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ATTENDANCE USING FACE RECOGNITION

A Report for the Evaluation of Project - 2

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BONAFIDE CERTIFICATE

Certified that this project report "**ATTENDANCE USING FACE RECOGNITION**" is the bonafide work of " **KUMAR KSHITIZ (16SCSE101806)**" who carried out the project work under my supervision.

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ABSTRACT

Nowadays, the fashionable attending management system targeting faces detection techniques. because the attendance marking may be a challenging task in real time. it's tough to mark the attendance of the large number of candidates/ students. As daily attending marking is additionally be important and vital role in schools, colleges and industries colleges for checking the performance of candidates. Manual attendance maintaining is hard for giant number of candidates. There is some machine-driven system already developed to scale back the human effort and reduce the errors and disadvantages to minimum. They even have some drawbacks like faux attending, accuracy, security, duplicate data entry and also time consuming. To beat these drawbacks, we'd like an intelligent automatic system which may reduce these drawbacks and human effort to minimum. So, so as develop an intelligent system, we'd like an exclusive identity of the candidates which can't be altered by other candidates. that face is ideal identity, which may be used as perfect identity to develop such intelligent automated system. So, we've bent to implement attendance using Face Recognition System. Many researches are conducted with the automated or smart attendance management system to resolve the problems of manual attendance. Face Detection and Face Recognition is 2 various things. Face Detection means the verification that's it faces or not while Face Recognition is that the verification that the face belongs to which name. The paper has conducted a literature survey on the previous work on research papers by different researcher has done. The system uses native binary pattern face recognition technique because it's fast, straightforward and has larger success rate. Also, it's pro-vision to possess an impact on intensity of sunshine flinch and head produce flinch that produces it effective. This wise system could even be degree effective due to maintain the degree will-less squat recognition system is planned supported appearance-based choices that consider the shortened squatter image instead of native countenance. the rest step in squatter recognition system is squatter detection Viola-Jones squatter detection methodology that capable of method photos terribly whereas achieving higher detection rates is employed.

INTRODUCTION

Facial recognition or face recognition because it is usually mentioned as, analyses characteristics of an individual's face image input through a camera. It measures overall facial structure i.e. distances between eyes, mouth, nose and jaw edges. These measurements are retained during a database and used as a comparison when a user stands before the camera. one among the strongest positive aspects of face recognition is that it's non-intrusive. Verification or identification are often accomplished from two feet away or more, without requiring the user to attend for long periods of your time or do anything quite check out the camera. this is often the foremost of the foremost important factor of this model; it can do that less time as was common time and with more accuracy. Traditionally student's attendance is taken manually by using attendance sheet, given by the school member in school. the present attendance marking methods are monotonous & time consuming. Manually recorded attendance are often easily manipulated. Moreover, it's very difficult to verify one by one student during a large classroom environment with distributed branches whether the authenticated students are literally responding or not. Hence the project is developed to tackle of these issues. The proposed system consists of a high-resolution camera to watch the classroom or office room. it's embedded on a micro-controller-based motor system which enables it to rotate in left & right directions. the info or images obtained by the camera are sent to a computer programmed system for further analysis. The obtained images are then compared with a group of reference images of every of the workers or students & mark the corresponding attendance. The system is also designed for continuous monitoring of the classroom by an operator if needed. The camera module is often a wireless or wired system.

Overall description

There are two main elements as follows:

A. Face Detection: face detection is that the first and essential step for face recognition, and it is used to detect faces in images. it's a part of the thing detection and may use in many Ares like security, bio-metrics, enforcement, personal safety and entertainment etc. Face detection is taken under consideration a specific case of object-class detection. In object-class detection, the task is to hunt out the locations and sizes of all objects during a very image that belong to a given class. . Face detection is taken under consideration a specific case of object-class detection. In object-class detection, the task is to hunt out the locations and sizes of all objects during a very image that belong to a given class. Face-detection algorithms specialize in the detection of frontal human faces. It's analogous to image detection throughout that the image of someone is matched bit by bit. Image matches with the image stores in information. Any facial feature changes inside the info will invalidate the matching methodology.

