Multiple Face Detection Attendance System

Arijit Haldar[1], Bashudev K Yadav[2], Himanshu K[3], Deepak K Sharma[4], Prof. Mrs. Rashmi K T[5]

CSE Department, Sri Krishna Institute of Technology, Bangalore-560090,
India Faculty and students of CSE Department, Sri Krishna Institute of Technology, Bangalore-560090, India

ABSTRACT

The Multiple Face Detection Attendance System is a sophisticated computer-based system designed to automate attendance management system in various settings, such as educational institutions, workplaces, and other organizations. The system utilizes advanced facial recognition technology to accurately detect and identify individuals, enabling efficient and reliable attendance tracking. Traditionally, attendance management has relied on manual methods like paper registers or ID card swiping, which are time-consuming and prone to errors. The Multiple Face Detection Attendance System aims to overcome these limitations by leveraging the power of artificial intelligence and computer vision technology. This process involves complex mathematical computations and pattern recognition techniques to ensure accurate identification. Once a face is successfully recognized and matched with an existing template, the system marks the individual as present in the attendance record. The attendance data is stored in a secure database, allowing administrators or authorized personnel to access it for various purposes, such as generating reports, tracking attendance trends, or calculating payroll. The Multiple Face Detection Attendance System offers several advantages over traditional methods. Firstly, it eliminates the need for manual intervention, reducing the chances of human error and ensuring greater accuracy. Secondly, it significantly reduces the time and effort required for attendance management, allowing administrators to focus on more productive tasks. Moreover, the system provides real-time attendance updates, enabling prompt action in case of any discrepancies or unauthorized access. Additionally, the system offers enhanced security features. It can detect and flag instances of identity fraud

Keywords: Automatic Face Recognition (AFR), Real Time Face Recognition, Attendance Management System.

1. INTRODUCTION

It's very important to Maintain the attendance in all the institutes for checking the performance of students. Every institute has its own method in this regard. Some are taking attendance manually using the old paper or file based approach and some have adopted methods of automatic attendance using some biometric techniques.

The Multiple Face Detection Attendance System is a modern solution that utilizes cutting-edge facial recognition technology to automate attendance management. It replaces traditional manual methods with an efficient and accurate system that saves time, reduces errors, and enhances security. Attendance management is a critical task in educational institutions, workplaces, and other organizations. Traditional methods such as paper registers, ID card swiping, or manual headcounts are labor- intensive, prone to errors, and can be manipulated. The Multiple Face Detection Attendance System addresses these challenges by leveraging computer vision and artificial intelligence to automate the process. The system is composed of several components working in tandem to achieve accurate attendance tracking. It consists of a network of cameras strategically placed at entry points or locations where attendance needs to be monitored. These cameras capture real-time video footage of individuals entering or moving within the premises. The core of the system lies in the specialized software that processes the video feed from the cameras. The software utilizes advanced algorithms to detect and locate human faces within the video frames. It employs sophisticated techniques like Haar cascades, convolutional neural networks (CNN), or deep learning models to achieve high accuracy in face detection. Once a face is detected, the software proceeds with the face recognition process. It analyzes the facial features, such as the distance between the eyes, the shape of the nose, and the contours of the face, to create a unique face template for each individual. These face templates are then compared against a pre-registered database of known faces, that student or employee photos can populate.

2. LITERATURE SURVEY

It reveals some facts based on thoughtful analysis of many authors work as follows.

[1]. "Automated Attendance System Using Face Recognition" by Swapnil Waghmare et al. (2018):

This paper presents an automated attendance system that utilizes face recognition for accurate and efficient attendance management. The authors discuss the various stages of the system, including face detection, feature extraction, and recognition. They evaluate the performance of the system using a dataset of student images and demonstrate its effectiveness in real-world scenarios.

