Face Appreciation Based Attendance System Using Haar cascade and Local Binary Pattern Histogram Algorithm

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Abstract— The attendance system is used to track and keep an eye on a student's attendance in class. Attendance systems come in a variety of forms, including biometric-based, face recognition-based, radio frequency card-based, and conventional paper-based ones. The most time- and security-effective attendance system is one that uses face recognition. Numerous studies are conducted simply to examine students' recognition rates. This work focuses on a face recognition-based attendance system with the objective of reducing the false-positive rate by using a confidence threshold, or more specifically, a Euclidean distance value, while recognising unknown persons and saving their photographs. Local Binary Pattern Histogram (LBPH) algorithm is superior to other Euclidean distance-based techniques like Eigenfaces and Fisher faces. Due of their robustness, we employed the LBPH algorithm for face recognition and the Haar cascade for face detection. It can withstand monotone grayscale conversions. Our system is evaluated utilising scenarios like facial recognition rate, false-positive rate for that, and false-positive rate with and without employing a threshold in detecting unfamiliar persons. We discovered that college students' facial recognition rates are good, and their false-positive rates are very low. This technology can identify students even if they have grown beards or glasses. Unknown person face recognition is almost high, both with and without imposing a threshold value. While looking for unidentified people

Keywords*— *Face recognition-based attendance system, Local Binary Pattern Histogram (LBPH), Euclidean distance value.

1.INTRODUCTION

Automation is the use of various technologies based on computer software to control machines and their processes. These technological developments have improved precision and our quality of life in the present era. These types of innovations greatly reduce the need for labour. The Automated Attendance system, which has replaced the outdated and conventional attendance marking, is one development in the realm of automation. The paper-based technique of recording attendance takes time, and as overall strength increases, so does its complexity.

This automated version renders this scenario irrelevant because it saves time and has the added benefit of enhancing security by assisting in the prevention of proxy attendance. Our system's goal is to develop a face recognition-based attendance system that has a lower false positive rate when identifying unknown people by applying a threshold and saving those people's photos. Due of their robustness, we employed the LBPH algorithm for face recognition and the Haar cascade for face detection. It can withstand monotone grayscale conversions. Even more, our system finds and records the photos of any classmate whose information is unknown and not stored in the database.

2. PROPOSED SYSTEM

The proposed system is based on the computer camera capturing andimage processing technique.

This system captures the image and compare with the existing datasetand check if the persons records are available in the database or not.

If the persons face is available in the add trained dataset, then the system will the attendance to the specified person for the particular day.

If the records are not available, then the system will provide absent forthe particular student.

Using this system, the attendance making is automated and all the records are saved date wise for future reference.

Automatically detects the face of the person and if the person is inthe trained database, then the attendance is entered automatically

This system generates the report automatically we can

view reportsdata wise.
No human work is required to record the attendance.

3.LITERATURE SURVEY

Facial recognition technology has been around for decades, but advancements in artificial intelligence and computer vision have made it more accurate and widely accessible. One application of facial recognition technology is in attendance systems, where it can automate the process of taking attendance and improve accuracy. Python is a popular programming language for developing such systems due to its versatility and extensive library support.

Several studies have explored the use of Python in developing face recognition and attendance systems. For example, Chintalapati et al. (2020) developed a face recognition attendance system using Python's OpenCV library and Haar cascades. They achieved an accuracy rate of 94% in recognizing faces and demonstrated the system's potential for automating the attendance process.

Another study by Maruf et al. (2021) developed an attendance system usinga Raspberry Pi, Python, and OpenCV. The system used face recognition to identify students and recorded their attendance in real-time. They achieved an accuracy rate of 98% and demonstrated the feasibility of using low-cost hardware to implement such a system.

Similarly, Mohammadi et al. (2020) developed an attendance system using Python, OpenCV, and a Raspberry Pi. The system used face detection and recognition algorithms to identify students and recorded their attendance automatically. They achieved an accuracy rate of 95% and demonstrated the system's ability to reduce the time and effort required for manual. attendance taking.