B. Face Recognition: Face recognition may be a method of recognizing a person's face by using algorithms. It uses bio-metrics to map countenance from photograph of particular human and compares it with the database of known faces to seek out that specific face. Face recognition algorithms verify countenance by extracting landmarks, or from the themes faces. It always utilized in security systems and can be compared to completely different bio-science viz. fingerprint or iris.

Purpose

The purpose of developing attendance management system is to computerize the normal way of taking attendance. Automated Attendance Management System performs the task of attendance marking and analysis with reduced human efforts. The prevalent techniques and methodologies for detecting and recognizing face fail to beat issues such as:

- Scaling,

- Pose,

- Illumination,

- Variations,

- Rotation,

- Occlusions.

The proposed system aims to beat the pitfalls of the prevailing systems and provides features like detection of faces, extraction of the features, detection of extracted features, and analysis of students' attendance. The system integrates techniques like image contrasts, integral images, colour features and cascading classifier for feature detection. The system provides an increased accuracy thanks to use of an outsized number of features (Shape, Colour, LBP, wavelet, Auto-Correlation) of the face. Faces are recognized using Euclidean distance and k-nearest neighbour algorithms. Better accuracy is attained in results because the system takes under consideration the changes that occur within the face over the amount of your time and employs suitable learning algorithms. The system is tested for various use cases. We consider a selected area like classroom attendance for the aim of testing the accuracy of the system. The metric considered is that the percentage of the recognized faces per total number of tested faces of an equivalent person. The system is tested under varying conditions i.e. various facial expressions, presence of partial faces (in densely populated auditoriums) and presence or absence of facial hair and spectacles. An increased accuracy (equivalent to 100%) is obtained in maximum of the cases considered.

Motivation and Scope

The current recognition system has been developed for frontal views of face images. A neural specification (may be alongside a feature based approach) are often implemented during which the orientation of the face is first determined, then the foremost suitable recognition method is chosen , Also the present recognition system acquires face images only from face files located on magnetic mediums. multiple Camera and scanner support should be implemented for greater flexibility for better results.

- Currently, this system has been reached the accuracy level almost up to 80% for partial and dense images. It can further be improved to get higher accuracy levels.

- Further, 2 or more IP cameras can be equipped and each image can be processed separately. The results of those are often merged to get better results and accuracy in denser auditoriums and classrooms.

The general experimental system guarantees better and faster recognition. Having examined techniques to deal with expression variation, in future it's going to be investigated in additional depth about face classification problem.

Existing System:

Traditionally student's attendance is taken manually by using attendance sheet, given by the school member in school . The Current attendance marking methods are time consuming. Manually recorded attendance can be easily manipulated. Moreover, it's very difficult to verify one by one student during a large classroom environment with distributed branches whether the authenticated students are responding or not. Hence the project is developed to tackle all these issues.

MODULES

- ADMIN APP: The admin needs to register first with the app by entering all the details. Admin can get login by entering valid username and password. They can add Student's attendance accordingly. And, can record the student's time of entry and time of exit.

- USER APP: The user can get login through valid username and password. Students can check their attendance, time of entry and time of exit accordingly of every lecture. As this proposed system is non-intrusive, so the details of every student remain safe and unchanged. Students can also change password if they feel uncomfortable.

LITERATURE SURVEY

Sr. No.	Author	Algorithm	Problem	Summary
1.	Vishar Shehu	PCA	The recognition rate is 56%.	Using HAAR, classifier and computer vision implemented face recognition
2.	Kasar, M. Bhattacharya	Neural network	Detection process id slow and computation is complex.	Accurate, only if larger size of image was trained.
3.	Suman Kumar , Kumar Rahul	Fisher Face	Bigger database is required because images of different expression of the individual have to be trained in same class.	Images of individual with different illumination, facial recognition if more samples are trained.
4.	Sayen Navaz	PCA	Low accuracy with the big size of images to train with PCA	Using PCA to train and reduce dimensionality and ANN to classify input data and find the pattern.

