Security Authentication System Using Facial Recognition

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Abstract – In today's world the security system should be strong enough as to prevent an institution from any kind of loss. Face recognition play an important role in a large number of applications from biometrics, security, surveillance, inventory to the authentication. In this paper we will design and implement a smart security system for areas which area restricted and where access is limited to people whose faces are available in the database. First we will acknowledge the face by detecting the human motion. Then facial scan is performed to determine the authority of the person to enter the restricted area. At the same time, we record the coordinate of detected motion .Along with the detection of alcohol intake and hidden weapon if there. Failure of any condition results to denial of entry. Experimental results shows how effective is the proposed security system in order to restrict the unauthorized access and increase reliability by use of facial scan. It is a solution to high security and can minimize human error .This system is divided into 2 parts i.e. software and hardware. The initial section comprises of microcontroller, camera and sensors whereas the next portion consist of face recognition algorithms.

Index Terms – Face recognition, Biometrics, MATLAB, Security, Software.

1. INTRODUCTION

Face recognition is a noteworthy territory of biometrics. It is a framework that perceives a human through a physical attribute. Facial sweep has a procedure to perceive a human by facial standards. Today, biometrics is the quickest developing fields in innovation. Forecasts show that the biometrics extension in the following century, to recognize ids to stay away from and limit access to security, facilities and storage.

Here we propose a security authentication system using face recognition. The system passes only people allowed by their facial scan and blocks unverified people. This framework comprises of a face detector linked to a microcontroller. In enrollment mode the framework permits to enlist clients and spare their extraordinary facial characters in the framework memory. After storing the user requires to bring their face close to the camera. The microcontroller now checks the individual's face character if the client is approved at that point there is discovery of liquor utilization alongside uncovering weapons if there. At the point when all these are confirmed then the microcontroller transmit the signal to a driver. The motor driver drives to open the entryway. This guarantees just approved clients are permitted to enter the premises and unapproved faces are hindered to enter with no human connection.

A facial acknowledgment security framework is a framework which catches a picture or a video of a human face and differentiate about it to the pictures spared in the database. Essentially it thinks about the special nodal focuses exhibit on the countenances, for example, structure, size, shape and extents of the appearances. Alongside focuses between the eyes, mouth, nose, and jaw, lines of the eye attachments, the edge of the mouth, area of the nose and eyes, brow marks and the zone around the check bones are likewise looked at for better execution.

To increase system security and performance several images belonging to user should be taken with different dimensions. At the time of matching, identification and comparing captured image with the recorded image the user should stand in front of the camera for a few seconds.

Facial acknowledgment security framework is broadly utilized in light of its significant advantages. For example, it should be possible from a more remote separation without letting the individual mindful that he/she is being checked. Such productive frameworks are required in banks, ATM or government workplaces as illustration, and this improves facial acknowledgment frameworks than other biometric advancements in that they can be utilized for observation purposes for eg. looking for offenders, suspected fear based oppressors, or missing individuals.
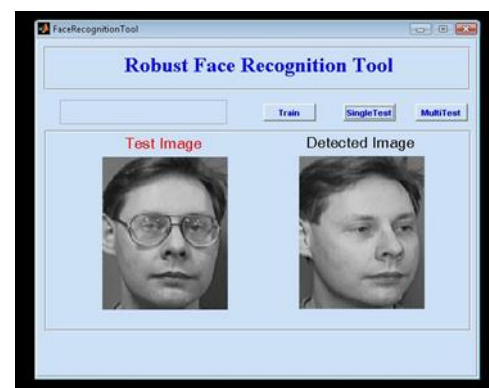

Figure 1. Test image and Detected image

2. EXISTING SOLUTIONS

During the previous decade numerous facial examining programming have been produced. Distinctive strategies and diverse calculations are utilized by each product. To recognize the face, some face check programming draws the face highlights from the given picture. Standardization of set of face pictures is finished by different calculations which additionally packs the face information and recover the information in one picture that can be utilized for facial acknowledgment. Correlation between given picture and face information is finished. This new strategy is being utilized for confront check which is the 3-D facial output.

A 3-D sensor is utilized to attract data in the state of the face. In this technique, so just unmistakable highlights of the face, for example, the eye attachments shape, jaw and nose, are utilized for confront check .This strategy has focal points over different calculations. Change of light has no impact on the acknowledgment, and the face is distinguished from an alternate points. Skin Texture investigation is another procedure in facial sweep.

This strategy utilizes the skin's subtle elements , as caught in computerized design or filtered pictures and afterward transforms into lines, examples and spots clearly in a man's skin. The current facial output programs are utilized for security reasons given underneath.

A. Face First

Face First is a software which gives a totally computerized, well-disposed interface , quick utilization of portable and live-video reconnaissance facial output framework. This product creates an alarm when a face is filtered. It happens when input confront matches the face in the database is characterized likelihood. The benefit of Face First framework is that it works in low-determination condition with genuine execution.

B. Morpho Trak

Biometric and identity administration solutions are given by Morpho Trak to a wide system of business sectors including law implemented offices, fringe control parole, driving permit administration, common ids, and IT security. This innovation is a piece of the world's biggest biometric organization with driving trend-setter in vast unique mark id frameworks.

