Double Authentication System Integrating Face Recognition and Eye Blink Count Recognition

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ABSTRACT

Authentication plays a major role in maintaining security in data access. It is the process of recognizing a user's identity and providing data access. It is a mechanism of associating an incoming request with a set of identifying credentials and providing access to data. Traditional password authentication could not provide enough security. Even though many other authentication methods were introduced but unfortunately they couldn't prevent all types of security attacks, because traces like fingerprints, touch marks, etc., were left during authentication. Hence we come up with an idea named "Double Authentication System Integrating Face Recognition and Eye Blink Count Recognition". This system provides double-layered authentication for a user, which makes authentication more secure. The two layers of authentication are face recognition followed by eye blink count recognition.This system first verifies the user's face and then takes the eye blink count from the user.

Keywords: Eye blink, deception detection, GHQ, Face analysis

I. INTRODUCTION

Biometrics is part of cutting-edge technology. Biometrics are the metrics related to human features. As an emerging technology, biometric systems can add great convenience by replacing passwords, helping law enforcement catch criminals, and even in organizations in posting the attendance of an employee. Several types of biometric types are available Face Recognition, Iris Recognition, Fingerprint Scanner, Voice Recognition, Hand Geometry, and Behaviour Characteristics.

II. LITERATUREREVIEW

A literature survey is the most important step in the software development process. Before developing the tools it is necessary to determine the time factor, economic, and company strength. Once these things are satisfied, ten next steps are to determine which operating system and language can be used for developing the tool. Once the programmers start building the tool the programmers need a lot of external support. This support can be obtained from senior programmers, books, or from websites. Before building the system the above consideration is taken into account for developing the proposed system.

In 1969, Paul Ekman observed the facial variations in the faces of some psychiatric patients while interviewing them and he analyzed whether they are telling the truth or lying.

III. RELATEDWORK

Liang,L.,Ai,H.:SummaryonFaceDetectionResearch.JournalofComputers25(5),449–459(2004) This paper studies two critical technical links between face detection and face recognition in there cognition off ace and conducts analyses and comparison the data for face recognition and counter in some of the collation of this information and the combination of related knowledge in digital image processing, it proposes a face recognition algorithm based on the singular value decomposition. After preprocessing face images, by the use of the projection method, it obtains the positions of five sense organs and then extracts local feature values near five sense organs as the main features of faces by using the singular value decomposition. For different face images of the same individual, the matching degree off feature values will be very high.[1]

Zhao, M.: Study on Coding Algorithm of Wavelet-based Color Face Images. Master Thesis. Computer Academy of Sciences of Sichuan Normal University, Sichuan (2005)A face recognition system is one of the biometric information processes, its applicability is easier and the working range is larger than others, i.e.; fingerprint, irisscanning, signature, etc. A face recognition system designed, implemented, and tested at Atılım University, Mechatronics Engineering Department. The system uses a combination of techniques in two topics; face detection and recognition. Face detection is performed on live acquired images without any application field in mind. Processes utilized in the system are white balance correction, skin-like region segmentation, facial featureextraction,andfaceimage extractiononafacecandidate.ThenafaceclassificationmethodthatusesFeed Forward Neural Network is integrated withthe system. The system is tested with a database generated in the laboratory with 26people. The tested system has the acceptable performance to recognize faces withinintended limits. The system is also capable of detecting and recognizing multiplefacesinliveacquiredimages.[2]

Liang,L.,Ai,H.:FaceDetectionsBasedonMulti-TemplateMatching.Journalof China's ImageGraphics44(10),623–630(2004)Facerecognitionhasbecomerelevantinrecentyearsbecauseof itspotentialapplications. The aim of this paper is to find out the relevant techniques which givenot only better accuracy butalsoefficientspeed. There are several techniquesavailable for face detection which give much better accuracy but the executionspeedisnotefficient.Inthispaper,anormalizedcross-correlationtemplatematchingtechniqueisusedtosolvethisproblem.Accordingtothe proposedalgorithm, first different facial parts are detected like the mouth, eyes, and nose. Ifany of the two facial parts are found successfully then the face can be detected. Formatching the templates with the target image, the template rotates at a certain angleinterval.[3]

Chen, M.: Studies on the Face Image Detection and Classification System.Ph.D. Thesis. Computer Science and Engineering Department of ShanghaiJiaotongUniversity, Shanghai(2003)

The reliability of the face recognition system has the characteristics of fuzziness,randomness, and continuity. In order to measure it in unconstrained scenes, we findoutandquantifykeybroad-senseandnarrow-senseinfluencingfactorsofreliabilityonthebasisofanalyzingoperationstatesforsixdynamicfacerecognition systems in the practical use of six public security bureaus. In this article, we propose an ovel evaluation method with a True Positive Identification of the face and eye blink count recognition in the sixth system and the development of the system using the convolutional system by this we can increase the rate of the experiment from the air. The rate in dynamic and M: N mode and create a novel evaluation model of system reliability with the improved Fuzzy Dynamic Bayesian Network. Subsequently, we infer to solve the fuzzy reliability state probabilities of the six systems with Netica and get the two most important factors with the improved fuzzy C-means algorithm. We verify the model by comparing the evaluation results with the actual achievements of these systems. Finally, we find several vulnerabilities in the system with the least reliability and put forward a few optimization strategies. The proposed method combines the advantages of the improved fuzzy C- means model with those of the dynamic Bayesian net work to evaluate there liability of the dynamic face recognition systems, making the evaluation results more reasonable and realistic. It starts new research on face recognition systems in unconstrained scenes and contributes to the research on face recognition performance evaluation and system reliability analysis. Besides, the proposed method is of practical significance in improving the reliability of the systems in use. [4]

