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Automatic Attendance System Using Face Detection

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Abstract — The conventional method of taking attendance is done manually by the teacher or the administrator which requires considerable amount of time and efforts also involving errors and proxy attendance. As the number of students are increasing day by day, it is a challenging task for universities or colleges to monitor and maintain the record of the students. Automated systems involving use of biometrics like fingerprint and iris recognition are well developed in the recent years however, it is intrusive and cost required for deployment on large scale gets increased substantially. To overcome these issues, biometric feature like facial recognition can be used which involves the phases such as image acquisition, face detection, feature extraction, face classification, face recognition and eventually marking the attendance. Given a collection of images, where each image contains several faces and is associated with a few names in the corresponding caption, the goal of face naming is to infer the correct name for each face.This system automatically detects the student in the class room and marks the attendance by recognizing their face. This system used two sensor they sense students entry and exit and activate cameras capturing real time human faces in the class. The detected faces are matched against the reference faces in the dataset and marked the attendance for the attendees. Finally the Absentee lists are said aloud through voice conversion system for Confirmation.

I. INTRODUCTION

Nowadays, biometrics traits has become very popular in playing a vital role in security related aspects from lower to higher grade such as, attendance system, physical and digital data entry access, login control, passport, national identity card, border line, etc. Biometric is a physiological or behavioral feature of an individual used to identity or verify his/her identity in an efficient manner. With regard to this existence and development of this research field, every manual system is taking an evolution converting into an automated digital world to reduce the manual errors and obtaining the work effortlessly. In such case, in reducing manual entry and hard resources, with less time consumption, attendance system is transforming into an biometric application for an efficient task of teacher to mark attendance for the students of class using fingerprint or face recognition methods. Various research works had been attempted in developing an automated attendance system using biometric traits in recent years. Hence, our proposed system aims to mark attendance automatically by means of face recognition and used IR sensor.IR sensor is used to sense students entry and exit that time camera will activate and detect face. The teacher can mark the attendance of the students with just the click of a button. The names of the absentees are called out by voice conversion using speech technology. Hence the teacher can easily mark the attendance of the absentees. IR sensor: An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, The resistances and 14 these output voltages, change in proportion to the magnitude of the IR light received.

II. PROBLEM STATEMENT

Traditional way of taking attendance involves a typical situation of students sitting in a classroom and the teacher calling out the names of the students to mark their attendance. The attendance is usually marked using hard resources - pen and paper. The huge attendance records that maintained are then used for later references.

III. LITERATURE REVIEW

1.Robust real-time face detection
Authors: P. Viola and M. J. Jones,
Description: This paper describes a face detection framework that is capable of processing images extremely rapidly while achieving high detection rates. There are three key contributions. The first is the introduction of a new image representation called the Integral Image which allows the features used by our detector to be computed very quickly. The second is a simple and efficient classifier which is built using the AdaBoost learning algorithm(Freund and Schapire, 1995) to select a small number of critical visual features from a very large set of potential features. The third contribution is a method for combining classifiers in a cascade which allows background regions of the image to be quickly discarded while spending more computation on promising face-like regions. A set of experiments in the domain of face detection is presented. The system yields face detection performance comparable to the best previous systems (Sung and Poggio, 1998; Rowley et al., 1998; Schneiderman and Kanade, 2000; Roth et al., 2000). Implemented on a conventional desktop, face detection proceeds at 15 frames per second.

