



Advanced Authentication System using Graphical Password

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Abstract— In this project, the proposed system is an Advanced Authentication System for providing more security to highly confidential data. The aim of this system is to provide the user with the more secure authentication based on condition. Here, Advanced Authentication System is adaptive and can be properly used for data security purpose. We are using graphical password for normal authentication but in threat we are using gesture detection

Keywords— Graphical Password, Gesture Detection, Haar Cascade, OpenCV, Viola Johns.

I. INTRODUCTION

The aim of the proposed system is to provide the user with the more secure authentication based on condition. In this project, the proposed system is an Advanced Authentication System for providing more security to highly confidential data. Normally, authentication is based on the biometric thumb, Finger detection, palm detection or Iris scan. They are considered as the most secure for authentication but this system is providing Graphical password system based on Knowledge based system. In the unusual condition there is a high chance where authorities may be forced to give access. Here, Advanced Authentication System is adaptive and can be properly used for data security purpose. The proposed system is using graphical password for normal authentication but in threat it is using gesture detection

II. LITRETURE REVIEW

In existing systems, it was really challenging to detect face. It was more difficult when our input face image is noisy or very low resolution. There are many problems in feature extraction and face recognition system. In our proposed system, Haar like features are used, which is mainly used for object detection and face recognition. The proposed system is real time, robust, effective and simple. Previous systems have used OpenCV for real time. OpenCV's recognition rate is fast and the requirement rate is low. Hence, OpenCV is good option for choosing as gesture detection technique. Instead of biometric system, we are using Graphical Password Technique. In today's security systems, knowledge-based schemes are used for user authentication. Biometrics can be used for user identification but one problem with the systems is the difficult between impostor pass rate and false alarm rate. Many Biometric systems require devices and some can be difficult to use. After referring various papers and techniques there are number of algorithms for authentication of right person but there may be the unusual condition where confidential data may be lost and hence there should be some system where access should be given to right person at right situation. [7]

III. EXISTING SYSTEM

Referring to the papers and technology used for authentication, most of the system uses biometric technologies there are five types of technologies:

- Facial
- Iris Scan
- PIN Code
- Thumb Detection
- Palm Detection

IV. PROPOSED SYSTEM

So, There should be some techniques to handle these kind of situation. The proposed system are providing solution for these kind of problems. The proposed system is Advanced Authentication System (AAS). For understanding the situation, the proposed system is using gesture to inform system about unusual condition. We have to make system intelligent enough to check right person along with right situation. According to the situation it will react intelligently and we are also using graphical password to it. Most token-based authentication systems also used knowledge-based authentication to prevent theft or loss of the token. An example is ATM authentication, which requires a combination and a PIN. The knowledge based techniques are currently the most frequently used method for user authentication. Password authentication methods are as follows :

- Token based authentication method.
- Biometric based authentication method.
- Knowledge based authentication method.

- Recognition method.
- Recall method.

A. Dhamiga and Perrig Method:

Dhamiga and Perrig proposed a technique called “Déjà vu” based on human ability to remember previously seen images. It is a recognition based method. User has to choose few images from a set of stored abstract images. User has to execute these same images at login time. These images are created using Andrej Bauer’s Random Art. They showed 90% success proportion using “Déjà vu” scheme. [3]

