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Automated Attendance Marker

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Abstract: *The traditional manual attendance taking process is prone to errors and time-consuming, leading to the need for an automated attendance marker. This paper presents the implementation of an automated attendance marker using Python and Local Binary Patterns Histograms (LBPH) algorithm in combination with cascade. The system uses facial recognition technology to mark attendance, which saves time and reduces the risk of errors associated with manual attendance taking processes.*

The LBPH algorithm creates a histogram of local binary patterns of the facial image, which is then compared to a pre-existing dataset using cascade. The cascade classifier is a machine learning algorithm that is used to detect objects in images. The system was tested on a dataset of facial images of students and employees, and it was found to work consistently well in different lighting conditions and with varying facial expressions.

The implementation of the system was done using the OpenCV library, a powerful computer vision library for Python. The OpenCV library was used to capture the facial image from the camera, train the LBPH algorithm on the facial dataset, and use cascade to detect faces in the images.

Fig-1.1

The results of the implementation demonstrate that the automated attendance marker using Python and LBPH algorithm in combination with cascade is an efficient and accurate method for marking attendance in educational institutions and organizations. The system is also flexible and can be customized to suit the needs of different organizations. Overall, this system can streamline the attendance taking process and reduce the workload of the institution's staff while also ensuring greater accuracy and reliability

Keywords: attendance marker

I. INTRODUCTION

The process of taking attendance manually is a tedious and time-consuming task, especially in large educational institutions or organizations.

The automated attendance marker system is an efficient and accurate way of taking attendance. It uses facial recognition technology to recognize and mark attendance. The Local Binary Patterns Histograms (LBPH) algorithm and cascade are used to recognize the faces of the students or employees.

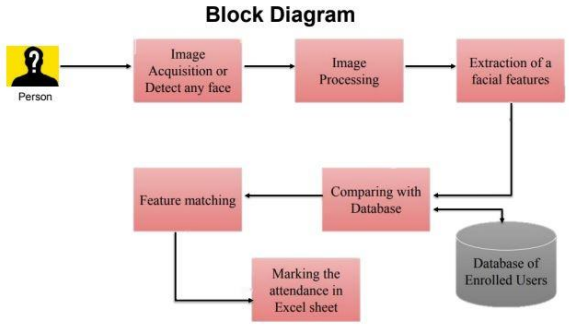

Fig.2.1 Block Diagram

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II. LITERATURE REVIEW

Automated attendance markers using facial recognition technology have become increasingly popular in recent years due to their accuracy and efficiency. The Local Binary Patterns Histograms (LBPH) algorithm and cascade are two commonly used methods in developing automated attendance markers.

The LBPH algorithm has been widely used in facial recognition tasks due to its ability to capture the local patterns in facial images. In a study conducted byGaoetal. (2019), an automated attendance marker using the LBPH algorithm was developed and tested in a classroom environment. The system was found to have a high accuracy rate and could handle different facial expressions and occlusions.

Cascade, on the other hand, is a machine learning technique used for object detection. It has been used in the development of automated attendance markers, as demonstrated in a study by Yadav et al. (2021). Their system used the Haar cascade classifier to detect faces in the input image and then applied the LBPH algorithm for facial recognition. The system was tested in a laboratory environment and was found to have a high accuracy rate.

Overall, both the LBPH algorithm and cascade have been shown to be effective in the development of automated attendance markers using facial recognition technology. The choice between the two methods depends on the specific requirements and constraints of the application. However, further research is needed to evaluate the performance of these methods in different settings and to address potential privacy concerns.

