Secure Bank Transactions Using Facial Recognition.

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Abstract: *This project proposes a method for a credit card transaction system that will integrate with face detection and face recognition technology using various Opencv and machine learning algorithms, respectively. Before access will be granted, the user will have to take a facial photograph to have access to his/her account, the geometry of the face and the distance between the eyes and the nose are compared. This photograph will be compared with the photograph in the bank server for verification, if it passes the verification, access will be granted, otherwise, it will be denied.*
Keywords: Opencv, Machine Learning.

I. INTRODUCTION

Over the last 40 years, The recognition of the face is being a functional analysis section in the field of neural networks, computer vision, machine learning approach, image processing, and pattern recognition. The process of Face Recognition involves two main steps. The first one is to train the face image of familiar particulars. The second step involves the classification of the recent trial image within the class. Which can be a major issue in recognition of a face. Humans can solve various problems of Face Recognition in which restricted storage space is the major issue.

The constraints of Face Recognition structure in the field of machine learning:

1. Pose interchange
2. Front vs. Profile
3. Blockage of face because of scarf, mask or obstacles in front
4. Ageing
5. Facial Expression change
6. Illumination variation
7. Size of the image

we have different types, including wearable inertial sensors, EEG, depth, RGB, and thermal. These sensors can be in use to acquire the data. To spot the face images over the pair of stable image and video series, The sensors are allowed to supply additional details as well as to assist the face recognition system. The outcomes of the Face Recognition system are extremely dependent upon the extracted features which are used to illustrate the pattern of the face as well as the categorization procedures and differentiate in the middle of faces where the base of extraction of the productive attribute are face localization and normalization. Robust Face Recognition Structure can be classified into three basic strategies:

1. Image Segmentation.
2. Feature Extraction.
3. Classification.

Work-Flow Diagram:
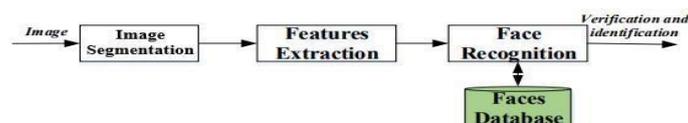
Fig 1: Work-Flow Diagram of Facial Recognition

II. LITERATURE SURVEY

The use of payment cards in various places such as shopping, restaurants, lodges, and online payment for booking hotels, movie tickets, flight and train tickets, etc is increasing day by day. So the problem is that a person has to carry payment cards along with him and keep the cards secure to use them all the time. This also

lacked security. In the present work, biometric face recognition payments are used in all kinds of payments. The face recognition payment system is safe, secure, and even easy to use. A general design of an online payment system using face recognition is proposed. Authors Gittipat Jetsiktaand t, Sasipa Panthuwadeethorn in [1] have explained the concern for face recognition Popularity of online transactions in the half-past decade leads to the leak of user information. Security of transaction processes can be hacked more easily due to advanced technologies. Biometric verification is considered a key to enhancing security problems. In this paper, the new process with face matching verification is proposed to improve the security of the online payment system. The simulation of the online payment process is also created then the performance of the new proposed process is evaluated. The experimental results show that the new proposed process with face matching verification can increase security as well as improve the usability, capability, and user satisfaction of the online transaction process. Authors John Richard D. Kho, and Larry A. Vea in their work[2] titled Credit Card Fraud Detection Based on Transaction Behavior explains fraud detection. The proliferation of the EMV (EuropayMasterCard-VISA) chip card design in the credit card business may resolve the problem proposed by the old Magnetic stripe card technology. Several classifiers were evaluated during the model creation however only the Random Tree and J48 yielded the highest accuracy value of 94.32% and 93.50% respectively. J48 is more fit in understanding the transaction logs data YOLO9000 Better, Faster, Stronger. Authors Abhinav Podil, Chi Zhang, and Viktor Prasanna in [3] briefed Fast and Efficient Implementation of Convolutional Neural Networks This paper proposes a deep convolutional neural network architecture code-named Inception, for classification and detection in the Image Net Large Scale Visual Recognition Challenge 2014 (ILSVRC14). We need to go deeper into an internet meme. Network-in-Network approach is applied to the convolutional layers to increase the representational power of neural networks. The method could be viewed as additional 11 convolutional layers followed typically by the rectified linear activation. The most convincing way of improving the performance of deep neural networks is by increasing their size. The number of units at each level. Authors: Nusrat Mubin Ara, Md. Saiful Islam in [4] explained Convolutional Neural Network Approach for Vision-Based Student Recognition System Computers are now too smart to interact with humans in different approaches. This interaction will be more acceptable for both humans and computers if it is based on the recognition process. In this article, the author's concern is to integrate and develop a student recognition system using existing algorithms. Among various face recognition methods, here author uses a deep learning-based face recognition method. After building the system, a resultant performance is also shown in this article. Face recognition with deep neural networks or convolutional neural networks is a very popular technique today. This method gives higher accuracy and precision comparing the previous methods. This method is used in Facebook's DeepFace and Google's FaceNet. Authors: Abir Fathalla, Gary Thung, and Ali Douai in [5] delineated Facial Expression Recognition via Deep Learning Interaction Human-Machine (IHM) has long confined research to develop techniques based on the use of triplet screen-keyboard-mouse. Today, it is moving towards new paradigms: the user must be able to evolve unimpeded in its natural environment; fingers, hands, face, or familiar objects are seen as many devices input or output. That is why they rely on artificial perception techniques, including computer vision. IHM is a rapidly evolving discipline. Future generations of human-machine environments will become multimodal integrating new information, from the consideration of the dynamic behavior, speech, and/or facial expressions, so as to make the use of machines the most intuitive and natural as possible. The face is the most expressive and communicative part of a human being it represents a major focus in current research concerning the improvement of IHM for establishing a dialogue between the two entities. Facial expression is a visible manifestation of a face from the state of mind (emotion, reflection), cognitive activity, physiological (fatigue, pain), personality, and psychopathology of a person. Emotion recognition consists in associating an emotion to a face image. . Facial expression recognition usually employs a three-stage training consisting of face Acquisition, facial feature extraction, and classifier construction.