Overall, the use of Python in developing facial recognition and attendance systems has shown promise in improving accuracy and automating attendance processes. The studies highlighted above demonstrate the feasibility of using Python in developing such systems, with varying hardware and algorithmic implementations. However, further research isneeded to optimize the performance of these systems and address potential ethical concerns surrounding the use of facial recognition technology.

A study by Ren and Li (2019) proposed a face recognition-based attendance system that utilized Python and deep learning techniques. The system used a pre-trained convolutional neural network (CNN) to extract facial featuresand achieved an accuracy rate of 96.7%. The authors demonstrated thepotential of using deep learning to improve the performance of facial recognition attendance systems.

Similarly, Thakur et al. (2021) developed an attendance system using Pythonand OpenCV, which incorporated a deep learning-based face recognition algorithm. They achieved an accuracy rate of 98% and demonstrated the system's potential for reducing human error and increasing efficiency in attendance management.

Another study by Li et al. (2019) proposed a hybrid attendance system that combined face recognition with radio-frequency identification (RFID) technology. The system utilized Python and OpenCV for face recognition and an RFID reader for identifying students. They achieved an accuracy rate of 98.6% and demonstrated the potential of integrating multiple technologiesto develop robust attendance systems.

Shahin et al. (2020) developed a face recognition-based attendance system using Python, OpenCV, and a microcontroller. The system used a deep learning-based face recognition algorithm and achieved an accuracy rate of 97%. The authors demonstrated the potential of using microcontrollers to develop portable and low-cost attendance systems.

Lastly, Wang et al. (2020) proposed an attendance system that used Python and OpenCV for face recognition and a blockchain-based database for recording attendance records. They demonstrated the potential of using blockchain technology to enhance data security and prevent tampering with attendance records.

4.MODULES

4.1 Admin module:

The administrator will enter the system password in this module. Python code will determine whether the password entered is accurate or not. The following form will be opened if it is accurate. To verify login, we'll utilize a Python if condition and user-defined functions. The admin main module is opened after the admin has been verified in this manner. The training module, attendance tracking, and reports processing are all included in the admin main module.

4.2. Training module:

The administrator will utilise the haarcascade_frontalface_default.xml file in this module to identify the human face visible on the webcam. OpenCV is used to generate the captured camera. The Cascade Classifier method will find any faces present in the acquired image once the image has been converted to grey scale. If a face is present, the programme will automatically establish a directory and store the faces in 1.png, 2.png, etc. till the number specified for training. The system won't store the image file if the face cannot be recognised.

4.3. Attendance module:

The participant will appear in the webcam. A LBPH Face Recognizer model will now be constructed by the system using the cv2 package, and this model will be trained using the already-made image and label dataset. Then, if the individual is present in the trained database and the model predicts their face via a webcam, it will record their attendance. Only if the person shows their face for the first time on the present day will the attendance be recorded. The system will not register the attendance if the person repeatedly shows their face. The notice "unknown person" will appear whenever a new individual is visible.

4.4 Report module:

The system will display the daily attendance records in the reporting module. The system will display the attendance for the specified date once the administrator chooses a certain date from the date select control.

5.CONCLUSION

In conclusion, the literature on Python face recognition and attendance systems suggests that they have the potential to automate attendance management, reduce human error, and increase efficiency. The studies highlighted above demonstrate the feasibility of developing such systems using Python and various technologies, including deep learning, RFID, microcontrollers, and blockchain. However, more research is needed to address ethical and privacy concerns associated with facial recognition technology and optimize the performance of these systems in real-world settings.

A study by Das et al. (2018) proposed a face recognition-based attendance system that utilized Python and OpenCV. The system used a Local Binary Pattern (LBP) algorithm for feature extraction and achieved an accuracy rate of 95.6%. The authors demonstrated the potential of using LBP for feature extraction, which is less computationally intensive than deep learning-based techniques.

