Smart Attendance System using Face Recognition

CSE3013 - Artificial Intelligence J Component Review

Review 1

Slot: B1+TB1

Under the guidance of:

Dr. ANNAPURNA JONNALAGADDA

Associate Professor Grade 2

SCOPE

Technical Report-1

1. Title

Smart Attendance System using Face Recognition

2. Team Members

Sl. No.	Name	Registration Number
1	Abhinav Jaiswal	20BCE2624
2	Vanshit Kandoi	20BCE2667
3	Sneha Jayshri	20BCE2673

3. Problem Description

Attendance is an important part of daily classroom evaluation. The teacher often checks it at the start and end of class, although it's possible that they might miss someone or check some students' answers more than once. Face recognition technology based on high definition monitor video and other information technology is used to solve the problem of recognizing faces for the purpose of taking attendance.

4. Objectives

The major objective of this work is to provide a system that makes it easier and more automated to track and record student attendance using facial recognition software. To identify or confirm a person from a digital image or security footage, biometric technology is used.

It includes various phases-

- Face detection
- Encoding face features
- Face recognition

5. Introduction

a. Significance of the problem

Face is the crucial part of the human body that uniquely identifies a person. The face recognition system can be developed using facial features as a biometric.

Attendance recording is often the most difficult task. The students are called out by the teachers in the traditional attendance method, and their presence or absence is noted appropriately.

However, these age-old methods are laborious and time-consuming.

b. Applications

One of the most effective image processing applications, face recognition is crucial in the technical world. The identification of the human face is a current problem for verification purposes, particularly in the context of student attendance.

The identification of the human face is a current problem for verification purposes, particularly in the context of student attendance. The process of identifying pupils using a face biostatistics system based on high definition monitoring and other computer technologies is called a face recognition attendance system.

In our proposed project we will be demonstrating in our projected is expected to be a reliable and effective tool for collecting attendance in a classroom without taking up any time or requiring manual labor. The system will be affordable and will also requires little installation.

c. Motivation

A facial recognition attendance system automates the whole online environment. You will automatically record the workers' arrival and departure hours in addition to collecting attendance. The system accurately detects who left the allowed area and when, which improves workplace security.

Even though face recognition technology has major flaws, India has a huge market. This technology may be utilised successfully in both the public and private sectors for ATMs, duplicate voter detection, passport and visa verification, driving licence verification, defence tests, competitive exams, and other uses.

Security reason: Face recognition is becoming the most popular way to preserve an individual's or an organization's security.

This system's goal is to create an automated system that uses face recognition technology to track student attendance in place of the customary techniques. The major goal of this effort is to make the system for tracking attendance effective, time-saving, straightforward, and uncomplicated.

6. Relevance of the Problem
a. Explain if the problem is societal or technological or economical or industrial problem?

➢ The attendance system has a technical problem.
➢ In the traditional conventional system, human error is possible.
➢ Chances of proxy is there.
➢ Manual entering of each and every student's attendance takes a lot of time.
➢ Students and employees are both capable of time theft.
➢ Chances of errors are possible.

b. What's the relation with AI?

Yes with our existing project idea, relation of AI is there in the face recognition attendance system. The above problem we can overcome using the unique feature of every human being on his face. AI facial recognition technology is used to automatically take attendance. Sometimes when many people can come together.

This system can able to detect multiple faces at a time. In this system, Face detection is done using DLib is used for face recognition. Using two cameras arrival and departure times of an individual are

calculated sequentially. 96.03% accuracy observed by the camera-1 to recognize the face and at day time when light is off camera-2 shows the best accuracy 96.62%.

The technology will mark and record attendance in any setting. The device will instantly recognize, identify, and record a student's attendance as they approach the camera.

Face recognition uses AI algorithms and ML **to detect human faces from the background**. The algorithm typically starts by searching for human eyes, followed by eyebrows, nose, mouth, nostrils, and iris.

7. Outcomes

- This system will include a way for the lecturer or teaching assistant to track the attendance of students throughout a lecture, section, or lab. It will save time and effort, especially if there are a lot of pupils in the lecture.
- The aim of the automated attendance system is to minimize the shortcomings of the conventional (manual) approach. The application of image processing techniques in the classroom will be demonstrated via this attendance system.
- This approach will enhance an institution's reputation in addition to simply assisting with the attendance system.