3.1. Literature Survey

ALGORITHM

1. Eigen face technique: This process is used for completing reduction in the dimensionality. This algorithm is frequently used for the recognition of faces. This detection and face recognition uses the principal component study. Eigen face acts as a core component for dividing of face into separate feature vector. Covariance matrix used for finding the data from the article vector. The faces are differentiated by using the highest Eigen values. The image having a face is then measured as grouping of Eigen expressions. The difference among faces is then measured using that of the Eigen vectors. Face space is defined as the top M Eigen faces that match with the outline of M dimensional space. Association and training data has a much relation between them. By author to symbolize photograph of the face. By recreating a image by using collecting small loads for every image and progress image as good face snapshot. Eigen picture helps to obtain the weights of each face. The Eigen face method is widely used because of its implementation and algorithm that makes the face recognition easy. This is good for storage and time of handling is also good. Eigen face has correctness and it depends on many things. The image can be minimized to the dimension size in short period of time can be done by PCA. This Eigen face is not suitable for location and lightening conditions.

2. Neural networks patterns: The main goal of neural networks is that it has the capability to perform complex face patterns. The neural networks are employed in many layers, different number nodes, and also different learning for achieving good performance. The applications if these methods are driving of robot autonomously, recognition of objects, and problem recognition. Principal component analysis is more efficient than the feature abstraction. Neural network is non-linear so it is used for face recognition. If there are 40 individuals and are having 400 images then the correctness of the face identification is attained by 96.2% by the authors. The time taken for arrangement is 0.5 second and time taken for training is 4 hours and sends slight invariance to rotation translation and scale.in supervised pattern matching

because of its ability and plainness we choose MLP algorithm that is multi-layer perceptron. For pattern classification neural networks are used. For extracting of feature vectors and also for finding specific feature points Gabor wavelet method is used.

3. Elastic bunch graphing approach: This conventional of the features with the help data structure method entirely different to that of the both fisher face and then the Eigen method. This face recognition method uses the elastic bunch matching method that deals with that of the identifying the faces considering at hat is called as the bunch graph[13] and also it same for query image and also for the landmarks that are expected and they are followed by using that of the bunch graph. By taking the instances of Gabor filters which has other name called the face graph the features are taken out. The fraction that is used for control sebum is done on the source of similarities between the query image and the face images of the database. EBGM that is elastic of bunch graph matching makes uses structure material of face method and then reproduces that of images of the same subject such as scale, rotate, and then deform in the plane of the image. During the matching process one model is taken and then deform, rotate, scale and translated.. To yield the local features the images Gabor wavelet conversion is used. These are inspired difficulty kernels that are controlled by the Gaussian enclose function that contains the set convolution constants for different kernel's advises occurrences. Elastic graph is matching the simple process for new graphs, and also associate to graphs with the images.

4. Geographical feature matching: The working out fixed of image expressions as of image of a surface depends on geometrical matching. Automatic facial acknowledgement and other works that are important are done by that of the geometrical of feature matching since 1973.the chief facial features such as mouth, nose eyebrows and eyes and outline of a face is defined by the vector that is used for representing of the location and size of the facial .the recognition was done by using Bayes classifier. The system attained a recognition rate of 75% on the database of a 20 people by making use of two pictures those are model image and the other is the test image. The geometry

expressions are taken from picture mouth position is taken out a set for by authors. These people has taken 35 features and formed a 35 dimensional vector. By doings so they achieved a 90% acknowledgment percentage databank certain persons. The author authors of offered assortment detachment process that accomplished acknowledgment level of 95% interrogation data store 687 personalities.30 manually signified distances was signified by every face. [17-18] the other authors reprocessed the methods to find the features themes every image that leads to decreased packing inevitability data store. Accurately there will be 35 to 45 feature points for every face that is produced.. The main drawback of this method is that the automated feature position algorithms do not offer a required substantial computational time and a high degree of correctness.

