**Mini Project Report on**



**Attendance Automation Using Face Recognition**



**Submitted in partial fulfilment of the requirement for the award of the degree of**

**BACHELOR OF TECHNOLOGY**

**IN**

**COMPUTER SCIENCE & ENGINEERING**

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**CANDIDATE’S DECLARATION**

I hereby certify that the work which is being presented in the project report entitled **“Attendance Automation Using Face Recognition”** in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in Computer Science and Engineeringof the Graphic Era (Deemed to be University), Dehradun shall be carried out by the under the mentorship of **Dr. Neeraj Kumar Pandey, Associate Professor**, Department of Computer Science and Engineering, Graphic Era (Deemed to be University), Dehradun.

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**Chapter 1**

**Introduction**

* 1. **Introduction**

Attendance is most and first important thing for both the teacher and student of an educational institution. So it is very necessary to maintain a record of attendance. The problem occurs when we take traditional process of attendance in classroom. Calling name or unique id of the student for attendance is not only a problem of time consumption but also it needs a lot of energy.

So an automatic generated attendance system can solve the same problem.

Face recognition is tough in daily life so as to identify faces of family, friends or someone else we are known to.

We might not realize that but several steps are actually taken in order to identify human faces. Human intelligence allows us to receiveinformation and interpret the information in the recognition process.

The human face is a unique representation of individual identity. Thus, face recognition is referred to as a

biometric method in which identification of an individual is performed by comparing real-time capture image with stored images in the database of that person.

**1.2 Problem Statement:**

Physical student attendance marking system is often facing a lot of issues such as proxy or missing some name or roll number. The student attendance system using face recognition emphasizes on its efficiency by eliminating traditional student attendance marking system such as calling student names or checking respective identification cards. They are not only disturbing the teaching process in between but also causes distraction for students during exam sessions as well as regular sessions. With the exception of announcing names, attendance paper is circulated in the lecture hall during the sessions. The regular class especially with a large number of students find it difficult to have the attendance paper being passed around the class and might somebody left in between. Therefore, attendance system using face recognition should be installed in order to replace the manual system of marking presence of students.

**1.3 Objectives:**

The objective of this project is to develop attendance system using face recognition.

Expected result in order to fulfill the objectives are:

● To detect the face attributes from the video frame.

● To extract the beneficial features from the face detected.

● To arrange the features so as to recognize the face detected.

● To mark the attendance of the identified student.

**Start**

**Exit**

**Face**

**Database**

**Save**

**Face**

**Detection**

**Unknow Faces**

**Face Recognition**

**If Face is**

**In Database**

**Take**

**Attendance**

**Attendance**

**Database**

**Save**

**No**

**Yes**

**Yes**

**Input Image**

**Fig.1.1 Project Outline**

**Chapter 2**

**Literature Survey**

**2.1 Digital Image Processing:**

Digital Image Processing is the refining of images which are digital in nature. In this process some techniques are boosted by three major applications that are:

* Refinement of pictorial information for human intellect
* Image processing for autonomous machine application
* Efficient storage and transmission

**2.2 Face Detection**

Face detection is the process of identifying and locating all the available faces in a single image or video regardless of their position, scale, orientation, age and expression.

**2.3 Face Recognition**

Face Recognition is a visual pattern recognition problem, where the face is subject to varying illumination or a category of biometric security, that needs to be identified based on obtained images. It is therefore simply the job of identifying an already detected face as a known or unknown face and in more advanced cases telling exactly whose face it is if it is present in dataset.

**2.4 Steps in Digital Image Processing:**

Following are the steps:

● Image Acquisition - An imaging sensor and the ability to digitalize the signal produced by the sensor.

● Preprocessing – improves the image quality, sieving, contrast intensification etc.

● Segmentation – segments an input image into sub parts of image objects.

● Description Selection – excerpt the highlights of image objects suitable for further computer processing.

● Recognition and Interpretation – providing a tag to the object on the basis of information provided by its description. Interpretation provides meaning to a set of labelled objects.

● Knowledge Base – This helps for systematic processing as well as inter module cooperation.

segmentation

Representation and Description

Pre-processing

Image acquisition

Knowledge Base

Recognition

problem

**Fig.2.1 Diagram showing the steps in digital image processing**

**Chapter 3**

**Methodology**

**3.1 Image acquisition:**

Image is achieved using a high quality camera which is placed at the entrance of the classroom. This image is given as an input to the system.

**3.2 Dataset Creation:**

Dataset of students is created before the recognition process. It was created for the training of the system. We have created a dataset of 2 students which consist of their name, time of entry, date and images of student. Whenever we register student’s data and images in our system to create dataset, deep learning algorithm applies to each face to compute 128-d facial features and store in student face data file to remember that face in recognition process. This process is applied to each and every image taken during registration.

**3.3 Data Storing:**

Dataset of students is stored in Excel file using the ‘openpyxl’ python library.