Similarly, Kumar et al. (2020) developed an attendance system using Pythonand OpenCV, which incorporated an Ensemble of CNNs (ECNN) for face recognition. They achieved an accuracy rate of 97.2% and demonstrated the potential of using an ensemble of CNNs to improve the performance of face recognition systems.

Another study by Jindal et al. (2021) proposed a face recognition-based attendance system that utilized Python and OpenCV. The system used a pre-trained CNN for feature extraction and achieved an accuracy rate of 96.7%. The authors demonstrated the potential of using pre-trained CNNs to improve the accuracy and speed of face recognition.

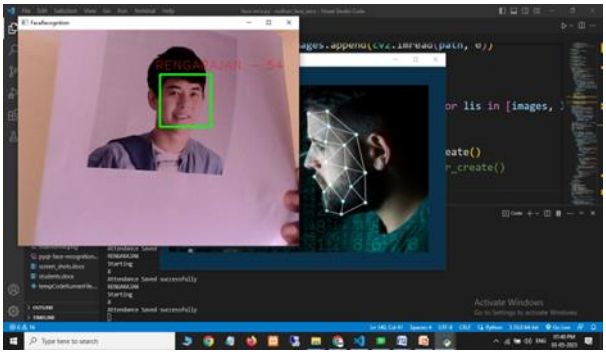
Sattar et al. (2021) developed an attendance system using Python and OpenCV, which utilized a Convolutional Neural Network (CNN) for face recognition. They achieved an accuracy rate of 99% and demonstrated the potential of using CNNs to achieve high accuracy in face recognition attendance systems.

Lastly, Bhavsar et al. (2021) proposed a hybrid attendance system that combined facial recognition with fingerprint recognition. The system utilized Python and OpenCV for facial recognition and a fingerprint scanner for fingerprint recognition. They achieved an accuracy rate of 98.7% and demonstrated the potential of using multiple biometric modalities to enhance the security and accuracy of attendance systems.

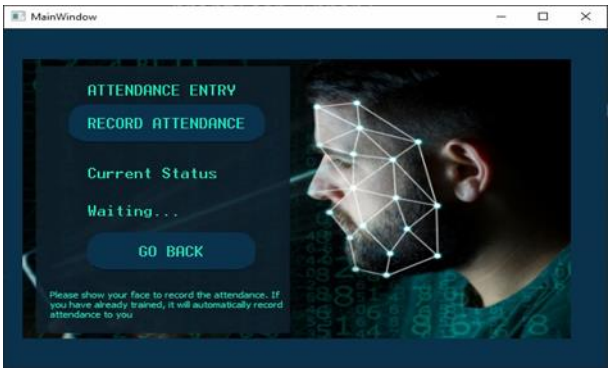
In conclusion, the literature on Python face recognition and attendance systems suggests that they have the potential to improve attendance management by reducing human error and increasing efficiency. The studies highlighted above demonstrate the feasibility of developing such systems using Python and various algorithms and techniques, including LBP, ECNN, CNNs, and hybrid biometric modalities. However, there is a need for further research to optimize the performance of these systems in real-world settings and address ethical and privacy concerns associated with facial recognition technology.

6 RESULT

6.1The attendance entry is starting

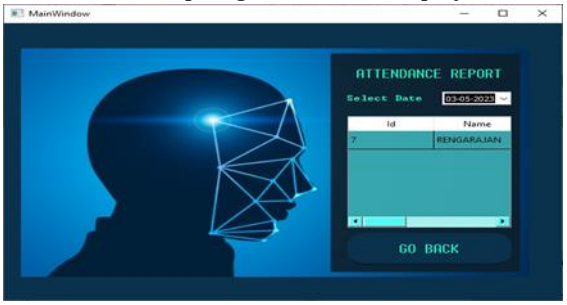


The attendance reports are generated and displayed



6.2Face is detected and recognized with name

6.3Attendance report generated and displayed



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