5. Fisher face approach: Fisher faces the most widely and effectively used methods for recognition of faces. This method depends on the method of appearance. Linear or fisher discriminant analysis for face recognition established in the year 1930 by Fisher. It is one of successful methods that are used for face recognition procedure Belhumer etal. This authenticated the method called LDA. This LDA method used for the finding of set of centre images that maximizes the ratio of the outside the class scatter and within the class scatter. This method has some drawbacks that the session the distribute medium will be perpetually alone ever since pixels of number image more than that pictures that are maximized for detection error rate so that if any alteration is posed and brightness if there changes that is inside the pictures that are same. Many algorithms have been proposed to overcome the above drawbacks.
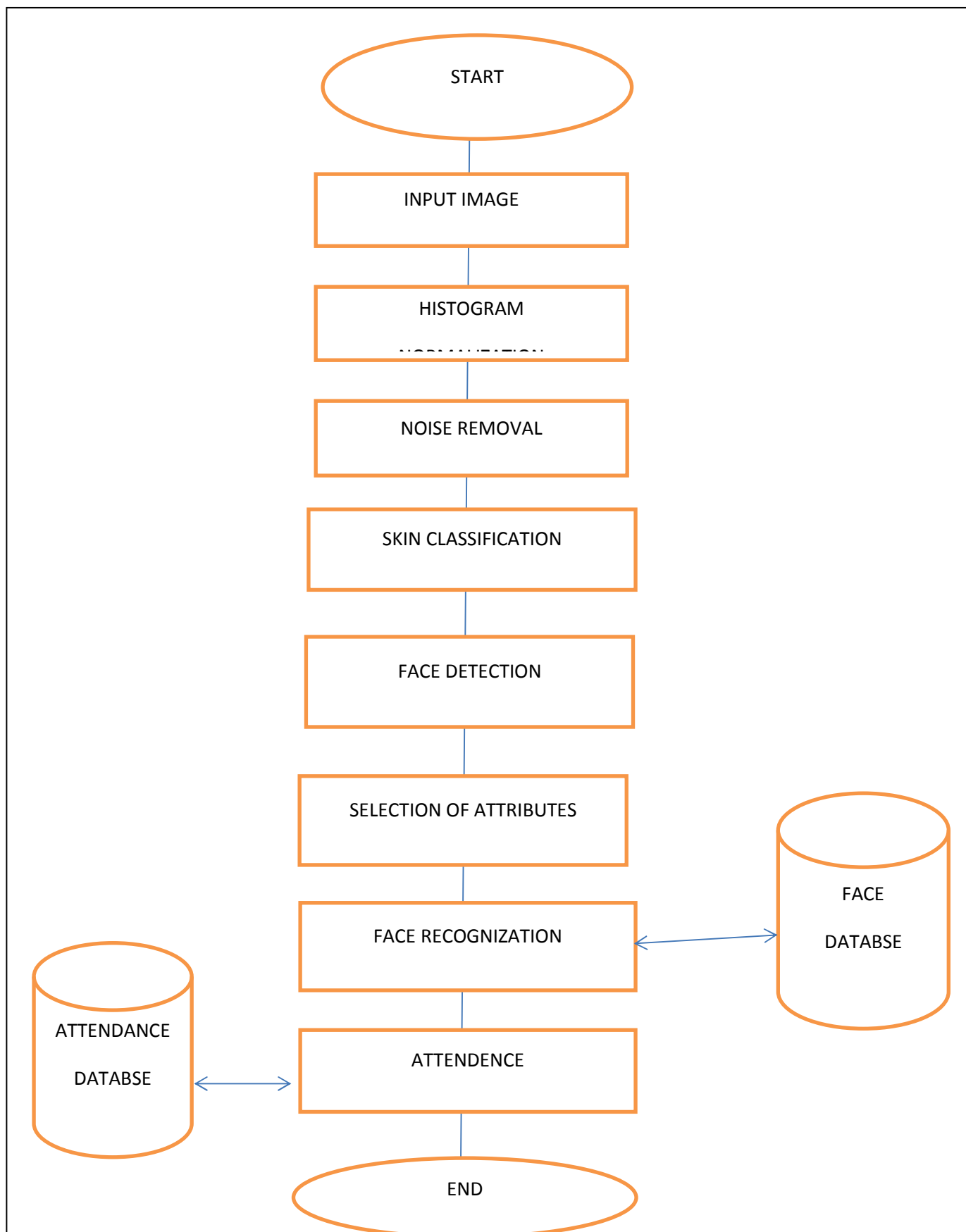
PROPOSED MODEL

System Architecture: In our procedure comprised camera is used for catching the pictures of the lecture hall and then directing pictures to picture enlargement segment. Splitting image increases identification and appreciation of the modules after the image improvement and being present noticeably at time to the recorder system. The experimental setup depicted below. Patterns of face pictures of a single student are stored in the database at the time of registration. So, the faces are then recognized from that of the image then the procedure matches with the database. The attendance marked on server if any of the face identified from the database and it are often accessed by everyone for varied reasons. This also habits the procedure that can be used for attendance. The system is also attached with the time table unit that robotically gets class at what time and what subject. The system robotically becomes presence deprived of opinions the learners and the teachers. So, teachers after coming to the class when taking attendance, they just press the attendance button to start the attendance procedure. This method is highly protected method here no one can give the attendance of the other and saves a lot of time.

