algorithms enable the machine to learn by itself, rather than someone programming it to recognize an image.

A CNN helps a machine learning or deep learning model "look" by breaking images down into pixels that are given tags or labels. It uses the labels to perform convolutions (a mathematical operation on two functions to produce a third function) and makes predictions about what it is "seeing." The neural network runs convolutions and checks the accuracy of its predictions in a series of iterations until the predictions start to come true. It is then recognizing or seeing images in a way similar to humans.

D. Neural Networks

Neural Network has continued to use pattern recognition and classification.There are methods, which perform feature extraction using neural networks. There are many methods, which combined with tools like PCA or LCA and make a hybrid classifier for face recognition.There are many ways for face recognition.In face recognition, the image first prepared for preprocessing and then trained the face recogniser to recognise the faces. After teaching the recogniser, testing the recogniser to see the results.Machine converts images into an array of pixels where the dimensions of the image depending on the resolution of the image. The computer reads any image as a range of values between 0 and 255. Colour images have 3 primary channels i.e, Red, green and blue. **Haarcascade_frontalface_default.xml file** to detect face. It is basically a machine learning object detection algorithm which is used to identify objects in an image or video. This is usually a Classifier. This classifier is used to detect particular objects from the input image. The method is to create a rectangle using

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cv2.rectangle. The parameters is used inside by passing image object, RGB values of the box outline and the width of the rectangle.

E. SOURCE CODE FOR THE VIDEO CAPTURING:

```
# Initialize and start realtime video capture
cam = cv2.VideoCapture(0)
cam.set(3, 640) # set video widht
cam.set(4, 480) # set video height
# Define min window size to be recognized as a face
minW = 0.1*cam.get(3)
minH = 0.1*cam.get(4)
while True:
et, img =cam.read()
   #img = cv2.flip(img, -1) # Flip vertically
gray=cv2.cvtColor(img,cv2.COLOR_BGR2GRAY
   faces = faceCascade.detectMultiScale(
      gray,
      scaleFactor = 1.2,
      minNeighbors = 5,
      minSize = (int(minW), int(minH)), )
   for(x,y,w,h) in faces:
      cv2.rectangle(img, (x,y), (x+w,y+h),
(0,255,0),2)
      cv2.imwrite("test2.jpg", gray[y:y+h,x:x+w])
img1=image.load_img("test2.jpg",target_size=(224
,224))
      img1 = image.img_to_array(img1)
      img1 = np.expand_dims(img1,axis=0) ###
flattening
      ypred = model.predict_classes(img1)
      #print(ypred)
 #print(exp(ypred[0]))
      #print("")
      font = cv2.FONT_HERSHEY_SIMPLEX
      # Use putText() method for
      # inserting text on video
 v=exp(ypred[0])
    #cv2.imshow('video', img)
```

```
Please Enter the 4 digit Code : 1234
Password Matched
Available Balance in your account:
500

Please Enter Amount to Withdraw : 350
Please collect the cash amount 350

Your available Balance is 150
Thank You, You are going to log out
```

Once the user's image is predicted, then their banking details are collected and then the machine asks for the 4 digit secret pin from the user to continue the transaction. If their face and 4 digit PIN are matched, then they are able to make

```
      #cv2.putText(img, v, (50, 50), font, 1, (0,
255, 255), 2, cv2.LINE_4)
      cv2.putText( img, str(v),(x+5,y-5), font,
1, (255,255,255), 2 )
```

IV. RESULT

The user stands in front of the camera and the camera starts recording. The Recorded images are trained and tested. These tested images are just checked with theinput dataset, if it matches it will go further processotherwise it shows some messages like unauthorized user. This one gives a higher accuracy. Initially we are going to collect the user's face images. It will capture each user's face 50 times and all the 50 images are stored in a separate folder.The collected face images of users are used for Training purposes and validation purposes. After data collection, the user's face images are pre- processed by using preprocessing techniques such as zooming, shearing, rescaling and horizontal flipping. These pre-processed data are then feeded into our Convolutional Neural Network model.

the transaction, if it is not matched then they aren't able to make transactions in the ATM.

V. CONCLUSION

Looking back on this project, the overall outcome of results to be observed. This can be evaluated by looking at how well our objectives were met. Our first objective is to givean accurate and reliable method for detecting faces while a transaction has been developed.In this technology, a user's faceprint is taken as a replacement for an ATM card which makes it simpler and easier. It is safe to withdraw the amount and check the account balance. The Proposed work increases efficiency. In the future, this work can be extended by adding more constraints like if two members of the same family are at the different location of the country, then both of them can have access to the same account anywhere and anytime they want without carrying an ATM card

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