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AUTOMATED ATTENDANCE SYSTEM WITH FACIAL RECOGNITION

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Abstract: This project's major goal is to develop a facial recognition-based attendance monitoring system for educational institutions to improve and modernize the current attendance system and make it more effective and efficient than it was previously. It has numerous advantages and can be used for security, identification, and authentication. The goal of this system is to create a face recognition-based class attendance system**.** The manual attendance system is time-consuming and cumbersome to maintain. This system consists of four phases- database creation, face detection, face recognition, and attendance updation. The database is created by the images of the students in class. Face detection and recognition are performed using the Haar-Cascade classifier and Local Binary Pattern Histogram algorithm respectively. Faces are detected and recognized from live streaming video of the classroom.

Key Words: Face Recognition, Face Detection, Haar- Cascade classifier, attendance system.

I.INTRODUCTION

Historically, taking attendance has been a manual and time-consuming process that requires educators and businesses to manually record each person's attendance. With the development of computer vision technology, a system for automatically taking attendance has been created in which people are detected and identified by their facial -features. The term "auto face attendance system using OpenCV" refers to this method. Developers can access a variety of features and tools through the open- source library of computer vision and machine learning techniques known as OpenCV. OpenCV provides a quick and accurate way for identifying faces in pictures and videos with the Haar Cascade Classifier. To record attendance, the auto-face attendance system utilizing OpenCV compares the facial characteristics of persons in real-time with a database of pre- registered faces. In schools, universities, and workplaces, the auto-face attendance system using OpenCV offers a wide range of applications. It eliminates human labor, increases accuracy, and offers an accurate and effective method of recording attendance. The system can also record and save extra information that can be utilized for subsequent analysis, like the time and date of attendance.

The process of developing an automatic face attendance system using OpenCV, as well as the required tools, strategies, and approaches, will be covered in this study. We'll look at how adopting such a system can be helpful, as well as its drawbacks and room for improvement.

II. EXISTING SYSTEM

[1] "Face Recognition and RFID Verified Attendance System." 2018 International Conference on Computing, Electronics & Communications Engineering (iCCECE), IEEE, 2018. The system keeps the authentic record of every registered student. The system also keeps the data of every student registered for a particular course in the attendance log and provides necessary information according to the need.

[2] A. B. Apte and P. D. Gawande: This paperproposes an automated attendance system that uses face recognition techniques to mark attendance. The system uses OpenCV for face detection and

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recognition and provides a contactless and efficient way of tracking attendance. The system consists of two main modules: face detection and face recognition. The face detection module uses OpenCV and Haar Cascades to detect faces. The face recognition module uses Local Binary Patterns (LBP) and Support Vector Machines (SVM) to recognize faces. The system has been tested on a dataset of1000 images and achieved an accuracy of 96.2%.

[3] A. K. Kori, D. K. Singh, and R. K. Singh:The proposed system uses Local Binary Pattern (LBP) and Principal Component Analysis (PCA) for face recognition. LBP is used to extract features from the facial images, and PCA is used for feature reduction and to improve recognition accuracy. The system uses a camera to capture the facial images of the students or employees and processes the images in real-time to mark their attendance. The authors have tested the system using a database of facial images of students and employees and achieved an accuracy rate of 94.68%.

III.PROPOSED SYSTEM

The system proposed is based on face recognition. When a student comes across the camera module, then his/her image/photo will be captured and recognized with validation. When recognition and validation are successful, his/her attendance will automatically be marked. This proposed work is based on the following block diagram in which the attendance of the particular student is marked as present when his face is matched.

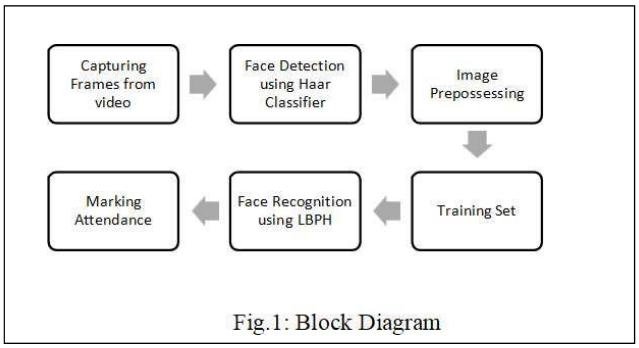

Fig.1: Block Diagram

☐ **Capturing frames from video**

The camera will be placed at the entrance of the classroom to get students' face images correctly.
The camera has 30fps in which these frames are taken and used for further processing.

☐ **Face Detection using Haar -Classifier**

In this phase, it implements face detection of the person, which helps in determining the captured image with the location and sizes of the student's face. The copy will be obtained from detected faces using the Haar cascade classifier.

