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Online Attendance using PCA Based Image Face Recognition

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Abstract: The manual taking of attendance leads to more man power, raw material finally time taking and control and security gets disturbed. Hence Biometric devices may recover this. Still we have an efficient and security constrains. This paper presents about the new way of taking the attendance of people in distinguished organizations or institutions with the concept of face reorganization using PCA (Principle Component Analysis) with Embedded Systems. For this application we are using the embed systems concepts by considering the different circuit boards and other peripherals and other software components. The techniques we used are illumination, Normalization and this may results an efficient system while having the head count in an organization or in an institution. This idea may give good results.
Key Words: PCA, Illumination, Pose, Normalization, Learning Process, Face detection, Face reorganization.

I.   INTRODUCTION

Now-a-days taking attendance is an basic problem to maintain the head count of an institution or an organization in a particular session or in a particular day so for this I want to introduce the new way of taking the attendance i.e., calculation of the head count of an organization or an institution for this I want to want to combine the technologies like face detection, face recognition, in videos and images by the help of the ancient and the latest algorithms. Principal component analysis (PCA) is a mathematical procedure that uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal components.

II.   RELATED WORK

PCA means principal Component Analysis Algorithm The purpose of PCA is to reduce the large dimensionality of the data space (observed variables) to the smaller intrinsic dimensionality of feature space (independent variables), which are needed to describe the data economically. This is the case when there is a strong correlation between observed variables. The jobs which PCA can do are prediction, redundancy removal, feature extraction, data compression, etc. Because PCA is a known powerful technique which can do something in the linear domain, applications having linear models are suitable such as signal processing, image processing, system and control theory, communications, etc. The main idea of using PCA for face recognition is to express the large 1-D vector of pixels constructed from 2-D face image into the compact principal components of the feature space. This is called eigenspace projection. Eigen space is calculated by identifying the eigenvectors of the covariance matrix derived from a set of fingerprint images (vectors).

PCA is a statistical method under the broad title of "Factor Analysis". PCA is used to reduce the large dimensionality of the data space to the smaller intrinsic dimensionality of feature space. The main idea of using PCA for face recognition is to express the large 1-D vector of pixels constructed from, 2-D facial image into the compact principal components of the feature space. This can be called "Eigen space projection". Eigen space is calculated by identifying the Eigen vectors of the covariance matrix derived from a set of facial images(vectors).Each face image is represented as a weighted sum of the principle components, which are stored in a one dimensional array. Each component represents only a certain feature of the face, which may or may not be present in the original image. A probe image is compared against a gallery image by measuring the distance between their respective feature vectors. The block diagram of PCA algorithm and flow of implementation is follows Figure 1 & 2

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III.   CHALLENGES

There are two basic challenges in a detecting and recognizing faces:

A.   Illumination problem

B.   Pose problem

The **illumination problem** is illustrated in Fig3. Where the same face appears differently due to the change in lighting. More specially, the changes induced by illumination could be larger than the differences between individuals, causing systems based on comparing images to misclassify the identity of the input image.
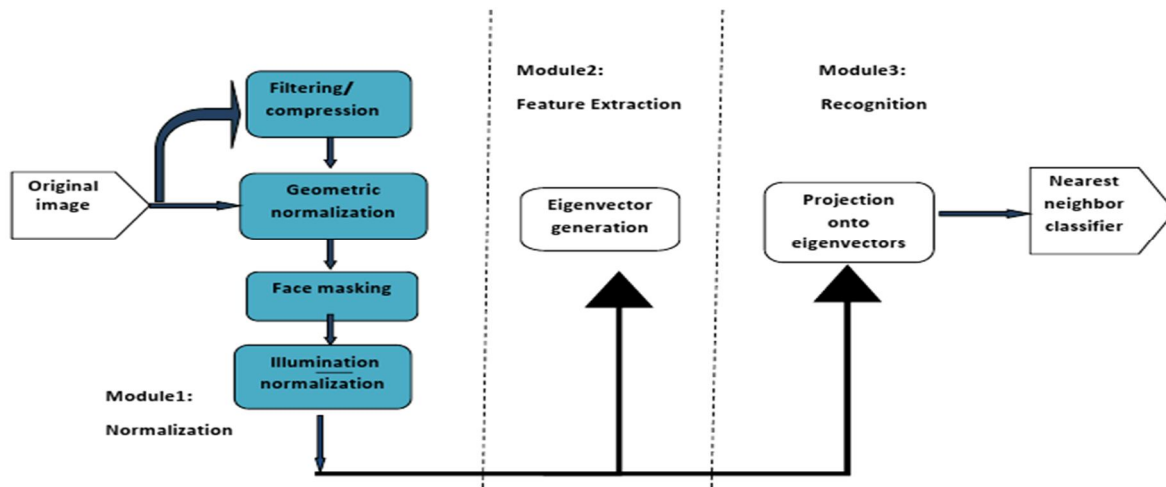