ARCHITECTURE:
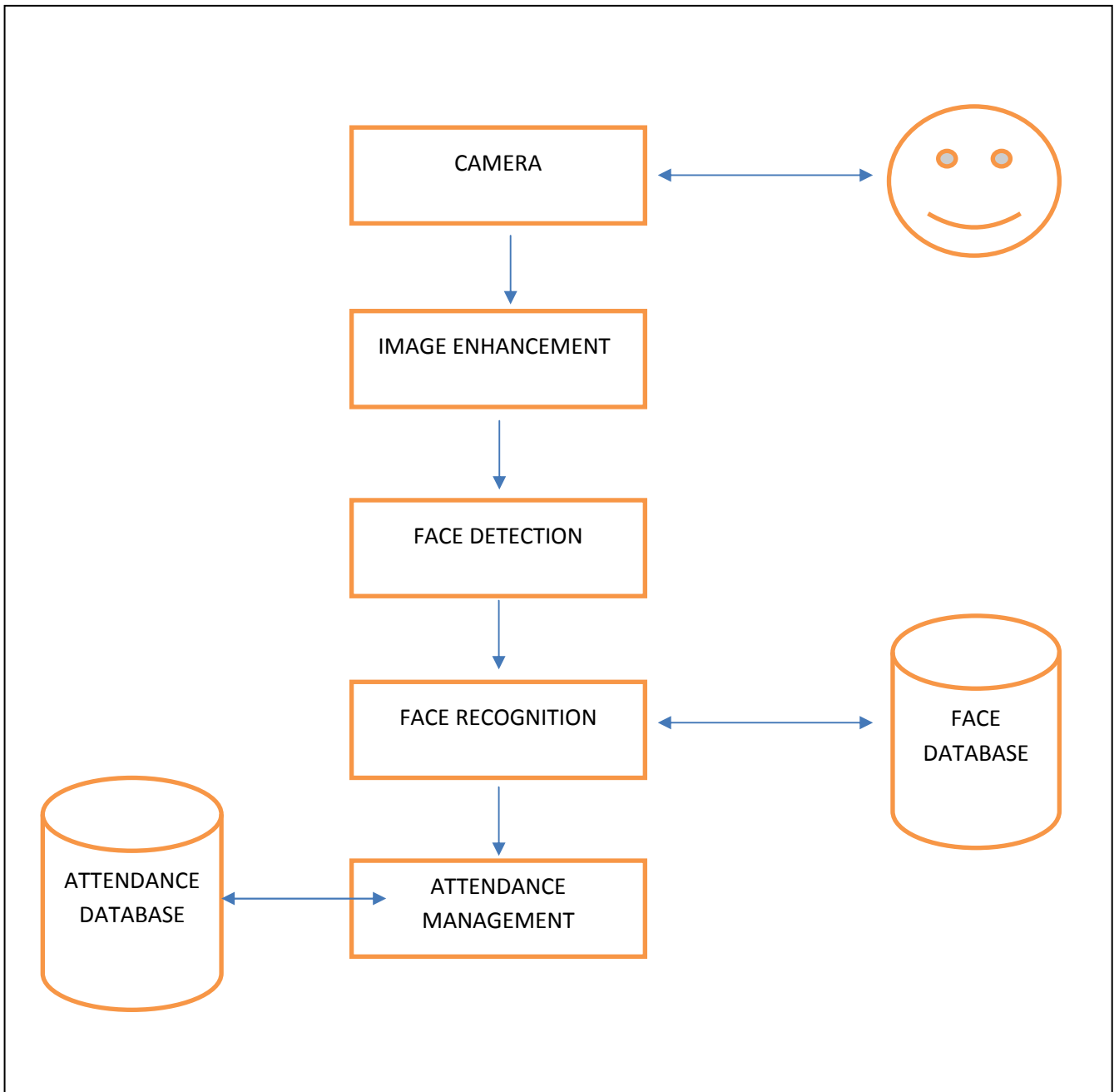
4.1.EXPERIMENTAL SETUP

ALGORITHM FLOW CHART

Software system procedure: The algorithm that has been taken for is subdivided from system process. Subsequent stages are comprised from the system algorithm.