[2]. "A Review on Automatic Attendance System Using Facial Recognition" by Akhil Jain and Samta Gajbhiye (2019):

This review paper provides an overview of different approaches and techniques employed in automatic attendance systems based on facial recognition. The authors discuss the advantages, challenges, and limitations of existing systems. They analyze various algorithms used for face detection, feature extraction, and recognition, highlighting their strengths and weaknesses. The paper concludes with recommendations for future research in this field.

[3]. "Face Detection and Recognition for Automatic Attendance System" by Swaraj Patel et al. (2017):

This research paper focuses on the development of a multiple face recognition system for an automatic attendance management system. The authors propose a method that combines Haar cascades and Local Binary Patterns (LBP) for face detection and recognition, respectively. They evaluate the system's performance using a dataset of student images and report high accuracy in attendance tracking.

[4]. "Real-Time Attendance Management System Based on Face Recognition" by Mehedi Hasan et al. (2018):

In this paper, the authors present a real-time attendance management system that employs face recognition technology. They discuss the system architecture, including face detection, feature extraction, and recognition modules. The proposed system is evaluated using a dataset of employee images, and the results demonstrate its effectiveness in accurately tracking attendance in real-world scenarios.

[5]. "Face Recognition based Attendance System using Machine Learning Algorithms" by Radhika C. Damale,

Facial recognition, a technology that identifies individuals based on their facial features, has become increasingly popular among researchers. It offers various applications in computer vision, such as face recognition, emotion detection, and surveillance systems with multiple cameras. Scholars are particularly drawn to face recognition systems, which employ different methods like Support Vector Machines (SVM), Multilayer Perceptron (MLP), and Convolutional Neural Networks (CNN). Deep Neural Networks (DNN) are employed for face detection, while SVM and MLP methods utilize feature extraction algorithms like Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA). In the CNN approach, images are directly fed into the CNN module as features, resulting in a high level of accuracy. When tested on self-generated databases, the CNN-based approach achieved an impressive accuracy of 98%, while SVM and MLP approaches achieved 87% and 86.5% accuracy, respectively.

[6]. "Real-Time Attendance Management System Based on Face Recognition" by Mehedi Hasan et al. (2018):

In this paper, the authors present a real-time attendance management system that employs face recognition technology. They discuss the system architecture, including face detection, feature extraction, and recognition modules. The proposed system is evaluated using a dataset of employee images, and the results demonstrate its effectiveness in accurately tracking attendance in real-world scenarios.

[7]. "Automated Attendance System using Face Recognition Techniques" by Jigar Shah and Kaushik Bhatt (2019):

The authors propose an automated attendance system based on face recognition techniques. They discuss the different stages of the system, including face detection, normalization, feature extraction, and matching. The paper provides a comparative analysis of different face recognition algorithms, such as Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), and Local Binary Patterns (LBP), and evaluates their performance on a dataset of student images.

[8]. "An Efficient Face Recognition Approach for Automatic Attendance System" by Neha Sharma et al. (2019):

This research paper presents an efficient face recognition approach for an automatic attendance system. The authors propose a technique combining Discrete Cosine Transform (DCT) and Support Vector Machine (SVM) for accurate face recognition. They evaluate the system's performance using

an employee dataset images and report high accuracy in attendance management.

[9]. "Attendance System Based on Face Recognition with Raspberry Pi" by Shijia Liu et al. (2020):

The authors describe the development of an attendance system based on face recognition using Raspberry Pi as the hardware platform. They discuss the system architecture, including face detection, feature extraction, and recognition algorithms. The paper provides experimental results and demonstrates the feasibility of implementing the system in real-world scenarios.