C. Crossed Matching Technology

This company has worldwide supplier of biometrics id administration frameworks, applications and advances for the legislatures, law requirement offices and organizations everywhere throughout the world. Their innovations incorporating biometric advances comprising of remote, portable or static utilize that improves facial acknowledgment frameworks.
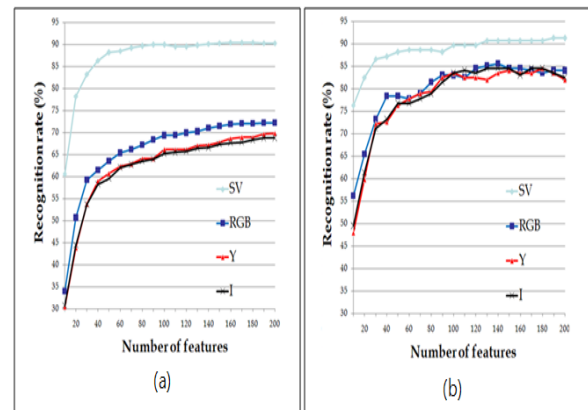

Figure 2 Curves for two different angles of an image

3. PROPOSED SOLUTION

Face recognition real time framework is a proposed arrangement that extraction a film from a camera associated with the PC with a running program, recognizes any face before the camera, and after that acknowledges if this face is available in an arrangement of face pictures in a database utilizing face acknowledgment strategy. The product is portrayed into two regions: facial discovery and face acknowledgment.
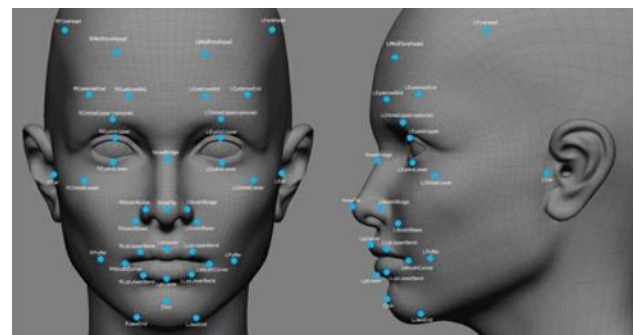

Figure 3 Nodal points on human face

4. RESULTS AND TESTINGS

To make the face scan security system validate, application of the algorithm was applied using MATLAB software. The database is created and accessed by the software during the processing of the input image.

This system is software based real-time face recognition system that reads a real-time video from the camera connected to the computer which is running the software, takes an image from this video, processes it to detect human face presented in front of the camera, and then recognizes unique nodal points of face and compare them with the database. Along with detection of alcohol detection and unearthing weapons if there.

This framework was tried on numerous cases and conditions, and it accomplished a face detecting with precision of 95% and a face acknowledgment exactness of 91%.

5. CONCLUSIONS

Security confirmation framework utilizing facial recognition might be utilized more in future for security since they give better execution over other biometric frameworks. Face discovery framework might be connected in ID frameworks and access control. The face likeness meter was found to perform palatable. The product is in MATLAB and depends on face discovery and acknowledgment. In spite of the fact that its exactness is around 90%, this framework might be enhanced by establishment of some propelled highlights. Exact division and Light standardization of face may permit the limit an incentive to make strides. Utilizing face motion and signal model, accelerates the execution time.

6. FUTURE WORK

Future targets incorporates change of the Face acknowledgment utilizing certain objectives in the face(distance amongst eyes) and may likewise examine face in 3-D because of which the likelihood error will diminish and the framework will be more exact and with a minimal effort.

REFERENCES

[1]   J. Goldstein, L. D. Harmon, and A. B. Lesk, "Identification of Human Faces," Proc. IEEE, May 1971, Vol. 59, No. 5, 748-760.

[2]   L. Sirovich and M. Kirby, "A Low-Dimensional Procedure for the Characterization of Human Faces," J. Optical Soc. Am. A, 1987, Vol. 4,No.3, 519-524.

[3]   M. A. Turk and A. P. Pentland, "Face Recognition Using Eigenfaces," Proc. IEEE, 1991, 586-591.

[4]   Pankaj Agarwal, Pankaj Singh, Rohit Sharma, and Mayank Rai "Design the Ultra-Low Power Digital Sub-Threshold Logic circuits in Domino Logic", in "International Journal of VLSI & Signal Processing Applications(IJVSPA)", ISSN 2231-3133, Vol.1, Issue 5, Page 5-8, 2012

[5]   R. Chellappa, C. L. Wilson, and S. Sirohey, 1995. Human and Machine Recognition of Faces: A Survey, Proc.of the IEEE, vol.83, no.5, pp.705-740

[6]   Robert J. Baron, 1981. Mechanisms of Human Facial Recognition, International Journal of Man-Machine Studies, vol.15, no.2, pp.137-178.

[7]   R. Brunelli and T. Poggio, 1993. Face Recognition: Features versus Templates, IEEE Tran. on Pattern Analysis and Machine Intelligence, vol.15, no.10, pp.1042-1052.

[8]   E. Osuna, R. Freund, and F. Girosi, 1997. Training Support Vector Machines: An Application to Face Detection, In IEEE Conference on Computer Vision and Pattern Recognition, pp.193-199.

[9]   Rohit Sharma, Pankaj Singh, Abhishek Singhal "Two Different Authentication Protocol For Rfid Credit Card Security", in Journal of Engineering and Applied Sciences, ISSN 1816-949x Vol 12, Issue – 22, Page – 6006 – 6012, 2017.

[10]   L. Sirovich and M. Kirby, 1987. Low-dimensional Procedure for the Characterization of Human Faces, Journal of Optical Society of America, vol.4, no.3, pp.519-524