

# Automated Face Detection System for Attendance Management in Educational Institutions

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**Abstract** - Face detection and face recognition are very important technologies these days, furthermore we noticed that they got have a variety of uses such as cellphones, army uses, and some high risk information offices. We decided to make a device that detects and recognize the face as a student attendance system and can be a substitute for the regular paper attendance system and finger print attendance system. The main function in our project is going to be done using Lab VIEW because, Lab VIEW is a very helpful programming tool in regards of facial uses and very helpful in other uses. Our project is based on a main program in Lab VIEW that detects and recognize faces with giving scores and parameters, furthermore the subsystems are an Excel sheet that is integrated with the program, and a messaging device that is for either a message for absent students or to the student's parents. Face detection attendance system uses facial recognition technology. This technology works by capturing an image of the face and analyzing it to identify unique facial features such as the distance between the eyes, nose, and mouth, the shape of the jaw line, etc. These features are then compared to a database of registered faces to determine the identity of the person. The technology also uses machine learning algorithms to improve its accuracy and speed as it is used. This allows the system to quickly and accurately recognize faces even in low light conditions or when the person is wearing glasses or a face mask.

**Keywords:** Face Detection, Face Recognition, in Lab VIEW.

## I. INTRODUCTION

Design of an automatic class attendance system using face detection algorithm of Lab VIEW software. The system requires a video capture device and the running Lab VIEW algorithm to be implemented successfully. It detects the faces and mark attendance accordingly. This system will prevent unnecessary wastage of time of classes that is usually wasted in form of class roll calls. In today's fast-paced world, where technology continues to redefine the way we live and work, traditional methods of attendance tracking have become

increasingly outdated and inefficient. Conventional attendance systems, relying on manual entry or card based mechanisms, are not only time-consuming but also prone to errors and manipulation. Recognizing this challenge, the Face Detection Attendance System emerges as a cutting edge solution, ushering in a new era of attendance management.

## II. LITERATURE SURVEY

Zhumaniyaz Mamatnabiyev, "Development of Attendance Monitoring System using IoT Technologies". Recently, applications of Internet of Things (IoT) technologies have been established in many organizations offering low-costed, low-powered, automatic systems. In addition, IoT systems are secure, less time-consuming, and controlled remotely. Implementing IoT technologies in managing the educational process makes huge changes by creating digital classrooms and automation systems. However, taking students' absence reports is still a critical element or issue in the education sector that is more paperwork, which is time-consuming, requires much workforce and efforts, and imposes inefficiency.

Payal Patil, S. Shinde, "Comparative analysis of facial recognition models using video for real time attendance monitoring system." Attendance reporting is one of the standard processes across the world in academic institutions. The key purpose is to encourage consistency in attending school which in turn improves the learning process for a student. The manual attendance system is widely used in the educational system which is time-consuming as well as laborious. The main concept behind the automatic attendance system is to apply facial recognition effortlessly compared to other biometric systems.

S. Matilda, K. Shahin "Student Attendance Monitoring System Using Image Processing". Attendance is a mandatory regularity of each organization. Manual attendance marking may be a troublesome, and time overwhelming work. It's vulnerable to error and manipulation to be happed. This system provides an economical and good methodology for

marking attendance. Face recognition is an identification of human by distinctive feature of their faces. It works with most blatant individual identifier of the face. Student attendance observation system is an automatic methodology for distinctive supportive student from advanced picture or video frame. Group of student image is captured and also the recognized on an individual basis.

Shubhobrata Bhattacharya, Gowtham Sandeep Nainala, Prosenjit Das, Aurobinda Routray, “Smart Attendance Monitoring System (SAMS): A Face Recognition Based Attendance System for Classroom Environment.” In present academic system, regular class attendance of students' plays a significant role in performance assessment and quality monitoring. The conventional methods practised in most of the institutions are by calling names or signing on papers, which is highly time-consuming and insecure. This article presents the automatic attendance management system for convenience or data reliability. The system is developed by the integration of ubiquitous components to make a portable device for managing the students' attendance using Face Recognition technology.

Tarun Sharma, S. L. Aarthy, “An automatic attendance monitoring system using RFID and IOT using Cloud.” If we talk about the current scenario of our education system than we found that we have lot of technologies to use but still we are following the traditional system. We if we talk about the attendance system in universities and schools, lecturers did that work manually. Lecturers took the attendance and update it manually in the database.