3. METHODOLOGY

By analyzing all the facts through the above section, this research article comes to a conclusion of implementing this system for Attendance system
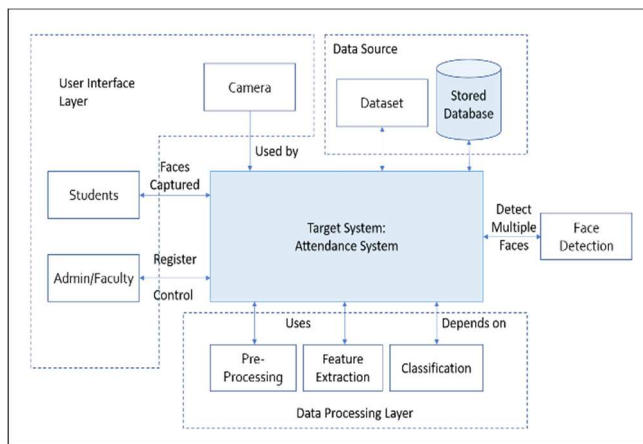

Fig -1: System Design.

Step 1: Taking the image.

Step 2: Detecting the total faces in the

image. Step3: Cropping the image into

total faces.

Step4: Applying pre-processing algorithms.

Step 5: Classification of faces as known and unknown faces.

Module for registration/Data feeding into system.

Step 1: classifying the system as User and

Admin. Step 2: Admin feeding details.

Step 3: Admin requesting for system

resource. Step 4: Capture image for

database.

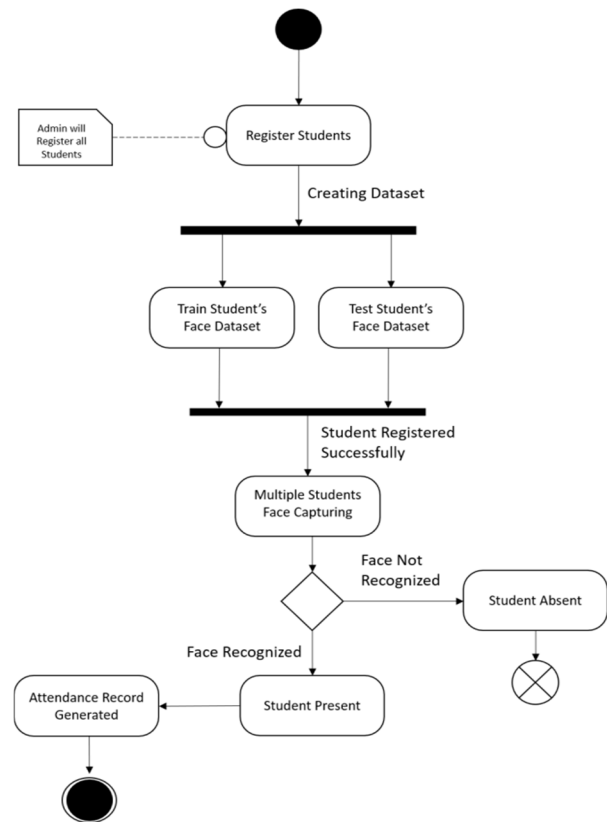Step 5: Training the Dataset and storing into database.

Fig-2: Level 0 DFD

Fig-3: Activity Diagram

4. CONCLUSION

The Multiple Face Detection Attendance System is an innovative solution that utilizes facial recognition technology to automate attendance management in various settings. By deploying a network of strategically placed cameras and specialized software, the system can capture real-time video footage and process it using advanced algorithms. These algorithms perform face detection and recognition tasks, identifying and locating multiple human faces within the video feed. The system then extracts facial features and matches them against pre-registered templates in a database. This process ensures accurate and efficient attendance tracking. Compared to traditional methods, the system offers several advantages, including reduced time and effort required for attendance management, elimination of human errors, real-time updates for immediate information, and improved security by detecting identity fraud or impersonation. Overall, the Multiple Face Detection Attendance System revolutionizes attendance management by leveraging facial recognition technology, providing a fast, accurate, and secure method for tracking attendance, streamlining administrative processes, and enhancing overall efficiency. Its ability to handle multiple faces, perform real-time processing, and offer enhanced security features makes it a transformative solution for attendance management in various domains.

5. REFERENCES

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