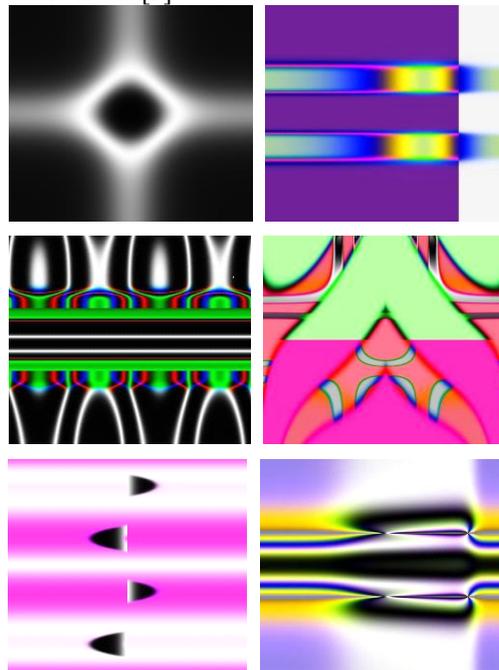


Fig. 1 Example of Random Art Images

V. SYSTEM ARCHTECHTURE

For informing the system about the unusual condition user at a victims system has to give gesture with graphical password which helps system to understand and behave accordingly to the situation. At the time, attacker may be busy in accessing the data which is actually a fake data he assumed to be true and with the help of video streams and notification at remote location situation can be in control. If there is no unusual condition it means there is no threat then simply user have to give graphical password to access database.

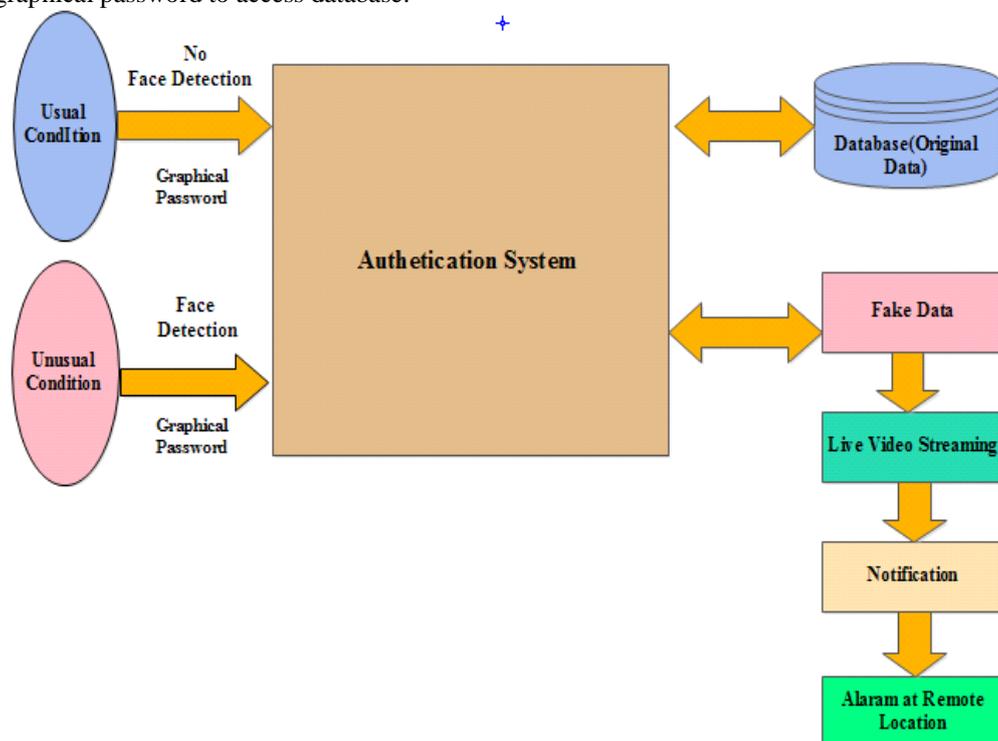


Fig. 2 System Architecture

A. Description of Module:

1. Login:

It is an important part to have a login Facility for an application due to the important factor of security. As every application contains database, so data related to every user can be stored. Login helps to trace out the user who in case tries to make any malicious activity within the application.

2. Session Management:

In usual/unusual condition user will has to choose few images from a set of stored abstract images. The user has to execute same images at login time with id for accessing a confidential data. When again the id and password will generate, it will scan against the template and again new id and password is created. When the old and current will match then authentication is provided. As our first module is graphical password based.

The work of the proposed system is just to process and check the generated which the authorized person can easily access the data without giving gesture.

VI. ALGORITHMS

The proposed system contains the flow which is based on two conditions:

- Usual Condition (No attack Situation).
- Unusual Condition (Authorized user in danger).

In usual condition authorized user will give graphical password for accessing data. In which the authorized person easily access data without giving gesture.