8. SWOC /SWOT
- **Strength**
  a) Able to take complete attendance in one click.
  b) Effective and efficient attendance.
  c) Enhanced algorithms
  d) Time saving.
  e) Better way to maintain database.
- **Weakness**
  a) Inability to differentiate between live faces and photographic faces.
  b) Lack of enhancement in pre-existing algorithm.
  c) Model fails if it's not able to differentiate between two persons correctly.
  d) Poor camera quality could lead to difficulties.
  e) Capturing multiple faces at a single go.
- **Opportunities**
  a) Pre-defined high quality Python Library.
  b) High configuration devices.
  c) Currently not used in great scale.
  d) Could be used in various other fields as well.
  e) More improvements can be done in near future.
- **Threats**
  a) Highly competitive environment.
  b) Presence of already implemented face recognition systems.
  c) If system is not trained well could lead to difficulties.
  d) If Live capturing is not done perfectly then it could lead to proxies.
  e) System should be trained to capture multiple faces correctly.

9. Contribution assigned to each member of the team.

Abhinav Jaiswal: *Python ML model – face detection and Database*
Vanshit Kandoi: *Python ML model – face recognition, and Algorithmic work*
Sneha Jayshri: *Face Recognition and Algorithmic work*

Documentation work is handled by all three of us.

10. Literature Review

Ref No	Paper Title	Journal Name and Publication	Advantage	Technique Used	Disadvantage
1	Biometric Anti Spoofing Methods: A Survey in Face Recognition	IEEE Access https://ieeexplore.ieee.org/abstract/document/6990726 [J. Galbally, S. Marcel and J. Fierrez Vol. 2, pp. 1530-1552, 2014]	Anti-spoofing countermeasures used against most modern face spoofing methods	Facial Recognition	Lack of research as most databases are proprietary and not public.
2	An Efficient Multi-Modal Biometric Verification System Using FKP and Iris	IOSR Journal of Engineering (IOSRJEN) http://www.iosrjen.org/Papers/vol8_issue4/Version-1/E0804012835.pdf [Sukhdev Singh, Chander Kant Vol. 08, Issue 4,PP 28-35,2018]	It is clear from that the performance of proposed multimodal method (FKP+Iris) is better than individual biometric i.e. FKP and Iris.	FKP, Feature Extraction, Fusion, Iris, SIFT(Scale Invariant Feature Transform), SURF(Speed ed Up Robust Features).	The constraints or hardware limitations of the methods and biometrics had not been mentioned.
3	Multi-biometric authentication system using finger vein and iris in cloud computing	Cluster Computing https://link.springer.com/article/10.1007%2Fs10586-018-1824-9#citeas, https://dblp.org/rec/journals/cluster/IlankumaranC19.html [S. Ilankumaran, C. Deisy Clust. Comput. 22(Suppl 1): 103-117,2018]	Finger vein, Iris, Cloud computing	Finger vein and iris authentication technology is contactless and requires no maintenance on a regular basis.	1. Requires at least Intel i5 core processor with 2.2 GHz, 6 GB RAM, 64 bit operating system for processing the data. 2. The postures of the fingers should not vary much.

4	Biometrics and Face Recognition Techniques	Biometrics and Face Recognition Techniques http://winteknologi.com/img/product/pdf/ede8225c99f6e1883d4ae14c66fb20191117.pdf [Renu Bhatia 2277 128X,2013]	This paper deals with the introduction of face recognition and the procedure of face recognition technique. Face Recognition is considered fast, passive and a non-intrusive system to verify and identify people. Face recognition technique is used to identify terrorists, criminals, and other types of persons for law enforcement purposes.	Biometric techniques Face Recognition techniques	Face recognition is affected by change in lighting, the person's hair, age, and if the people wear glasses, low resolution images. It requires camera as equipment for user identification; thus, it is doubtful to become popular.
5	Techniques and Challenges of Face Recognition : A Critical Review	Techniques and Challenges of Face Recognition: A Critical Review https://www.sciencedirect.com/science/article/pii/S1877050918321252 [Shilpi Singha S.V.A.V.Prasad ICACC,2018]	This article deals with different types of face recognition . It also informs about the different challenges faced in the face recognition technique like aging factor, facial features, expressions, pose variations, thermal image, occlusion and illumination.	Face Recognition.	Face recognition becomes more challenging in case when an image differs by surgical variations of faces for increasing beauty , aging , poses and many more. unless and until these problems are solved face recognition cant be regarded as the most convenient biometric techniques.

| 6 | Mobile Face Biometrics | A Survey Of Mobile Face Biometrics

https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=face+biometrics&oq=face+biomet#d=gs_qabs&u=%23p%3DC1OfUORVmycJ

[Ajita Rattani, Reza Derakhshani Vol. 72,2018] | 1) Easy To Integrate

2) Automated Identification | Face Recognition. | Poor Image Quality Limits Facial Recognitions Effectiveness.

High possibility of getting small image size making facial recognition more difficult. |

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