Fig1: SRC **:** "Implementing pca based image face recognition using openCV & beagle board
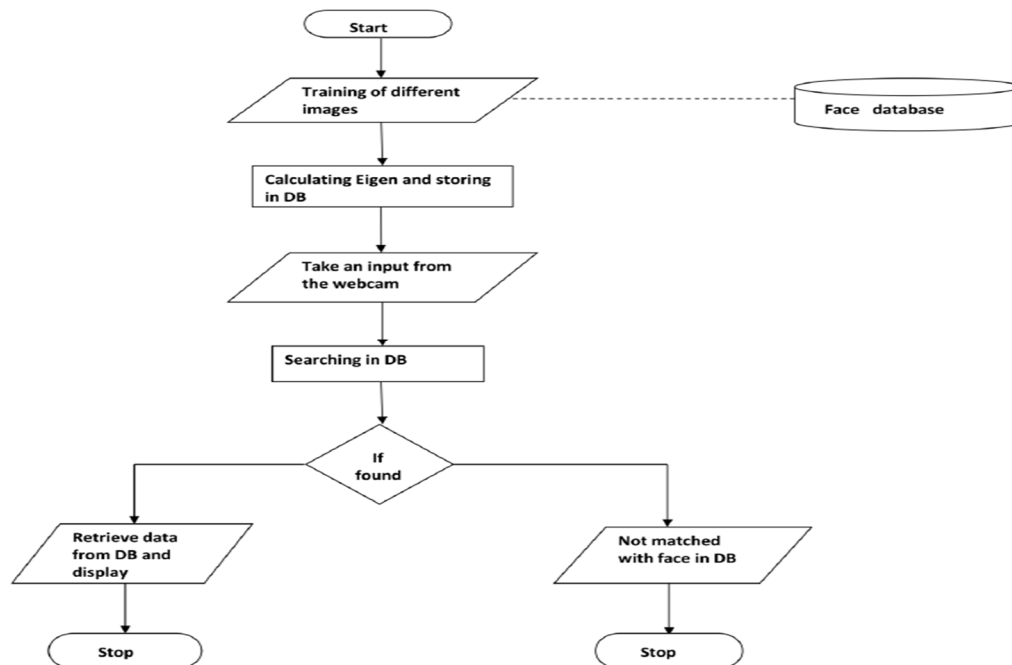

Fig2: flow of implementation for PCA algorithm

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Fig 3: SRC **:** "Implementing pca based image face recognition

The **pose problem** is illustrated in Fig4. Where the same face appears differently due to changes in viewing condition

Fig 3: SRC: **"**Implementing pca based image face recognition Implemented PCA algorithm outputs

These are the output screens those are obtained for project **"**Implementing pca based image face recognition using open CV & beagle board".

Fig 4: output screen

Fig5 : output screen

IV.   PROPOSED WORK

Till now we had seen the part of the our actual application that was been taking about i.e., we will use this application face detection to get the presence of the person in the institution or an organization for a particular time that was to be as attended. We will adopt an efficient face recognition system that which will detect and recognize the people from this we will find the people those who are attend the session and who are not i.e., we will take the details of the people those who attend the session as in the form of a document, excel, etc formats and we can maintain them as the in the form of the databases.

V.   IMPLEMENTATION OF ALGORITHM

S1: At we have to establish the setup that was required to implement.

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S2: learn the system with the values that are required to perform the application.

S3: Perform the face recognition system application that for which the attended or not was required.

S4: the people who recognized by the system should be stored into the database as attend.

S5: We should arrange the data that was gathered as recognized should maintain in appropriate manner i.e., in a formatted document, sheet, etc.

S6: If person was not recognized by the system it says that the learning process was not done properly for that data so once the learning process should be should be done for that data.

S7: we can perform the application for the number of times required as per the sessions presented.

S8: Finally we should maintain the data when the application was performed without a mismatch.