Lu, C.: Study on Several Problems of Automatic Face Recognition and the System Implementation. Ph.D. Thesis. Computer Academy of Sciences of Tsinghua University, Beijing (1998) The paper analyses the multiple kernel learning-based face recognition in the pattern matching area. Based on the analysis of the basic theory of multiple kernelSVM, this thesis focuses on the multiple kernel SVM algorithm based on the semi-infinite linear program (SILP), including SILP based on column generation (CG)and SILP based on

chunking algorithm (CA). The two SILP-improved algorithms are applied to several classification problems, including UCI binary classification problem datasets and multi-classification problem datasets. Furthermore, the two SILP-improved algorithms are applied to the actual problems of face recognition. The experiment data shows that with the multiple kernel learning-based method, the performance of face recognition can be obviously improved. [5] Su, G.: Summary on Face Recognition Technology. Journal of China's Image Graphics 5(11),220–238(2000)Face recognition presents a challenging problem in the field of image analysis and computer vision, and as such has received a great deal of attention over the last fewyearsbecauseofitsmanyapplicationsinvariousdomains.Facerecognition techniques can be broadly divided into three categories based on the face data acquisition methodology: methods that operate on intensity images; those that dealwithvideosequences;andthosethatrequireothersensorydatasuchas3Dinformation or infra-red imagery. In this paper, an overview of some of the well-known methods in each of these categories is provided and some of the benefits and drawbacks of the schemes mentioned therein are examined. Furthermore, a discussion outlining the incentive for using face recognition, the applications of this technology, and some of the difficulties plaguing current systems with regard to this task have also been provided. This paper also mentions some of the most recent algorithms developed for this purpose and attempts to give an idea of the state of the art off ace recognition technology.[6]

Li,J.: Research Progress of New Face Recognition Technology. Journal of Computers 31(10), 293–295(2004) Over the past few decades, interest in theories and algorithms for face recognition has been growing rapidly. Video surveillance, criminal identification, building access control, and unmanned and autonomous vehicles are just a few examples of concrete applications that are gaining attraction among industries. Various techniques are being developed including local, holistic, and hybrid approaches, which provide a face image description using only a few face image features or the whole facial features. The main contribution of this survey is to review the happens.some well-known techniques for each approach and to give the taxonomy of their categories. In the paper, a detailed comparison between these techniques is exposed by listing the advantages and the disadvantages of their schemes in terms of robustness,accuracy,complexity,anddiscrimination.Oneinterestingfeaturementionedinthepaperisthedatabase usedforfacerecognition.Anoverview of the most commonly used databases, including those of supervised andunsupervisedlearning,isgiven.Numericalresultsofthemostinterestingtechniques are given along with the context of experiments and challenges handled by these techniques. Finally, a solid discussion is given in the paper about future directions in terms of techniques to be used for face recognition. By this, the algorithms for face recognition have been growing rapidly. Video of the surveillance, criminal identification, etc.,[7]

IV. PROPOSEDSYSTEM

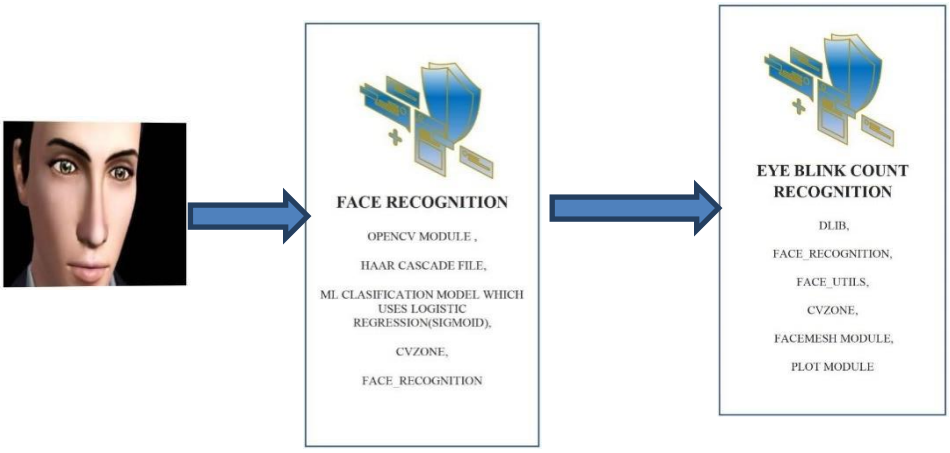

Fig1: System Architecture of Face Recognition and Eye Blink Count Recognition

The flow of authentication is, firstly the face of the user was recognized by using the face recognition model

and then the password will be taken from the user through eye blinks, this part will be done by the eye blink count recognition model. For recognizing the face of t h e user we need to build the face recognition model, which requires an **Opencv** package and **HaarCascade** xml file and in the aspect of Machine Learning, we use a Classification Technique i.e., **Logistic Regression** (sigmoid). We train our model with the sample gray scale converted images of the admin / user. Then wet test our model with random face so fad min and check the accuracy. If go to accuracy our face recognition model is ready to use. For recognizing the eye blink count of a user we calculate the **Euclidean distance** between the and lower lid of an eye of a user. The Euclidean distance becomes zero if the user closes both lids and becomes some positive.

