Software Requirements Specification

For

Attendance Management System

Under the supervision of

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Date created

13.09.2021

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1.Abstract

To maintain the attendance record of the students/employees of any institution/organization manually is a very challenging task. The traditional method of calling the names of the students is very time consuming & a difficult process, especially for large groups of students/employees and there is always a chance of proxy attendance.This report reviews a different method which can be adopted to reduce the time wasted while taking the attendance.

2.Introduction

2.1. Purpose

The main motive of this attendance management system is to store the attendance of the students automatically with the help of facial recognition to maintain the attendance record of students. The daily attendance of students will be recorded which will be stored already in the database. As a student arrives the system will automatically match his/her face with the images present in the database by applying face detection and recognition techniques and the recognized students will be marked as present and their attendance will be updated with corresponding time.Digitalization of the system would also help in better visualization of the data using graphs to display the no. of employees present today, total work hours of each employee.

2.2. Intended Audience and Reading SuggestionsProduct Scope

This document is intended for developers, students, teachers, users and others who are concerned about face detection/recognition for marking attendance.
Preferably read the document in the sequence of table of contents only to understand properly. Document is organized in a manner to understand the need and implementation details of the system.

2.3. Product Scope

The main objective of this project is to remove the manual attendance system in which the teachers/professors call the name or the roll number of

a particular student and if he/she is in the class then they'll mark them present otherwise they will mark them absent.[1]

3. Motivation

organisation has a large number of employees, then this system could be very useful to reduce the time wasted while taking attendance.

4. Literature review

In this paper,the idea of two technologies namely student Attendance and Management system has been implemented with a machine learning approach .This system automatically marks the student attendance and maintains the attendance records.Therefore the attendance of the student can be made available by recognizing the face.After recognizing ,the attendance details will be stored in database and we get the overall report of total time attending by the student ,it's in and out time and all.[1]

In the past years there has been a lot of research on the attendance marking system using face recognition as a lot of things like classes,exams etc are running online due to Covid pandemic.

Detecting faces in different samples based totally on techniques. Basic sample for detecting a face is nose, eyes, hair, ears and while it is based totally on the tone of skin. Face detection is detecting face based totally on region of face and presences of face in snap shots .Different types of detecting the face techniques they're Ada-Boost Algorithm for Face Detection, Viola Jones Face Detection[3][5]

Algorithm, SMQT Features and SNOW Classifier Method, Local Binary Pattern (LBP). By making use of recognition algorithms to cropped faces photos from that we get similarity between taken photographs and database photos. In this paper PAC algorithm is used for face detection and reputation.

Popular attendance is uploaded to a database using face detection and recognition of scholars or people. From this guide paintings is lower with the aid of human and mechanically attendance gadget primarily based on faces procedure completed.

- **Automated Attendance System Using Face**

  Automated Attendance System using Face Recognition proposes that the device is based totally on face detection and recognition algorithms, that is used to mechanically detect the pupil face whilst he/she enters the magnificence and the gadget is capable of marking the attendance by way of spotting him. Viola-Jones Algorithm has been used for face detection which detect human faces using a cascade classifier and PCA set of rules for feature choice and SVM for classification. When it is compared to traditional attendance marking this gadget saves the time and additionally enables to screen the students.[1][3][5]

- **Student Attendance System Using Iris Detection:**

  In this proposed system the student is requested to stand In the front of the digital camera to come across and recognize the iris, for the system to mark attendance for the scholar. Some algorithms like Gray Scale Conversion, Six Segment Rectangular Filter, Skin Pixel Detection are getting used to detect the iris. It allows in preventing proxy issues and it maintains the attendance of the scholar in an effective manner, but in one of the time-ingesting processes for a Iris or a body of workers to wait till the finishing touch of the previous participants.[1]

- **Face Recognition-based Lecture Attendance System :**

  Continuous remark allows in estimating and enhancing the overall performance of the attendance. To reap the attendance, positions and face photos of the scholars present within the elegance room are captured. Through non-stop remark and recording the gadget estimates seating function and vicinity of every pupil for attendance marking. The work is centered on the technique to acquire the different weights of each targeted seat in keeping with its location. The effectiveness of the photograph is likewise being discussed to permit the quicker recognition of the picture.[2]

5.Overall Description

5.1. Product Perspective

This Attendance Marking System will be used to take the attendance of students at any point of time. The system will keep a track of the student's

presence, time-in and time-out. It will automatically generate a graph of their attendance which can be monitored by teachers or higher authorities .