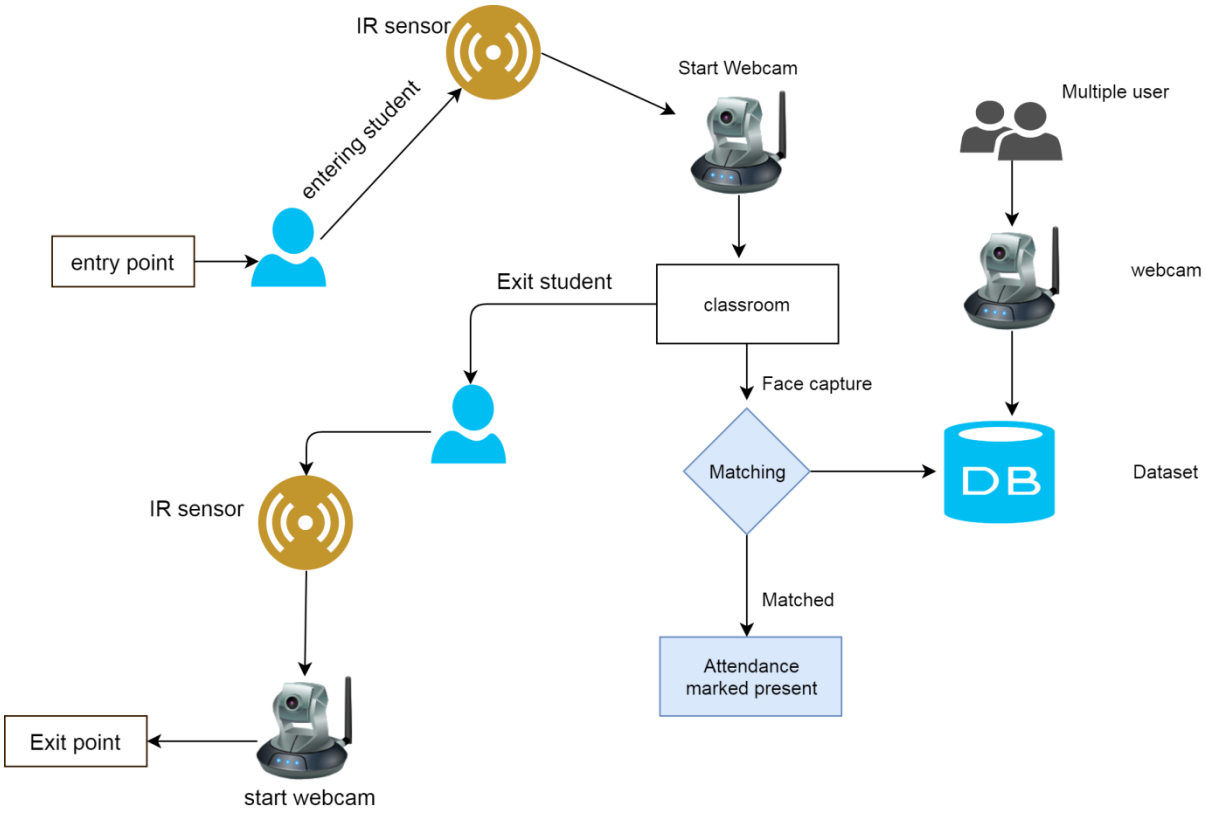
2.A graph based approach for naming faces in news photos.
Author: D. Ozkan and P. Duygulu
Description: A method to associate names and faces for querying people in large news photo collections. On the assumption that a persons face is likely to appear when his/her name is mentioned in the caption, first all the faces associated with the query name are selected. Among these faces, there could be many faces corresponding to the queried person in different conditions, poses and times, but there could also be other faces corresponding to other people in the caption or some non-face images due to the errors in the face detection method used. However, in most cases, the number of corresponding faces of the queried person will be large, and these faces will be more similar to each other than to others. 15 In this study, we propose a graph based method to find the most similar subset among the set of possible faces associated with the query name, where the most similar subset is likely to correspond to the faces of the queried person. When the similarities of faces are represented in a graph structure, the set of most similar faces will be the densest component in the graph. We represent the similarity of faces using SIFT descriptors. The matching interest points on two faces are decided after the application of two constraints, namely the geometrical constraint and the unique match constraint. The average distance of the matching points are used to construct the similarity graph. The most similar set of faces is then found based on a greedy densest component algorithm. The experiments are performed on thousands of news photographs taken in real life conditions and, therefore, having a large variety of poses, illuminations and expressions.