A. Viola Jones Object Detection Framework:

The Viola-Jones object detection framework is the first object detection framework which gives competitive object detection rates in real-time proposed in 2001 by Paul Jones and Michael Jones. It can be trained to detect a variety of object classes, it was motivated by the problem of face detection. This algorithm is implemented in OpenCv as cvHaarDetectsobjects. A human can do this easily but a computer needs proper instructions and constraints. To make the task more proper, Viola-Jones needs full view frontal upright faces. Thus, in order to be detected, the entire face point towards the camera and should not be tilted to any side.

The algorithm has four stages:

- Haar Feature Selection
- Creating an Integral Image
- Adaboost Training
- Cascading Classifiers

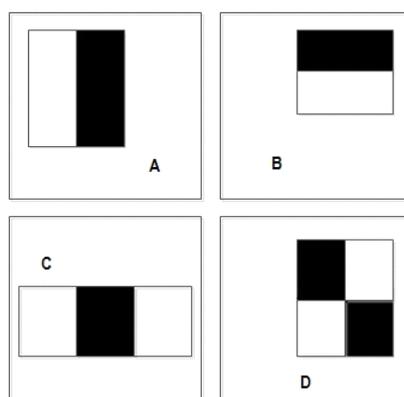


Fig. 3 Feature types used by Viola and Jones

The features sought by the detection framework absorb the sums of image pixels within rectangular areas. They bear some similarity to Haar basis functions which have been used before. The figure shows the four different types of features used in the framework of Viola and Jones. The value of any given feature is the addition of the pixels within clear rectangles subtracted from the sum of the pixels within shaded rectangles.[12]

B. Algorithms for face detection:

1. Haar like feature

Haar-like features are digital image features used in object recognition. Viola and Jones adapted the concept of using Haar wavelets and developed Haar-like features. A Haar-like feature takes adjacent rectangular areas at a specific location in a detection window, and sums the pixel intensities in each area and determines the difference between the sums. In this phase of detection, Viola-Jones object detection framework, a window of the targeted size is moved over the input image and for each subpart of the image the Haar-like feature is examined. This difference is then compared to a learned threshold that differentiate non-objects from objects because such a haar-like features are required to illustrate an object with enough accuracy. The key advantage of a Haar-like feature over most other features is its calculation

speed. The contributions of Viola and Jones was to use summed area tables, which are known as integral images. Integral images are defined as two-dimensional lookup tables in the form of a matrix with the same size of the original image. Each element of the integral image contains the sum of all pixels placed on the up-left region of the original image.

Finding the sum of the shaded rectangular area

$$\text{Sum} = I(C) + I(A) - I(B) - I(D)$$

where points A,B,C,D belong to the integral image I.[12]

2. Integral Image

The integral image is defined as the addition of the pixel values of the original image. The value at any location (x, y) of the integral image is the addition of the image's pixels above and to the left of location (x, y). The rectangular features of an image are examined using an intermediate representation of an image, called the integral image.

A(x, y) is the original image and AI [x, y] is the integral image then the integral image is computed as shown fig.[12]

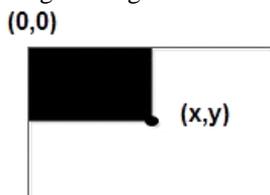


Fig. 4 Summed area of Intergral image

3. Haar Features

Haar features are composed of two or three rectangles. Face candidates are scanned for Haar features of the current stage. The weight and size of each feature are generated using a machine learning algorithm from AdaBoost. Each Haar feature has a fixed value that is calculated by taking the area of each rectangle and multiplying each by their respective weights and then adding the results. The area of each rectangle is found using the integral image. Since, L is subtracted off twice it must be added back on to get the correct area of the rectangle. The area of the rectangle R, denoted as the rectangle integral, can be calculated as follows using the locations of the integral image: $L4 - L3 - L2 + L1$. [12]