V. RESULTS

UserTestScreen -I

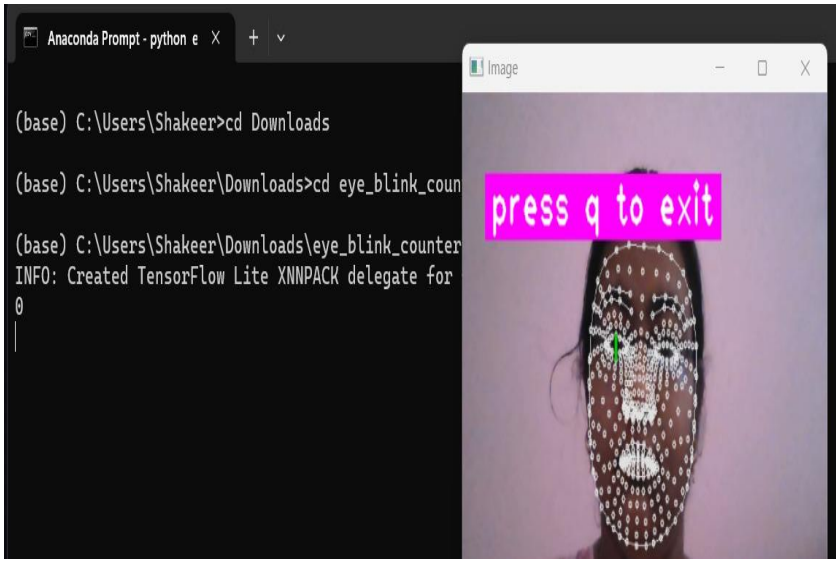

Fig1:-Performing Face Authentication

UserTestScreen – II

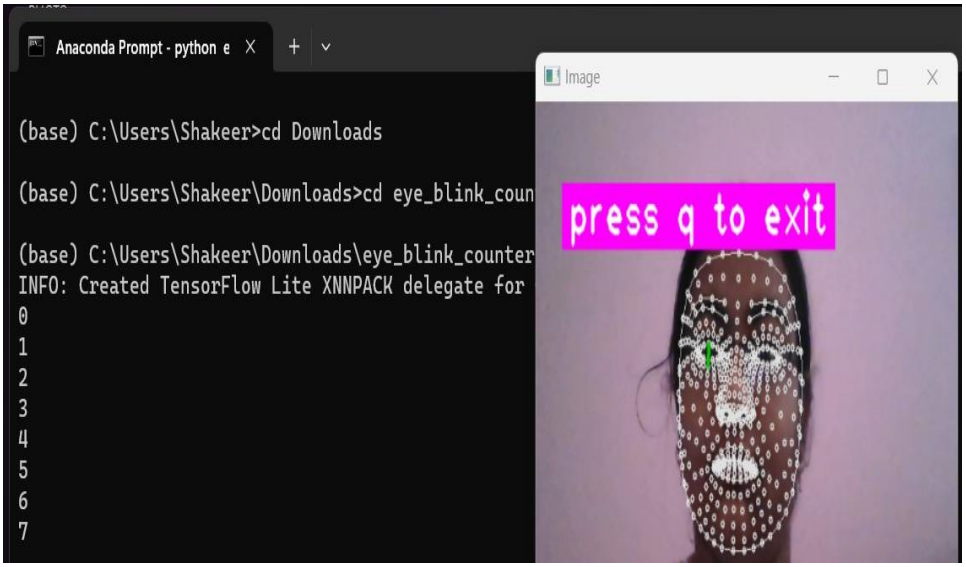

Fig 2:-Eye Blink Count Recognitio

VI. FUTURESCOPE

The future scope of the project is to build the dataset with more classes and to train the proposed CNN model as the project uses only four classes. To build a robust web application with different features such as Login Page, Attendance Management, Student Section, Faculty Section, etc.

VII. CONCLUSION

The paper formally introduces the role of Convolutional Neural Networks (CNNs) in Face Recognition and the adaption of CNN in attendance posting and also proposes a novel CNN architecture for Face Recognition.

The paper also provides a detailed explanation of the key components which are essential to building a robust deep learning model, such as collecting real-time data i.e., Human Faces, Data Augmentation, and Pre- Processing, Training, and Hyper Parameter `Tuning the proposed CNN model. Moreover, the project also provides a web application for attendance posting using Face Recognition by using the developed CNN model.

VIII. REFERENCES

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