Attendance Management System Using Facial Recognition

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ABSTRACT

The main purpose of this project is to build a face recognition based attendance management system for any institution or organization to enhance and upgrade the current attendance monitoring system in to a more efficient and effective one. The current system has lot of ambiguity that causes inaccurate and inefficient attendance record. Problems of attendance monitoring and management that exists in the current system can be resolved using current emerging technologies. The technology working behind this proposed project will be the face recognition system. The human face is one of the natural traits that can uniquely identify an individual. Possibilities for a human face to change or being duplicated is low. In this project, databases of human face images will be created to use them in the recognizer algorithm. During the attendance human faces will be compared against the stored data to seek for identity. When an individual is identified, attendance will be recorded automatically by saving the necessary information in to an excel sheet database. Further the saved attendance information can be used for monitoring and management purposes.

Keywords : Attendance Management System, HPENet, PTNet, Facial Recognition

I. INTRODUCTION

Attendance Management System (AMS) is a software developed for the daily attendance of people from any organization. Previously, organizations relied heavily on paper records. Currently used various bio-metric and electronics based attendance management system methods focus on providing information in an easy way and intelligible manner which also reduce paper and save precious time. These projects make use of databases in order to keep a record of attendance and is used while generating a report for an individual. The administrator can add a new person and view the attendance report of the required individual. These systems will help in evaluating attendance eligibility of an individual electronically by way of data processing. The attendance report also can be sent through email to the required individual, if required [1]. Attendance marking in a classroom during a lecture is not only a onerous task but also a time consuming one at that. Due to an unusually high number of students present during the lecture there will always be a probability of proxy attendance. Attendance marking with conventional methods has been an area of challenge.

The growing need of efficient and automatic techniques of marking attendance is a growing challenge in the area of face recognition. In recent years, the problem of automatic attendance marking has been widely addressed through the use of standard biometrics like fingerprint and Radio frequency Identification tags etc., However, these techniques lack the element of reliability[2]. In this proposed project an automated attendance marking and management system is proposed by making use of face detection and recognition algorithms. Instead of using the conventional methods, this proposed system aims to develop an automated system that records the student's attendance by using facial recognition technology.

II. LITERARTURE REVIEW

A literature review is the identification and examining of the existing research work in the chosen field to gain valuable information. Literature review was performed to understand the existing learning algorithms and to choose the suitable supervised and unsupervised method for image classification. As the study was made to compare supervised and unsupervised algorithms, the literature review was performed to identify the most effective algorithm of each kind. The algorithms identified were further used in experimentation.
Related Work
In this report various methods of Attendance management system have been surveyed and chosen facial recognition based bio-metric system, in view of it's advantages over other methods, for developing this ATTENDANCE MANAGEMENT SYSTEM software. Survey details are given below:
[1] PHYSICAL REGISTER BASED ATTENDANCE MANAGEMENT SYSTEM
Author: Shoewu, O., O.M. Olaniyi, and A. Lawson.
Use of physical register based entry or marking of candidates attendance is a traditional very good old practise; which is slowly disappearing in the industry

and academia due to various disadvantages as mentioned below.
· There is a risk of human error
· Manual time entry is very time-consuming
· Keyboard and printing errors
· Incorrect Entry of Times
· Too much paperwork
framework adopts a differentiable rendering layer for self-supervised training. HPENet is used to conduct head pose estimation on guided face image B and store face position feature information and pose direction vector. We input the low-quality face image A and guide face image B to fit 3D face information through the PTNet and convert the face posture with the mapping function, so as to generate face B′ with the same posture as face A.

[2] ELECTRONIC BASED E-ATTENDANCE SYSTEMS
Author: M. Kassim, H. Mazlan, N. Zaini, and M. K. Salleh, S. K. Jain, U. Joshi, and B. K. Sharma
1. Smart card:
A smart card, chip card or integrated circuit card (ICC), is defined as any pocket-sized card with embedded integrated circuits which can process information. In this, we are using a contact smart card where the information inside the card is communicated with the card reader by inserting card into the card reader. Each candidate will be issued with a unique smart card. Whenever the card is inserted into the reader, it gets the card information and sends to the microcontroller serially. So the controller receives the data and transmits it to the PC and the recorded attendance information can be used later as required.
2. Web based Attendance management:
Attendance Management System is based on a web server, which can be implemented on any computer. For example this application can be built using PHP as server side language, MySQL and PHP can be used as back-end design and HTML, CSS and JavaScript can be used for front- end tools. The system communicates

with database residing on a remote server. It calculates automatically, the attendance percentage of students without any manual paper-based work. The system facilitates the end users to login and mark their attendance with interactive user interface design and recorded data can be finally used for automated data processing of attendance management. This system can be used either on desktops or mobile devices. Using the device IP addresses of desktops or GPS of mobile devices; the location details of the candidates or users also can be captured along with their attendance data.