III.   PROPOSED SOLUTION

In the proposed system we are using the face authentication method to avoid fraud. We enter the card details and when we go on the payment option, there we need to scan the face for the payment to be successful. In case the face doesn't match then the payment won't be successful and in this way, we can avoid the fraud detection only the owner will be able to use. And in the future, we can use also use biometrics for the payment mode. This system is expected to provide a higher level of authentication (multifactor authentication) which will bring unauthorized access to the barest minimum. Before access will be granted, the user will have to take a facial photograph to have access to his/her account, the geometry of the face and the distance between the eyes and the nose are compared. This photograph will be compared with the photograph in the bank server for verification, if it passes the verification, access will be granted, otherwise, it will be denied.

The main purpose of the project is Facial recognition. Where the system captures the photo of the user and checks whether the photo matches against the photo in the database if it matches the transaction is allowed

else it is declined. The process of facial recognition involves a lot more work behind the system where many algorithms are involved to recognize a face. The three main steps in the system are
- Face detection
- Feature extraction
- Face recognition

Face Detection- Face Detection is the essential step for face recognition. It is used to detect faces in real-time for surveillance and tracking of persons or objects. It is widely used in cameras to identify multiple appearances in the frame Ex- Mobile cameras and DSLRs. Facebook is also using the same approach which is a face detection algorithm to detect faces in the images and identify them.

Feature Extraction- Feature extraction is the next step in face recognition which helps in extracting the required features for the further detection and authorization process in which, a basic set of the raw data or information is divided and segregated into more manageable groups. The most important objective of these huge data sets has a large number of variables. These variables required a lot of computing resources to process. These features are easy to process, but it is able to explain the actual trained data set with accuracy and originality.

Face Recognition- Face Recognition performs comparing of the face over one or more trained faces in a trained dataset. This is the final step of the process. The project was implemented using the Local binary pattern algorithm. Here the actual matching of the face takes place against the photo in the database. After this step, we get the final result, whether the system found a matching face in the database.

Process of Facial Recognition System- Face detection work to detect multiple faces in an image. First, the image is extracted by providing the destination of the image. That picture is converted from RGB to Grayscale because it is easy to detect faces in the grayscale using cv2. After that, image manipulation was used, in which the resizing, cropping, blurring, and sharpening of the images were done if needed. The next process is image segmentation, which is used for contour identification of the multiple objects in a single picture so that the classifier can quickly identify the objects and faces in the image.

Haar Cascade- It is an object detection algorithm. A Haar Cascade is largely a classifier that is oriented to observe the thing that it's been trained for, from the supply. The Haar Cascade is by super-imposing the positive image over a collection of negative images. The training is mostly done on a server and on numerous phases. Higher results are obtained by victimization top-quality pictures and by increasing the number of stages that the classifier is trained. The further step is to use the Haar-Like features algorithm, which is proposed by Viola and Jones for face detection. This algorithm is used for finding the location of the human faces in a frame or image. All human faces shares some universal properties of the human face like the eyes region is darker than its neighbor pixels and the nose region is brighter than the eye region. The haar-like algorithm is also used for feature selection or feature extraction for an object in an image, with the help of edge detection, line detection, and center detection for detecting eyes, nose, mouth, etc. in the picture.

Local Binary Patterns Histogram- It was first described in 1994 (LBP) and has since been found to be a powerful feature for texture classification. Using the Local Binary Pattern combined with histograms can represent the face images with a simple data vector. The first computational process of the LBPH is to generate an intermediate picture that describes the actual image in an accurate way, by highlighting the facial characteristics. The algorithm uses a concept of a sliding window, based on the parameters of the face and neighbors.
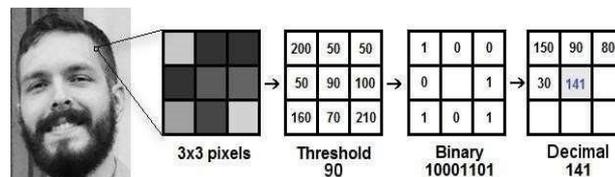
Fig2: LBPH operation.

Now using the image generated in the last step can use the Grid X and Grid Y parameters to divide the image into multiple grids, as can be seen in the following image.
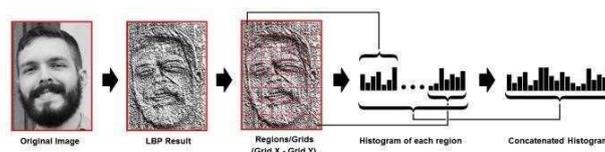
Fig3: Obtaining Histogram

So, to find the picture that matches the input image and just needs to compare two histograms and return the image with the closest histogram.

IV. CONCLUSION

This system can convert less security into more secure transactions. This system creates a more reliable communication means between the user and the bank system. Also, it generates a face at the end of the transaction which is verified by the various algorithm.

1. Online payment systems for money transactions are based on face recognition which provides authentic user data privacy and prevents misuse of data in the world.

2. This technique identifies theft and prevents customer data which improves the security of the payment process.

3. This system can also convert less security into more secure transactions. This system creates a more reliable communication means between the user and the bank system.

4. This is useful to totally remove fake transactions and fraud, i.e to read OPT then it required the face of the user which is provided for transactions. Then the transaction is done.

5. It ensures that innocent people are not wrongly arrested based on previous crimes.

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