4. Haar Feature Classifier

A Haar feature classifier uses the rectangle integral to calculate a feature. The Haar feature classifier multiplies the weight of each rectangle by its area and the results are summed together. Several Haar feature classifiers make a stage. A stage comparator sums all the Haar feature classifier results in a stage and compares this addition with a stage threshold. The threshold is constant and obtained from the AdaBoost algorithm. [12]

5. Cascade

The Viola and Jones face detection algorithm eliminates face candidates fast as using a cascade of stages. The cascade removes candidates by making proper requirements in each stage with later stages being much more hard for a candidate to pass. Candidates exit the cascade if they pass all stages or fail any stage. A face is detected if a candidate passes all stages. [12]

C. Steps for algorithms in Haar like feature

- Image is passed to the CV_8U type.
- The matrix is scaled using Haar like feature detection.
- Image is flip.
- Convert into BGR to Grey
- Convert into image is passed for processing.

Window of viola-jones object detection is stirred on input image. Haar like feature is calculated for each sub section it uses integral image. The threshold value is obtained. It defines characteristics of certain region of image.

Lookups and rectangle features are obtained.

$$I = I(C) + I(A) + I(B) - I(D)$$

Where, A, B, C, D belongs to integral Image I.

Main parts of the faces are calculated using the above steps. All above steps are carried out in haarcascade_FrontalFace_alt.xml of Java CV. Jar library.

Now if the last frame and current frame is found different that is mismatch of the pixels then system judge the situation as unusual (as per our project).

VII. RESULTS

The image of the face is captured by webcam with the help of Processing. OpenCv then do various steps as given in our algorithm. Following fig. shows the outcome of the face detection .If the user shows only one side face which has probability to consider it in frame only 50%. So, it's not considered as face.If the user gives downward position to recognize the face then the frame will consider only 0%. So,it will be considered as no face detection to system. The user shows full frontal face to recognize by the system then the system will consider as 100 % . It is the best image to recognize the face.If there is usual condition then there will be no notification on server side.The fig shows the result of usual condition where original data is given to the user.

TYPE	NAME	CALIBRE	DISTRIBUTIONS	FEATURES	LOCATION	IMAGE
Sword	Hema	Straight	viz	Extensible	Nashik	
hanger	vaishnavi	flexible	POR	extensible	pune	
W1	Nilima				IALNA	
W1	Nilima				IALNA	
	SHARMILA			DIRECTION	KALYAN	
natil sir	ser	ert	edfsdfn	sdf	nashik	

Fig. 5 Original Database

If there is unusual condition then there will be a alarm notification on the server side and the live video streaming will occur as show in following fig.

