Real Time System Using Face Recognition

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Abstract - *Real-time human face detection and recognition from video sequences in surveillance applications is a challenging task due to the variances in background, facial expression and illumination. The face detection approach is based on modest algorithm and can achieve fast, accurate face detection that is robust to changes in illumination and background. The detection stage provides good results maintaining a low computational cost. The recognition stage is based on an improved independent components Analysis approach which has been modified to cope with the video surveillance application. In the recognition stage, the Hausdorff distance is used as a similarity measure between a general face model and possible instances of the object within the image. After the integration of the two stages, several improvements are proposed which increase the face detection and recognition rate and the overall performance of the system. The experimental results demonstrate the significant performance improvement using the proposed approach over others. It can be seen that the proposed method is very efficient and has significant value in application.*

*Key Words***: Face Recognition, Face Detection, Database, Eigen Faces, Feature Extraction**

1. INTRODUCTION

This software project uses some basic .net API's to interact and get the output of local camera. It may be a webcam or any other attached camera. We use these API's to get the camera video input to our system. We then use the video data to manipulate and recognize faces in real time. Our system works as follows:

- Admin or local authorities will enroll the user's face into the attendance system.
- Face can be enrolled using system camera.
- Our system works and manipulates live video data to identify faces in it.
- Next step is to store these faces based on a matrix form.
- Once faces are recognized and stored we can now detect them.
- Whenever the face reappears it is recognized by name in a real time video.
- The system is also capable of detecting multiple faces in a real time video at the same time.

Humans have been using physical characteristics such as face, voice, etc. to recognize each other for thousands of years. With new advances in technology, biometrics has become an emerging technology for recognizing individuals using their biological traits. Now, biometrics is becoming part of day to day life, where in a person is recognized by his/her personal biological characteristics. Our goal is to develop an inexpensive security surveillance system, which will be able to detect and identify facial and body characteristics in adverse weather conditions. There are many factors which influence this type of methods i.e. lighting condition background noise, fog and rain. A particular attention is given to face recognition. Face recognition refers to an automated or semi-automated process of matching facial images. Many techniques are available to apply face recognition one of them is Principle Component Analysis (PCA). PCA is a way of identifying patterns in data and expressing the data in such a way to highlight their similarities and differences.

1.1 Proposed Method

1. Image input of User using camera
   - Image input of class will be taken from camera. This image will consist of all the students present in class for that particular lecture.
2. Face Detection
   - Using algorithm, the face of the user is detected for identification.
3. Face Recognition
   - Here, the detected face is recognized for further comparison with the users for matching.
4. Feature Comparison
   - In this phase the calculated features are compared with stored features.
5. Attendance Database
   - particular student is registered in the database. This database is stored in the backend of the system and the results drawn are all entered in the same.

6. Monthly Report
   - At the end of each month monthly report will be generated. The report can be generated as per the institute norms.

In this way, the proposed system does the work of attendance marking using face detection and face recognition respectively and generates the final report as per the required institute norms.

The Facial recognition system mainly consists of two phases: Enrolment phase and the Authentication / verification phase. The organization of the system is shown below diagrammatically through the figures.

Enrolment: Capture and processing of user biometric data for use by system in subsequent authentication operations.

During the first phase, user enrolment, features are extracted from the input face given by the user by a process called Feature extraction, and are modelled as a template. The modelling is a process of enrolling user to the verification system by constructing a model of his/her face, based on the features extracted from his/her facial sample. After the features are extracted and all the signal processing is done the system checks for the quality of the templates that are extracted from face, if sufficient quality of features are extracted then the templates are stored in the database else the system needs to acquire new facial image. The collection of all such enrolled models is called facial database.

Facial recognition is a computer application composes for complex algorithms that use mathematical and metrical techniques, these get the image in raster mode(digital format) and then process and compare pixel by pixel using different methods for obtain a faster and reliable results, obviously these results depend of the machine use to process this due to the huge computational power that these algorithms, functions and routines requires, these are the most popular techniques used for solve this modern problem.