5.2. Product Features

- The main objective of this project is to remove the manual work

- It'll also save the attendance time

- In and Out time of the students will be noted

- The system will be capable of managing a student's presence.

- It will also generate a graph of their availability

- Real time face detection and processing

- Effective access control

- Ease of use

- Automatic management

- Cost Effective and error free

5.3. User Classes and Characteristics

- Administrator

    1. Login

    2. Register new employees to the system

    3. Add employee photos to the training data set

    4. Train the model

    5. View attendance report of all employees. Attendance can be filtered by date or employee.

- Students

    1. Login

2. Mark his/her in and out attendance by scanning their face

3. View attendance report of self

- Professors / Teachers :

    A Professor/teacher can see the attendance report of the students and can keep a track of the students.

5.4. Operating Environment

- The attendance management system using face recognition shall function on the PC of our own .This entails the system to operate on the Windows platform.

- The attendance management system shall interface between Windows designated to store the attendance records.

- The Attendance management system will record all the essential details of each particular student/Employees.

5.5 Design and Implementation Constraints

- The time allotted for this project will be limited to the end of this semester.

- All the HTML code for the user manual will conform to the HTML 5.0 standard.

- Programming will be done in Python,SQL,HTML.

5.6 User Documentation

- The system will provide an online user manual in HTML that describes the functionality and options available to the user.

- The system will provide a hard copy of the user manual ,which is identical to the manual outlined above.

5.7 Assumptions and Dependencies

- The database mentioned within this software requirements specifications document is previously administered with the correct information needed by the attendance management system.

- Statistics on students attendance is dependent on a professor's consistent utilization of the system for each class period.

6. Keywords and definitions

HOG- HOG (Histogram of Oriented Gradients) is a simple and powerful feature descriptor. It is not only used for face detection but also it is widely used for object detection like cars, pets, and fruits. HOG is robust for object detection because object shape is characterized using the local intensity gradient distribution and edge direction.[12]

SVM- A support vector machine (SVM) is a supervised machine learning model that uses classification algorithms for two-group classification problems. After giving an SVM model sets of labeled training data for each category, they're able to categorize new text.[12]

DLIB- dlib is used for face detection and facial landmark detection. The frontal face detector in dlib will be used here. It is simple and just works out of the box.This detector is based on *histogram of oriented gradients (HOG)* and *linear SVM.* [9]

OPENCV- OpenCV(Open Source Computer Vision) is an open source library of programming functions used for real-time computer-vision. It is mainly used for image processing, video capture and analysis for features like face and object recognition. It is written in C++ which is its primary interface, however bindings are available for Python, Java, matlab/octave.[10]

7. Proposed Methodology

In this paper we would present an efficient method of the system which will capture the images of each student's face and store it in the database for their attendance. The face of the student has to be captured in such a manner that all the features of the students' face need to be detected like the right side of student's face or left side of student's face.There is no need for the teacher to manually take attendance in the class because the system records a video and through further processing steps the face is being recognized and the attendance database is updated.

Algorithm-

I. Capture the face of each student using Dlib's HOG facial detector.
II. Store it in the database for further facial recognition & attendance marking.
III. The face of the student needs to be captured in such a manner that all the feature of the students' face needs to be detected
IV. After the face recognition, the face identification will be done
V. In face identification a one-to-many mapping for a given face against a database of known faces will be done
VI. If the captured face found in the database then it'll mark that student present and note in time
VII. When the student leaves then note the out time