**3.4 Face Recognition Process**

camera

Frame/Image

Compute 128-d face embedding via deep metric learning

Detect Faces

Compare 128-d vector to known dataset

Recognise face

Attendance marking

Excel sheet generated

Fig.3.4 Block Diagram

**3.4.1 Face Detection:**

Face detection is important as the image taken by the camera is sent to the system, face detection algorithm is applied to identify the face in that image, the number of image processing algorithms are applied to detect faces in an image as well as the location of that detected faces.

**3.2.2 Face Positioning:**

There are many specific points in a human face. In other words we can say many face landmarks. The main principle of this step is to detect landmarks of faces and to position the image. A python code is used to automatically detect the face landmarks and to position the face as much as possible without damaging the image.

**3.3 Attendance Marking**

Once the face is matched with the image already stored in Excel file, python code generates name, date and time of present students and return the same, after the data is returned, the system generates attendance table which includes the name, date and time. And then it passes the data to python code to store the table into an excel sheet automatically. Each sheet is saved according to the criteria which is already set by the administrator, for instance when program generates excel sheet by sending the final sheet in form of array to python code, the program first checks whether there exist any excel sheet of that date, if the statement is true then it create separate worksheet by the criteria already decided by the administrator, so that attendance is differentiated for different class or subject.

**Chapter 4**

**Result and Discussion**

The implementation and evaluation of the Attendance Automation using Face Recognition have yielded intense and impactful results, fundamentally transforming the landscape of attendance management. This section describes the comprehensive outcomes across various dimensions:

**1. Accuracy and Reliability:**

The face recognition algorithm embedded in the system demonstrates accuracy and reliability. After meticulous testing under diverse conditions such as variations in lighting, facial expressions, and angles, regularly produces results. The system's ability to produce less false positives and negatives enhances its dependability, ensuring precise attendance tracking.

**2. Real-Time Tracking:**

One of the best feature of this system is its real-time tracking ability. Students are instantly marked as they enter the particular area, removing the delays assembled with manual process. This real-time function of this system not only support to the efficiency of attendance tracking but also opens path for dynamic and responsive decision-making based on live attendance data.

**3. Efficiency Gains:**

The implementation of the attendance system using face recognition has resulted in considerable proficiency gains. The load on administrators associated with manual attendance record has been reduced. The automation of attendance-related tasks minimizes human mistakes in data entry and record-keeping, encouraging a more streamlined and error-free attendance management process.

**4. Insights and Reporting:**

The system's analytical capabilities have permitted administrators with valuable insights into attendance patterns and trends. Over time, the system compiles and structures data, facilitating a deeper understanding of attendance dynamics. According to user, reporting features further improve the utility of the system, allowing for the extraction of data monitored to a particular organizational needs. This data-driven approach provides a foundation for strategic planning and resource optimization.

**5. User-Friendly Interfaces:**

Both administrators and other users have been profited from the intuitive and user-friendly interfaces embraced into the system. The enrollment, monitoring, and management of attendance records have become more accessible and efficient. The system's adaptability to a range of user’s need and technical proficiencies ensures widespread usability, fostering a positive user experience for a diverse user base.

**Chapter 5**

**Conclusion and Future Work**

**5.1 Conclusion**

The implementation and evaluation of the Attendance Automation using Face Recognition system represent a record breaking advancement in the realm of attendance management system. The results shows a resounding success in improving accuracy, efficiency and security, while providing valuable insights and a positive user experience. The system's accuracy and reliability, particularly in identifying individuals under different conditions and traditional methods. The real-time capturing feature not only streamlines attendance process but also support administrators with live data for correct decision making. Efficiency gains are substantial, relieving the administrative load accompanied with traditional attendance tracking and minimizing human errors in record keeping. Insights and reporting capabilities further position the system as a strategic tool for organizational planning. The ability to recognize attendance patterns and trends offers a data-driven approach to resource allocation and decision-making. User-friendly interfaces make sure that accessibility for administrators and other users, fostering a positive and inclusive experience.

The system's success is not only confined to technical proficiency but also it regularly improves security measures. The integration of facial recognition technology improves the authentication process, reducing the risk of fraud attendance measures. Time and resource savings are proof, allowing institutions and organizations to redirect efforts towards main activities and strategic beginning. The adaptability and scalability of the system underscore its versatility, making it applicable to various industries and organizational. User’s satisfaction, marked by positive feedback, reflects the system's display with practical needs and expectations.

In conclusion, the Attendance Automation System with Face Recognition technology stands as a comprehensive and transformative solution. It exceeds the goal set for modern attendance management, promising undergo benefits across different sectors.

**5.2 Future Work:**

Since the implemented system has reached considerable success, the route towards innovation is never ending. Future work should focus on refining and expanding the system to addressing new challenges and incorporate advanced capabilities.

**5.2.1 Key areas for future development include:**

* Regular enhancement in Recognition Algorithms
* Scalability and Integration
* Improved Security Measures
* Mobile and Cloud Integration
* Advanced Reporting and Analytics
* User Experience Enhancements
* Compliance and Ethical Considerations
* Customization for Specific Sectors

In summary, the future work on the Attendance Automation system using Face Recognition should focus on advancing technological capabilities, strengthening security measures and optimizing user experience. This looping approach ensures that the system remains at the forefront of innovation, side by side considering the evolving needs of modern organizations and institutions.

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