VI.   FLOW OF IMPLEMENTATION

The following diagram will explain the flow of execution of the information retrieval using the DEBS
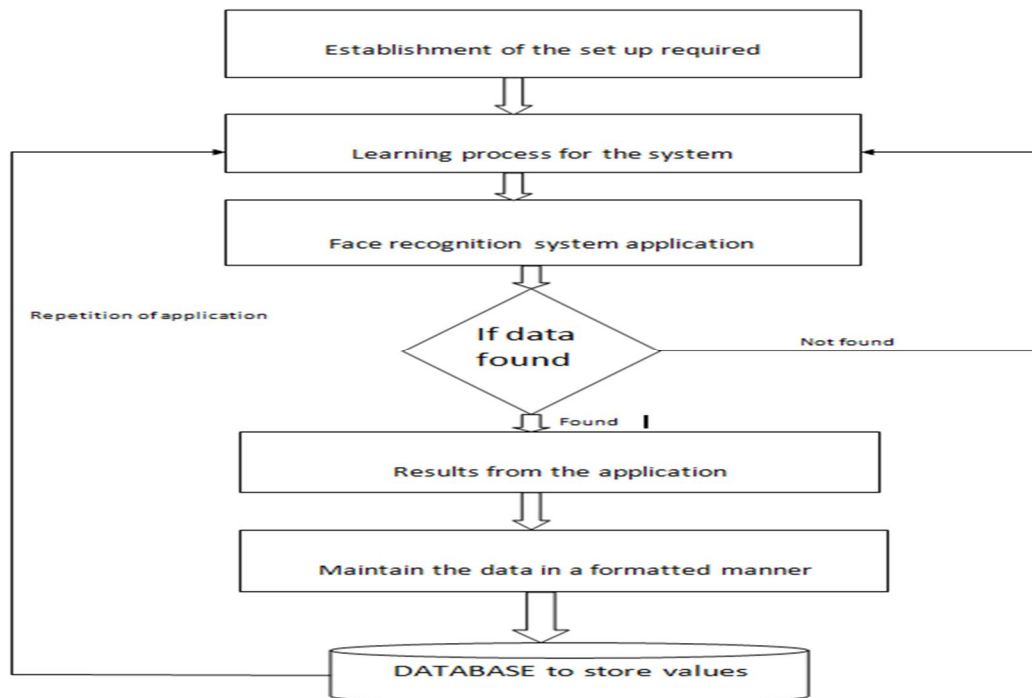

Fig 3: flow of Implementation to online attendance

VII.   SCOPE

We can apply this algorithmic concept to any kind of organization for the implementing of the calculation of the people that are attend and the people those who are in a leave. We can also use this for the security systems for the accurate security. We can also use for finding the difference of different kind living beings and also for scientific application.

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A.   Merits
1) Less complex
2) Applicable to any kind of institutions and organizations
3) High efficiency
4) Robust

B.   Demerits
1) Designed cost will have variation
2) Illumination an pose problem will vary as per the equipment
3) High resolution cameras are required

VIII.   CONCLUSION

It is observed that giving efficient results using PCA Based Image Face Recognition techniques. At present we are working on the small databases to detect and recognize the people of an institution from the class room of students i.e., to mark attendance form them in different classes for a day. We also experienced in different aspects which are Designed cost will have variation, Illumination an pose problem will vary as per the equipment finally need High resolution cameras. We also want to extend it to implement the algorithm on the large and huge amount of database to provide the good and efficient attendance monitoring system for the organizations that are having more number of employees.

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AUTHOR DETAILS

Prof. P. Parthasarathy received B.E in Electrical Engineering from Osmania University in the year 1982. He did his post-graduation from College of Engineering, Osmania University with specialization in Industrial Drives and Controls. He is having 14.5 years of experience in industry, 2 years of experience as consultant in machines manufacturing and 16 years of experience in teaching. He started a manufacturing industry and supplied the customized machines to ARM, ECIL, ARCI, Gujarath Telephone cables etc. He also guided many Projects in UG and P.G level. He worked in various reputed engineering institutions. He is also pursuing PhD. His research includes Embedded Systems, Power Electronics and Digital Signal Processing. He organized and published many Research Papers in various National & International Conferences and Journals. He joined in Guru Nanak Engineering College as a Professor and Head of the EEE department in the year 2003. Later, he has been elevated as Dean (SW), Vice-Principal and presently working as Associate director in School of Engineering & Technology, Guru Nanak Institutions Technical Campus, Hyderabad.

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