☐ **Image Processioning**

In this, there is a prepossessing requirement to enhance the input image to improve the quality of the picture. We convert the input image to a greyscale image using color to the Grey image conversion technique.

☐ **Training Set**

When comparing the faces, which are to be recognized with the same face in the trained data-set is the recognition process. Supply algorithm faces in the training set to make recognition

IV.IMPLEMENTATION

The face recognition process was performed using the LBPH algorithm because of its smaller computation load, thus it is relatively fast and can be used for the real-time recognition process. The LBPH concept is to not look at the whole image as a high- dimensional vector but to only review the local features of the important objects. The extracted object features only have low dimensions, for example in the face recognition case, it will only review the face, eye, and mouth features. The processwas necessary thus in the next process there would be no too-far result difference because of the detected facial size, due to the different distances between the face and the camera and different variations of the environmental light intensity during capturing the image. The feature extraction was performed using the LBPH algorithm. The detected face would be compared to all faces in the database to find the most similar face to the detected face. The database was stored using CSV file format to show the names and directories of the faces that exist in the database.

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System Flow Diagram Algorithm -

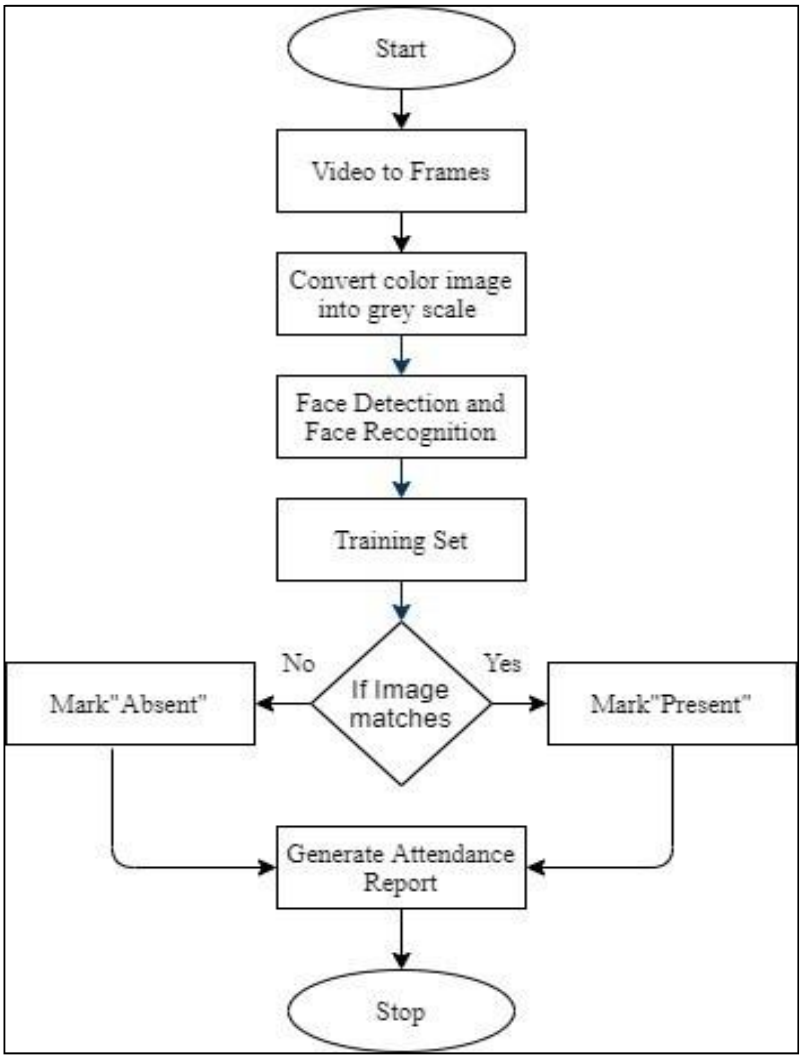

Fig.2: Flow Diagram

STEP 1 : Input image is captured as frames from a video.
STEP 2 : To convert the color image to greyscale
STEP 3 : Face Detection is done using the Haar Cascade classifier
STEP 4 : Face recognition is done using LBPH
STEP 5 : The face is compared with the trained image
STEP 6 : If the student is matched with the database
STEP 7 : If it matches the student in the database attendance marked on “PRESENT” the data-sheet.
STEP 8 : If it does not match the student database then the attendance is marked "ABSENT" on the data-sheet
STEP 9 : Generate a report STEP
STEP 10 : Update Attendance
STEP 11 : Continue Step 6
STEP 12 : Stop