3.Robust subspace segmentation by low-rank representation.
Author: G. Liu, Z. Lin, and Y. Yu
Description: In this paper low-rank representation (LRR)to segment data drawn from a union of multiple linear subspaces. Given a set of data vectors, LRR seeks the lowest-rank representation among all the candidates that represent all vectors as the linear combination of the bases in a dictionary. Unlike the well-known sparse representation (SR),which computes the sparsest representation of each data vector individually, LRR aim standing the lowest-rank representation of a collection of vectors jointly. LRR better captures the global structure of data, giving amore elective tool for robust subspace segmentation from corrupted data. Both the or ethical and experimental results show that LRR is a promising tool for subspace segmentation.

4.Cross-media alignment of names and faces
Author: P. T. Pham, M. Moens, and T. Tuytelaars
Description: This paper experiments on aligning names and faces as found in images and captions of online news websites. Developing accurate technologies for linking names and faces is valuable when retrieving or mining information from Multimedia collections. We perform exhaustive and systematic experiments exploiting the (a)symmetry between the visual and 16 textual modalities. This leads to different schemes for assigning names to the faces, assigning faces to the names, and establishing name-face link pairs. On top of that, we investigate generic approaches to the use of textual and visual structural information to predict the presence of the corresponding entity in the other modality. The proposed methods are completely unsupervised and are inspired by methods for aligning phrases and words in texts of different languages developed for constructing dictionaries for machine translation. The results are competitive with state of the art performance on the Labeled Faces in the Wild dataset in terms of recall values, now reported on the complete dataset, include excellent precision values, and show the value of text and image analysis for identifying the probability of being pictured or named in the alignment process.

5. Learning by Associating Ambiguously Labeled Images
Author: Zinan Zeng, Shijie Xiao, Kui Jia, Tsung-Han Chan.
Description: In this paper we propose a novel framework to address this problem. Our framework is motivated by the observation that samples from the same class repetitively appear in the collection of ambiguously labeled training images, while they are just ambiguously labeled in each image. If we can identify samples of the same class from each image and associate them across the image set, the matrix formed by the samples from the same class would be ideally low-rank. By leveraging such a low-rank assumption, we can simultaneously optimize a partial permutation matrix (PPM) for each image, which is formulated in order to exploit all information between samples and labels in a principled way. The obtained PPMs can be readily used to assign labels to samples in training images, and then a standard SVM classifier can be trained and used for unseen data. Experiments on benchmark datasets show the effectiveness of our proposed method.

IV. SYSTEM ARCHITECTURE



V. ARCHITECTURE EXPLANATION

This architecture proposed work of an automated attendance system using image processing techniques and . This work is experimented on students face we have to used classification methods, SIFT algorithms, etc. But improvements are expected to increase its efficiency of classification. This system automatically detects the student face and marks the attendance by recognizing their face.. This system is developed by capturing real time human faces . The detected faces are matched against the reference faces in the dataset and marked the attendance for the attendee. If the face is not matched the attendance marked absent.

VI. MODULES

- **User**
- **Registration**
- **Login**
- **System**
- **Capture Image**

- **Detect Face**

User:
In user module the user login into the system . New user registration is done in this module.

Registration:
In registration module the user registration is done by filling the details like name, email, DOB, gender, contact no, username and password.