3. Barcode Scan Recognition

This system takes down students' attendance using barcode. Every candidate or user is provided with a card containing a unique barcode. Each barcode represents a unique id of candidate or user for attendance. Students just have to scan their cards using barcode scanner and the system notes down and records their attendance as per dates and time.

[3] BIO-METRIC BASED SYSTEMS

Author: Prabhakar S., Pankanti S., and Jain A. K., M. K. P. Basheer and C. V. Raghu

1. Fingerprint Attendance System Project:

Whenever user place his finger over fingerprint module then fingerprint module captures finger image, and search if any ID is associated with this fingerprint in the system. If fingerprint ID is detected then LCD will show Attendance registered and in the same time buzzer will beep once and LED will turn off until the system is ready to take input again.

2. Finger vein Recognition:

Finger vein biometrics identifies a user based on the vein patterns in their fingers, which are unique to every person. It is also known as vascular biometrics, as the identifiable information is from the blood vessels beneath your skin. The magic behind it is that the haemoglobin — the iron-containing protein we all have in our blood — changes colour when it is exposed to near- infrared light or visible light. As a result, the

reader can scan the user's unique pattern of veins. The vein pattern is digitised, encrypted and securely stored on server side.

3. Palm vein Recognition:

Palm vein recognition is a biometric authentication method based on the unique patterns of veins in the palms of people's hands. Palm vein recognition systems, like many other biometric technologies, capture an image of a target, acquire and process image data and compare it to a stored record for that individual.

4. Iris Recognition:

Iris scanning measures the unique patterns in irises, the colored circles in people's eyes. Biometric iris recognition scanners work by illuminating the iris with invisible infrared light to pick up unique patterns that are not visible to the naked eye. Iris scanners detect and exclude eyelashes, eyelids, and specular reflections that typically block parts of the iris. The final result is a set of pixels containing only the iris. Next, the pattern of the eye's lines and colors are analyzed to extract a bit pattern that encodes the information in the iris. This bit pattern is digitized and compared to stored templates in a database for attendance verification.

1. Voice Recognition:

It is a technology that uses voice, phrases and words spoken by someone and transformed into electronic signals, then the electronic signal is converted into a voice print or spectogram. The next voiceprint or spectrogram is stored as a table in the form of sequence of numbers in which each dominant frequency in each segment expressed as a binary number. From here we already have a sound template that can be used to match on the authentication process and for the attendance recording.

2. 2. Facial Recognition (FR) Technology:

A camera is needed to use facial recognition. Before deploying the application to users, it must be initialised with the required dataset images , which will be

processed at the start of the program. To ensure the optimal speed of the program, the dataset images must be minimised. The best way of doing this is by separating the dataset images by a particular group or department. Thus, every candidate would use the same application, except it will have been initialised with different images for different departments or groups. Once the program has been loaded with the person images, it will be able to recognise individual faces by using an appropriate algorithm to compare the current frame image with the one that has been initialised. Initialising the images in the program before generating the installer provides much greater reliability because person cannot easily alter the initialised images.

3. GPS based biometric attendance recognition system: A mobile device equipped with a biometric based attendance system such as face recognition or finger print with a GPS locator can do wonders for tracking the attendance of mobile candidates or users. The face recognition system works by adopting algorithm such as the Local Binary Pattern Histogram (LBPH) and also the attendance management system retrieves the candidate's location by using GPS services. This method has a high potential to replace the current attendance systems, as it is designed for speed and accuracy and is more convenient than the current approach specially for the mobile users.

III. SYSTEM ANALYSIS

Analysis is the process of breaking a complex topic or substance into smaller parts to gain a better understanding of it. Gathering requirements is the main attraction of the Analysis Phase. The process of gathering requirements is usually more than simply asking the users what they need and writing their answers down. Depending on the complexity of the application, the process for gathering requirements has a clearly defined process of its own [3].

Proposed System

The purpose of developing this software is to computerize the traditional way of taking attendance through facial recognition based bio metric system. Another purpose of this software is to generate reports automatically at the end of each session or as and when required. A graphical user interface is provided in the proposed system, which provides user to deal with the system very easily. This project is developed as a desktop application, and it can work very well for any particular organization [4].

The system architecture gives a high-level overview of the functions and responsibilities of the system. It defines the breakdown of the system into various subsystems and the individual roles played by them.

Fig. System Architecture.

· Data Preprocessing

Real world data are generally incomplete, noisy and redundant. In order to avoid those data has to be pre-processed. In this project the data preprocessing includes removing of the redundant attributes. One such processing is the conversion of UNIX time stamp into user readable form, seconds[5].