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V.RESULTS

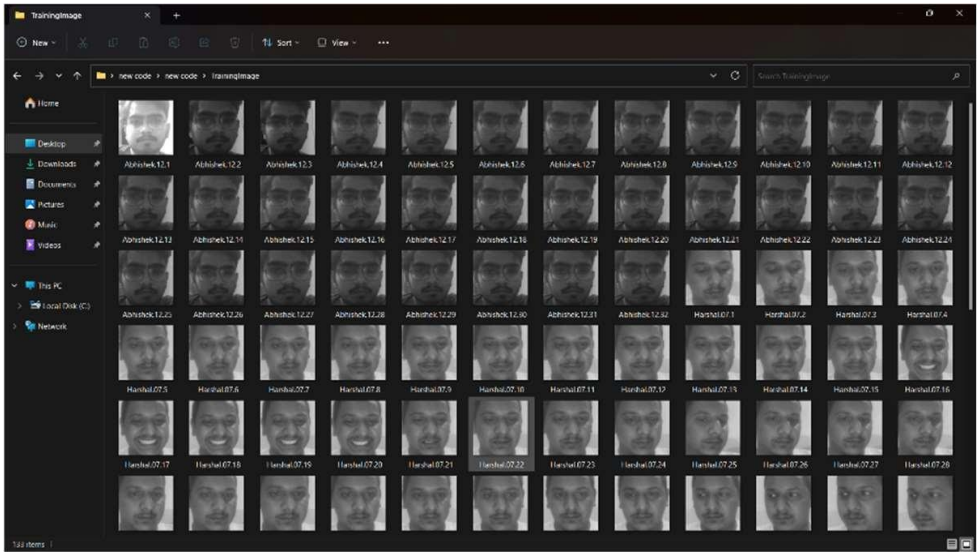

Fig : Face Capture

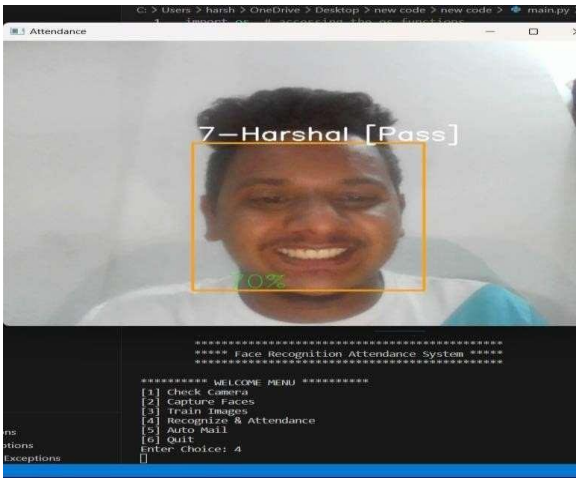

Fig : Face Recognition

VI. FUTURE SCOPE

 Improving accuracy: Although facial recognition technology has made significant progress in recent years, there is still room for improvement in terms of accuracy. Future research can focus on developing more advanced algorithms and improving the quality of the training datasets to improve recognition accuracy.

 Enhancing security: As facial recognition technology becomes more widely used, there will be an increasing need to ensure that the technology is secure and resistant to attacks, such as spoofing or hacking. Future research can focus on developing more secure algorithms and integrating additional security measures, such as multi-factor authentication or liveness detection.

 Integration with other technologies: Auto attendance systems for facial recognition can be integrated with other technologies, such as biometric identification, smart classrooms, or employee management systems. Future research can focus on developing more seamless integration and improving the interoperability of different systems.

 These systems save the time and effects of the attendance system. It is a good accuracy. The proposed method is the update the presence marking on the students. The system is used for schools, colleges, and libraries.

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VII.CONCLUSIONS

In conclusion, an auto-attendance system for facial recognition using OpenCV has the potential to improve efficiency, accuracy, and convenience in schools, universities, and workplaces. The proposed system offers an innovative solution for attendance tracking that is more efficient, secure, and accurate than traditional methods. The system is based on state-of-the-art facial recognition algorithms, which have shown promising results in recent years. By leveraging the power of OpenCV, the proposed system can provide real-time and accurate attendance tracking for large groups of people. However, there are also ethical considerations that must be taken into account when implementing facial recognition technology. It is important to address concerns

regarding privacy, bias, and discrimination to ensure that the system is fair and transparent. Additionally, the system must be secure and ensure the protection of the data being collected. Overall, an auto- attendance system for facial recognition using OpenCV offers a promising solution for schools, universities, and workplaces to streamline attendance tracking and improve efficiency. With continued research and development, this technology has the potential to become even more accurate, secure, and versatile in the future.

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