1) Image Acquisition

2) Histogram Normalization

3) Noise filtering

4) Classification of skin

5) Face tracking

6) Face identification

7) And monitoring attendance

IMPLEMENTATION

Three basic steps are used for implementing the proposed system.
1. Detect and extract the face image and save the details in an xml file.
2. Calculate eigenvalue and eigenvector for that image.
3. Recognize the face and match it according to eigenvalues and eigenvectors stored in xml file.
4. Store the name of the face displayed in Microsoft Access Database.

Face detection and extraction:
The function openCAM_CB() is called for starting the camera to capture the image. Next ExtractFace() is used to extract the frontal face in a vedio frame. The ExtractFace() uses OpenCV haarcascade method to load the face.xml (haarcascade file) as the classifier. The output of the classifier is in binary form and outputs "1" if face is found and "0" otherwise. After the face is detected it is clipped into a grayscale image of 50x50 pixels which is done by "Add Face" button in the face recognition module.

Learning and Training Face Images:
The function Learn() performs the PCA algorithm on training datasets. The Learn() implementation involves four steps.
1. Load the training data.
2. Find a subspace by doing PCA on training data.
3. Project the training faces onto the PCA subspace.
4. Save the training information such as

a. Eigenvalues
b. Eigenvectors
c. Average training face image
d. Projected face image
e. Person ID numbers

CONCLUSION AND FUTURE WORKS

CONCLUSION:

With the use of this application, we can fairly conclude that:
It will help the authorities of the educational institution maintain the security and integrity of its vital data like attendance Records. Examination Marks, etc. As the data shall immediately be transmitted over cloud wirelessly the authorities need not have to worry about misplacement or misuse of attendance registers or examination registers etc. This Attendance Management system is using the login mechanism by using the username and password. At the time of login the user needs to Punch In and at the time of logout the users need to Punch Out.

FUTURE WORKS:

This application holds a huge scope of future enhancements and improvements. Some significant points are listed below:

We can make the attendance module more dynamic where in a feature of skipping the day could be made available to the users. Skipping of an attendance day shall be relevant in circumstances where there is a holiday in the college, the teacher is on unplanned leave, etc.

The feature of customizing students details within a batch, addition, deletion and modification of a batch, customization of subjects are big future enhancement possibility in our application. This shall male our application more dynamic, giving it a realistic look and feel.

Another way that innovators are looking to implement facial recognition is within subways and other transportation outlets. They are looking to leverage this technology to use faces as credit cards to pay for your transportation fee. Instead of having to go to a booth to buy a ticket for a fare, the face recognition would take your face, run it through a system, and charge the account that you've previously created. This could potentially streamline the process and optimize the flow of traffic drastically.

REFERENCES

[1] TolbaA S, El-BazA H and El-HarbyA 2006 Face Recognition: A Literature Review International Journal of Signal Processing

[2] SushmaJaiswal, Sarita Singh Bhadauria and Rakesh Singh Jadon 2011 comparison between face recognition algorithm Eigen faces fisher faces and elastic bunch graph matching Journal of Global Research in Comaputer Science 2

[3] Ming-Hsuan Yang, David JKriegman and NarendraAhuja2002 Detecting Faces in   Images: A Survey IEEE transaction on pattern analysis and machine intelligence

[4] V. Shehu and A. Dika, "Using real time computer vision algorithms in automatic attendance management systems," Inf. Technol. Interfaces (ITI),

[5] Kasar, M., Bhattacharyya, D. and Kim, T. (2016). Face Recognition Using Neural Network: A Review. International Journal of Security and Its Applications.

[6] C. Kotropoulos and I. Pitas, Rule-based face detection in frontal views, Proc. Intl Conf. Acoustics, Speech and Signal Processing, vol. 4, pp. 2537-2540, 1997.