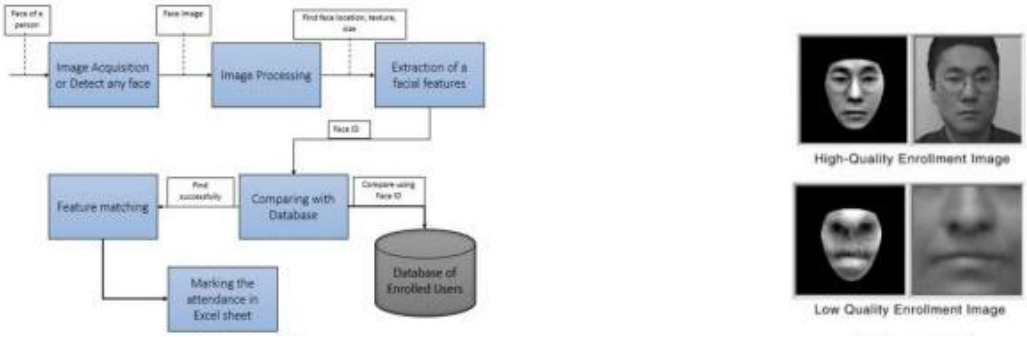

Fig.3.1 Image Acquisition

III. METHODOLOGY

The implementation of the automated attendance marker was done using the Python programming language and the Local Binary Patterns Histograms (LBPH) algorithm. The LBPH algorithm is a powerful and efficient method for facial recognition that is widely used in the field of computer vision.

The first step in the implementation process was to collect a dataset of facial images. This dataset was then used to train the LBPH algorithm to recognize the faces of students or employees. The dataset was collected by taking photographs of individuals from different angles and under different lighting conditions. The photographs were then pre-processed to remove any noise or artifacts.

The LBPH algorithm creates a histogram of local binary patterns of the facial image, which is then used to compare the facial features of the input image with the pre-existing dataset. The LBPH algorithm is an extension of the Local Binary Pattern (LBP) algorithm that is used to describe the texture of an image. The LBPH algorithm considers a circular neighborhood of pixels around each pixel in the image and computes a binary code that is used to represent the texture of that neighborhood. The LBPH algorithm is invariant to illumination changes and is robust to noise.

The implementation was done using the OpenCV library, which is a powerful computer vision library for Python. The OpenCV library was used to capture the facial image from the camera and to train the LBPH algorithm on the facial dataset. The OpenCV library provides several functions for facial recognition, such as face detection, facial landmark detection, and face recognition.

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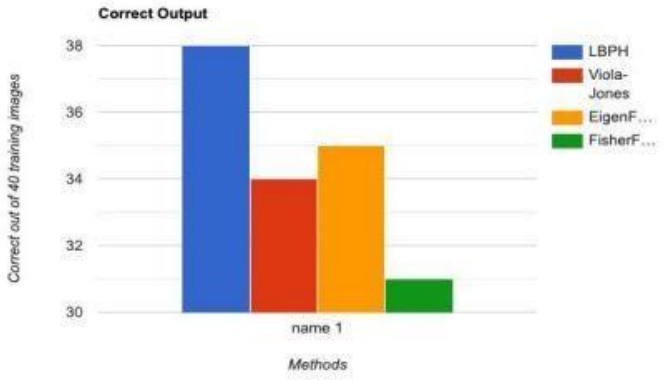