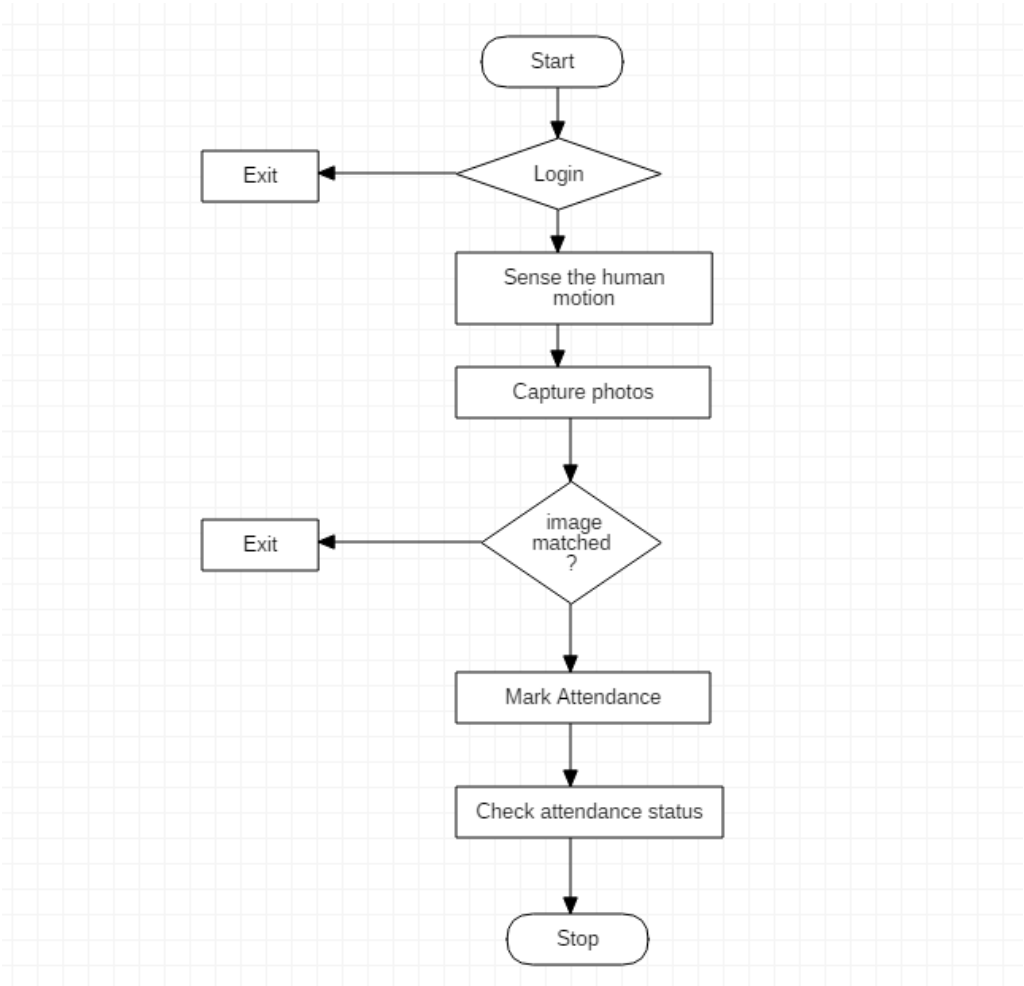
Login:
In this module the user login using the username and password.

System:
In System module the preprocessing , feature extraction and face detection of a an image is done.

Capture Image:
In Capture module the user image is captured.

Detect Face:
In Detect Face module the user image is detected and attendance is marked.

FLOWCHART



HARDWARE REQUIREMENT

- System : Pentium IV 2.4 GHz.
- Hard Disk : 40 GB.
- Monitor : 15 VGA Colour
- Mouse : Logitech.
- Ram : 256 Mb.

VII. ADVANTAGES

- We performed a detailed security analysis and performance evaluation of proposed data.
- Required less time to mark attendance.
- Increase Efficiency.
- Improve the accuracy.

VIII. APPLICATION

- Mainly used in Institutes.
- This system can be used in industry for marking attendance.
- Detect fraud at crowded area such as bus stands, theatres, railway station.

IX. CONCLUSION AND FUTURE SCOPE

This paper focuses on developing an automated attendance system It saves time and effort, especially if it is a lecture with huge number of students. This attendance system shows the use of facial recognition technique for the purpose of student attendance. The system can be extended to respond to the presence of newcomers in the classrooms. Also, means to mark attendance without the intervention of teachers in a classroom i.e. automatically marking attendance at the beginning of every hour can be implemented. It can be extended to video surveillance to detect frauds at crowded areas such as bus stands, theatres, railway stations where in by face recognition techniques, the identity of the culprits can be found.

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