· Design

The design phase briefly explains the modules contained in the project through a architectural pattern. The architecture is a system that unifies its components or elements into logical functional blocks. The architecture shows the structure of the system and modules included in system [6].

· Implementation

Implementation is the realization of an application, or execution of plan, idea, model, design, specification, standard, algorithm, or policy. Implementation encompasses all the processes involved in getting new software or hardware operating properly in its environment, including installation, configuration,

and running, testing and making necessary changes. In this project the regression model is built and tested using various test cases in order to predict the popularity of the model and its accuracy.

· Body PartMap

It models visual appearance and context structure of pedestrian body parts and creates based on single pedestrian parsing model. It merges the segmentation masks of all pedestrians to create the body part map. The body part map is proposed to model the body-part semantic structures of individual pedestrians, which can serve as an important cue to judge whether there exists a person at a certain location. We introduce it into our framework as a novel supervised label to address the difficulties in crowd counting problem [7].

IV. RESULTS
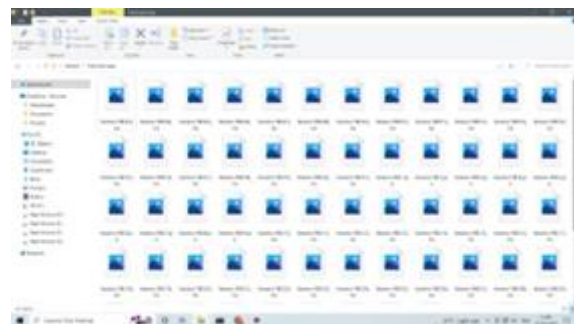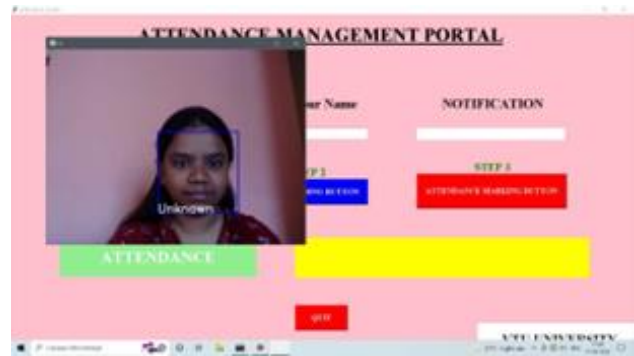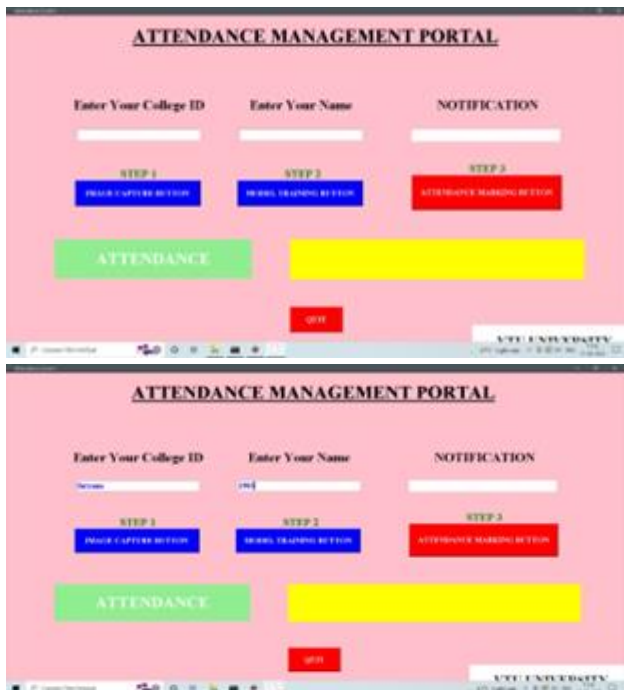
V. CONCLUSION

This project has proposed a smart attendance tracking system that can run on a DESK TOP or it can even be used as a mobile application by integrating GPS Module to the software to run on a smart phone. However, the FACIAL RECOGNITION BASED ATTENDANCE MANAGEMENT SYSTEM is chosen to develop as a DESKTOP BASED APPLICATION and face detection is the core component of this project. The attendance system has been designed to improve the efficiency of the attendance-taking process and to reduce the rate of errors in managing attendance records. This report presents a simple yet efficient approach to calculate the attendance in a class by

employing facial recognition techniques. The system also successfully recognizes and marks the attendance of the detected students. We wish to implement an efficient, time saving and easy to operate system which will in turn benefit both faculty and students.

VI. REFERENCES

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