1.2 Block Diagram
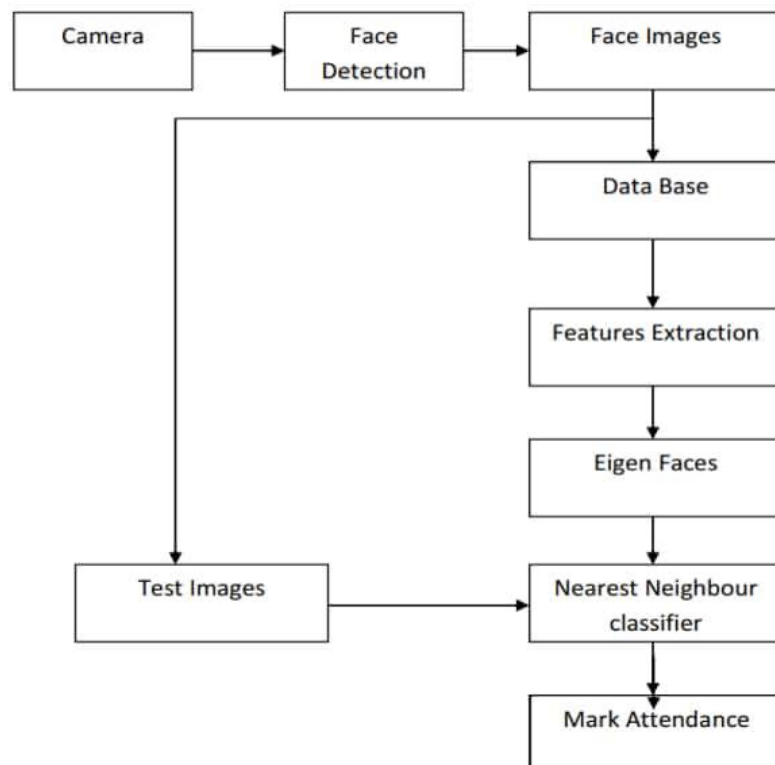
2. PROJECT IMPLEMENTATION

The Project is loaded in Visual Studio 2010. We used Visual Studio for Design and coding of project. Created and maintained all databases into SQL Server 2008, in that we create tables, write query for store data or record of project.

❖ **Hardware Requirement:-**

  ➢ i3 Processor Based Computer

  ➢ 2 GB-RAM

  ➢ 5 GB Hard Disk

  ➢ Camera

❖ **Software Requirement:**

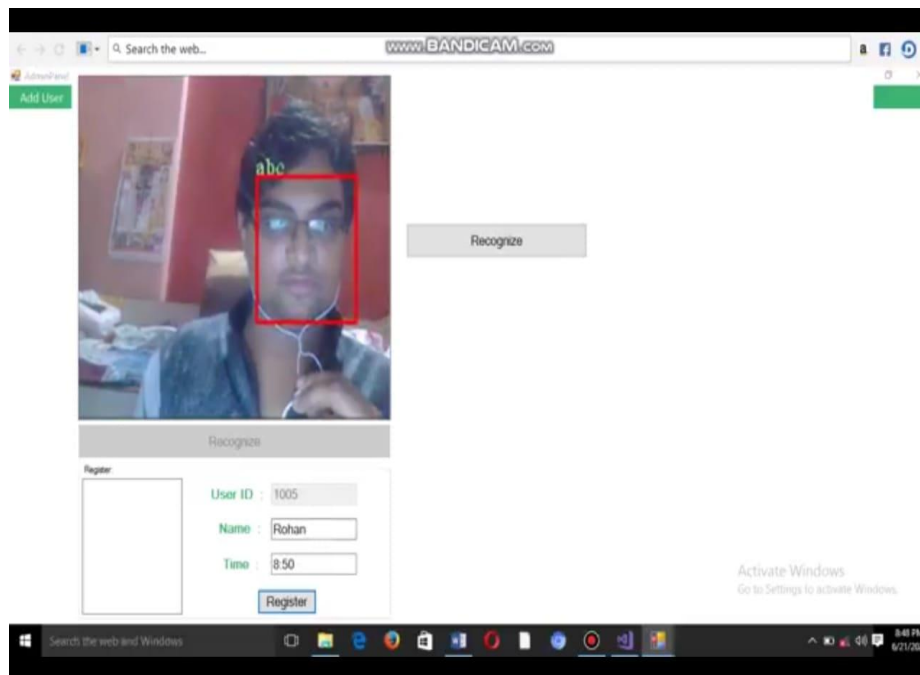 ➢ Windows 7 or higher

  ➢ Visual studio 2010.