8. Flow Chart
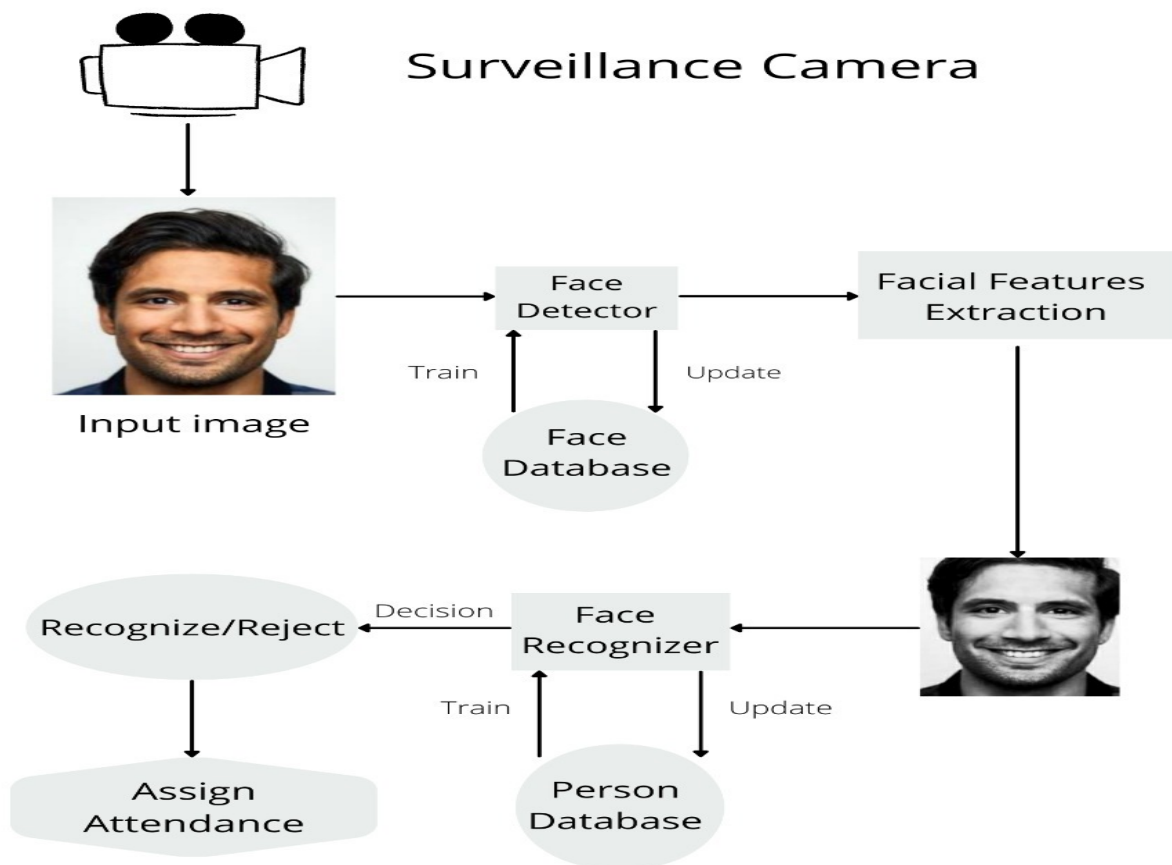
9. Conclusion

In this report, a functional real time Attendance management system has been made. By using different algorithms and techniques for facial recognition operation the accuracy will increase and the chances of proxy will decrease. In future this project will be enhanced and could be used at those places where we require surveillance like ATMs and banks. Using various concepts of image and video processing and fundamental properties of image we tried to develop this project.

10. Future Enhancements

This technology could be further used as following-

- This technology can be further developed to be used in other avenues such as ATMs.

- It can be implemented in large halls like auditoriums to calculate the number of people present there.[1]

- Security and surveillances are the major segments which will be deeply influenced. Other areas that are now welcoming it with open arms are private industries, public buildings, and schools.

- It is estimated that it will also be adopted by retailers and banking systems in coming years to keep fraud in debit/credit card purchases and payment especially the ones that are online.

- The system can be configured and used in Atm machines to detect frauds.Also, the system can be used at the time of elections where the voter can be identified by recognizing the face.

11. Activity Schedule

End of September	Preprocessing the data sets
2nd week of october	Training and testing base model
End of October	Final testing

1st week of November	Performing final tests of datasets
2nd week of November	Compiling final result

12. References

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