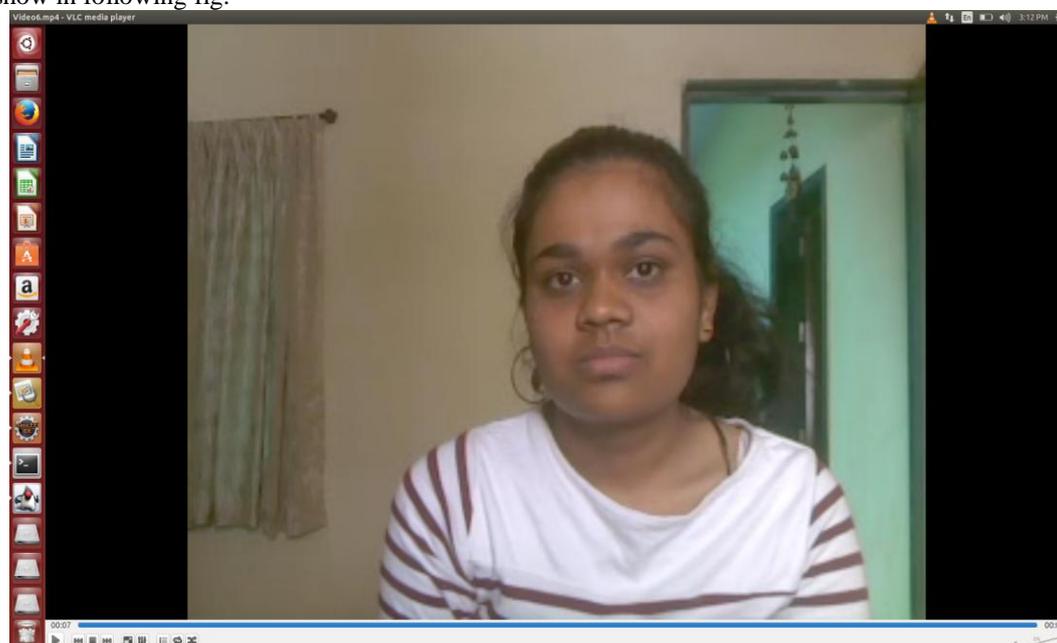


Fig.6 Live video streaming

After checking the results we come to conclusion that it is not necessary to a user to provide face at unusual condition. The user has to move away his\her face from the frame or camera after some slot of time.

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REFERENCES

- [1] Mamta S.Kala, “ Real Time Face Detection And Tracking Using OpenCV ”, International Journal of Soft Computing and Artificial Intelligence, ISSN: 2321-404X, Volume-2, Issue-1, May-2014
- [2] Harshith.C, Karthik.R.Shastry, Manoj Ravindran, M.V.V.N.S Srikanth, Naveen Lakshmikanth,“Survey On Various Gesture Recognition Techniques For Interfacing Machines Based On Ambient Intelligence”, International Journal of Computer Science & Engineering Survey (IJCSES) Vol.1, No.2, November 2010.

- [3] Rachna Dhamija, Adrian Perrig, “Deja Vu: A User Study Using Images for Authentication”, SIMS / CS, University of California Berkeley
- [4] R.V.Sudhakar, A. Mruthyunjayam, D. SugunaKumari, M. Ravi Kumar, B.V.S. Ramesh Babu “Improving Login Authorization by Providing Graphical Password (Security) ”, International. Journal of Engineering Research and Application ISSN: 2248-9622, Vol. 3, Issue 6, Nov-Dec 2013, pp.484-489
- [5] Swapnil Athavale ,Mona Deshmukh ,“ Dynamic Hand Gesture Recognition for Human Computer interaction” , International Journal of Engineering Research and General Science Volume 2, Issue 2, Feb-Mar 2014,ISSN 2091-2730
- [6] Varun Jasuja, Mr. Marish Singla,Mr. Rajesh, “Multiple Face Detection & Recognition Using Principal Component Analysis Algorithm” International Journal of Engineering Research and General Science Volume 2, Issue 2, Feb-Mar 2014 ISSN 2091-2730
- [7] Giriraj R. Mulay, Anil S. Kale, Ganesh S. Mate, Ravindra P. Tupe “ Adaptive Intelligent Authentication System (AIAS) ”, International Journal for Research in Engineering Application & Management (IJREAM) Vol-01, Issue 01, APR 2015.
- [8] Sajjad Ur Rahman, Zeenat froze, Mohammed Tareq, “ Hand Gesture Recognition Techniques For Human Computer Interaction Using OpenCv”, International Journal of Scientific and Research Publications, Volume 4, Issue 12, December 2014 1 ISSN 2250-3153
- [9] Farnaz Towhidi, Maslin Masrom, “ A Survey on Recognition-Based Graphical User Authentication Algorithms”, International Journal of Computer Science and Information Security, Vol. 6, No. 2, 2009.
- [10] Geeta M. Rane, “Graphical Password Authentication: Methods and Schemes”, International Journal of Trend in Research and Development, Volume 2(5), Sep - Oct 2015 . ISSN 2394-9333
- [11] Kamal Nasrollahi and Thomas B. Moeslund, “ Haar-like features for robust real-time face recognition”, Image Processing (ICIP), 2013 20th IEEE International Conference, Melbourne, VIC, 3073 - 3077 INSPEC Accession Number: 14112798, 15-18 Sept. 2013.
- [12] Paul Viola and Michael Jones, “Rapid Object Detection using a Boosted Cascade of Simple Features”, ACCEPTED CONFERENCE ON COMPUTER VISION AND PATTERN RECOGNITION 2001