  ➢ SQL Server 2008.
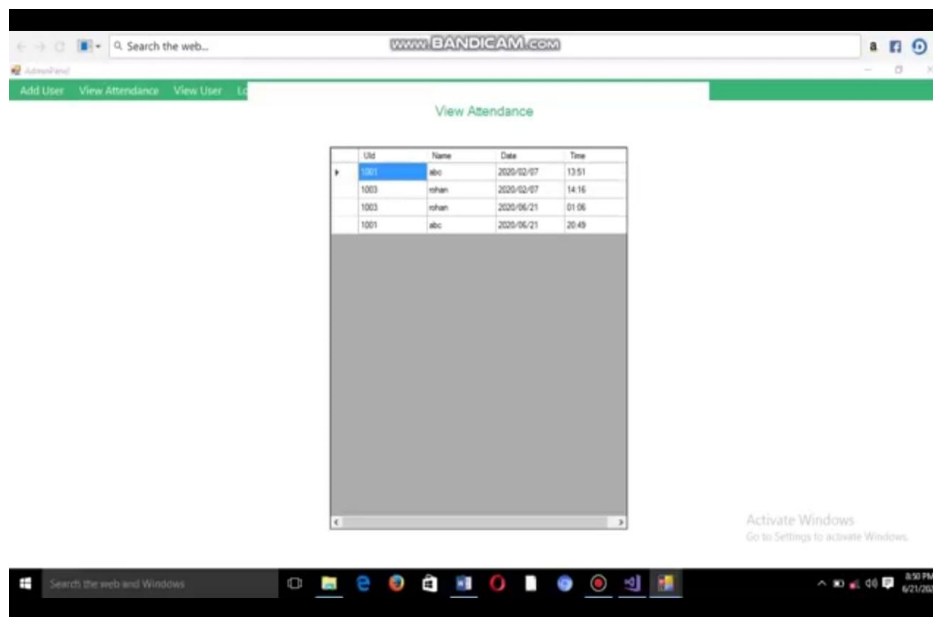

Fig -1: Face Recognition

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Fig -2: Face Attendance

3. ADVANTAGES

1) Load Balancing:

   Since the system will be available only the admin logs in the amount of load on server will be limited to time period of admin access.

2) Easy Accessibility:

   Records can be easily accessed and store and other information respectively.

3) User Friendly:

   The Website will be giving a very user friendly approach for all user

4) Efficient and reliable:

   Maintaining the all secured and database on the server which will be accessible according the user requirement without any maintenance cost will be a very efficient as compared to storing all the customer data on the spreadsheet or in physically in the record books.

5) Easy maintenance:

   Face Attendance system is design as easy way. So maintenance is also easy.

4. CONCLUSIONS

We have proposed simple and efficient techniques for processing and recognizing face objects. The characteristics of these techniques are very suitable for many applications. We first identified two key issues in the face recognition literature: the illumination and pose problems. We then examined existing methods of handling these two problems extensively.

To handle pose and illumination problems in a uniform framework, we proposed a reflectance model with varying albedo for 3D face and introduced a new concept, the self-ratio image. Finally, we proposed using a 3D model to synthesize the prototype image from a given image under any lighting and viewing conditions. This technique alone can be used to synthesize new images, i.e. enhancing appearance adding this technique into existing subspace LDA system, we basically propose an enhanced system. In the future, we plan to improve our method by deforming the 3D model to fit individuals better or using multiple 3D face models.

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