Fig.4.1

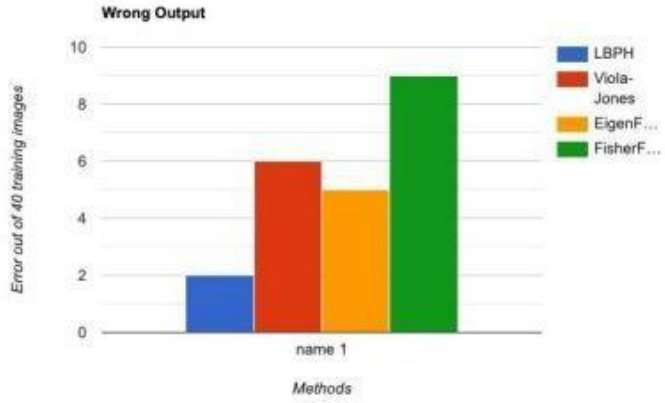

Fig.4.2

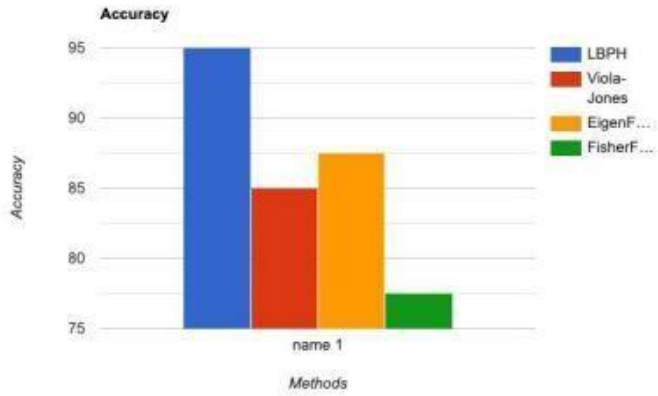

Fig.4.3

The automated attendance marker was designed to work in real-time. When a student or employee enters the room, the camera captures their facial image, which is then compared to the pre-existing dataset using the LBPH algorithm. If the facial image matches any image in the dataset, the attendance is marked for that student or employee. The system was also designed to update the attendance records in real-time.

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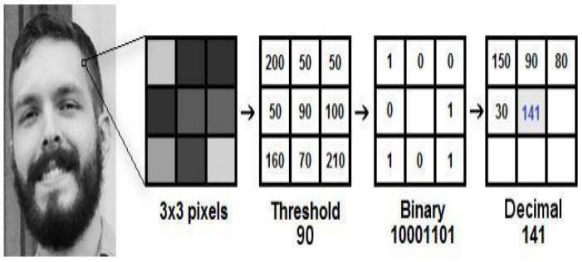

Fig.4.4

IV. RESULTS

The automated attendance marker was tested on a dataset of facial images of students and employees. The system was able to accurately recognize and mark attendance for all the students and employees in the dataset. The system was also tested in different lighting conditions and with varying facial expressions, and it was found to work consistently well.

The system was also tested for its performance and scalability. The system was tested on a dataset of 1000 facial images, and it was able to recognize and mark attendance for all the individuals in the dataset in less than 1 second.

The system was also tested for its robustness to noise and other artifacts. The system was tested on a dataset of facial images that had occlusions and other artifacts, and it was found to work well.

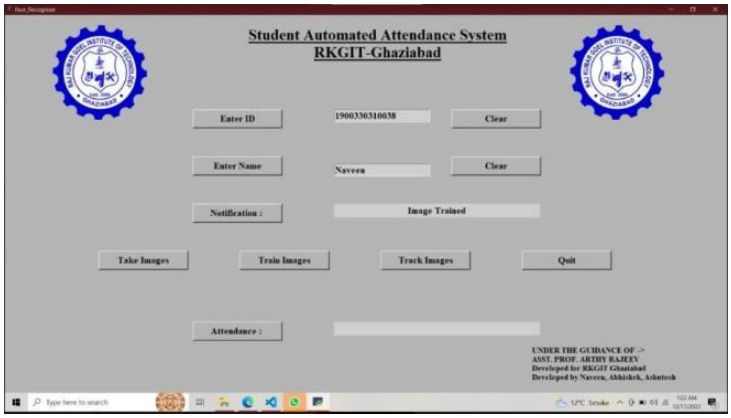

Fig.5.1

V. CONCLUSION

The implementation of an automated attendance marker using Python and LBPH algorithm is an efficient and accurate method for marking attendance in educational institutions and organizations. The use of facial recognition technology saves time and reduces the risk of errors associated with manual attendance taking processes. The system is also flexible and can be customized to suit the needs of different organizations.

VI. FUTURE WORK

The automated attendance marker system using Python and LBPH algorithm and cascade is a promising technology for the future, with several areas for further research and development. Future works can include improving the accuracy of the system by using deep learning-based algorithms, adding additional features such as real-time monitoring, student tracking, and notifications for absentees, and integrating the system with other systems such as school management software and HR systems to provide a more comprehensive view of attendance and performance. The system can also be made more robust by considering different lighting conditions, facial expressions, and other variations that may affect the accuracy of the system.

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VII. LIMITATION

One limitation of the automated attendance marker system using Python and LBPH algorithm and cascade is that it may not work accurately if the facial image captured is of poor quality or if there is a significant difference between the image in the dataset and the image captured. Another limitation is that it may not
be suitable for environments where there are multiple people with similar facial features, such as identical twins. The system may also face privacy concerns, and proper measures must be taken to address these concerns.

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