### III. PROPOSED SYSTEM

To maintain secure attendance record system, the concerned faculty might have a proper methodology for checking and consistent maintaining of attendance record. There exist two methods of maintaining attendance framework like Manual Attendance System and Automated Attendance System. With Manual working attendance faculties experiences more drawbacks to maintain the attendance of the students in the classroom continuously. In a classroom high student-teacher ratio makes the difficulty of maintaining the attendance in proper format each day. This process of maintaining physical attendance format for every student and consolidating it regularly makes process tedious. Now by implementing the automatic Attendance maintaining using face recognition of the students and faculties the Automated Attendance System limits the manual marking on daily basis. [1] With the attendance system incorporating Recognition of Human Face, it is very advantageous that a student presence is monitored by capturing different facial expressions as image when he or she enters the class or after all students is sitting

inside the room. Basically the techniques used in face recognition are Brightened and featured one which uses face representations with expressions on the face with some specific featured attributes.



Figure 1: Proposed Methodology

#### Image Acquisition:

It is the process of taking an image out of a source—usually one that is hardware-based—in order to process it. The hardware-based component of our concept is WebCamera. It is the initial stage in the workflow sequence since a picture is necessary for all processing to be done. The resulting image has not undergone any kind of processing.

#### Segmentation:

Segmentation is the process of taking items out of the background of an image that has been taken. The segmentation process makes use of edge detection, context subtraction, and skin-color detection. Recognizing gestures requires the detection and segmentation of hand motion and location.

#### Features Extraction:

Preprocessed images are used to extract predefined features, such as form, contour, geometrical feature (position, angle, distance, etc.), color feature, histogram, and others, which are then utilized for sign identification or classification. A step in the dimensionality reduction process that separates

and arranges a sizable amount of raw data is feature extraction.

Lowered to more manageable, smaller classrooms Processing would be easier as a result. The most significant aspect is the sheer quantity of variables present in these enormous data sets. This data requires a significant amount of processing power to process. So, by choosing and combining variables into functions, function extraction helps to extract the optimal feature from enormous data sets. These features accurately and uniquely describe the actual data collection process, and they are also very user-friendly.

#### Preprocessing:

Preprocessing techniques such as erosion, dilation, and Gaussian smoothing are applied to each image frame in order to remove noise. Converting a color image to grayscale results in a smaller image. Grayscale picture conversion is a popular way to minimize the quantity of data that needs to be processed. Preprocessing goes through the following phases:

##### a) Morphological Transform (Morphological Transform):

To produce an output image with a comparable size, morphological processes employ a structural feature on the input image. To find the value of each pixel in the output image, it compares the matching pixel in the input image with its neighbors. Morphological alterations come in two flavors: erosion and dilation.

**Dilation:** The output pixel's value is the maximum value of all the nearby pixels. If every pixel in a binary image has the value 1, then that pixel is set to 1. Morphological dilatation closes tiny gaps and makes artifacts more visible.

**Erosion:** The value of the o/p pixel is the lowest of all the nearby pixels. In a binary image, a pixel is set to 0 if every one of its neighbors is also 0. Morphological erosion removes minor artifacts, leaving behind larger objects.

##### b) Blurring:

Blurring occurs when an image is passed through a low-pass filter. In computer vision, the term "low-pass filter" describes a technique for removing noise from an image while preserving the integrity of the remaining portion. Before moving on to more complex tasks, including edge detection, a blur is a basic process that needs to be finished.

##### c) Thresholding:

Thresholding is a type of image segmentation where an image's pixels are altered to facilitate picture interpretation. The act of turning a grayscale or color image into a binary—

basically, black and white—is known as Thresholding. Thresholding is most frequently used to choose regions of interest in an image while disregarding the parts we don't care about.

##### d) Recognition:

In this instance, classifiers will be used. The techniques or algorithms used to interpret the signals are called classifiers. The Hidden Markov Model (HMM), K-Nearest Neighbor classifiers, Support Vector Machine (SVM), Artificial Neural Network (ANN), and Principle Component Analysis (PCA) are a few popular classifiers that recognize or comprehend sign language. CNN will be used as the classifier in this research, nevertheless. CNNs are utilized for picture recognition and classification due to their high precision. Utilizing a hierarchical paradigm, the CNN creates a network akin to a funnel before producing a fully-connected layer that processes the output and connects all of the neurons.

## IV. RESULTS AND DISCUSSIONS

It can be inferred from the results that the validation test of the Plant Leaf Disease Detection using CNN was considered legitimate that the system is a valuable tool for attendance system.

The study here discussed the background of the work and the limitations which they had. This research also dealt with the advantages and disadvantages of the Face recognition and count system and the proposed changes that will help the system to become better. The data analysis section enlightened on the Convolutional Neural Network techniques for facial recognition and also gave an assumption as to how the system can be modified to include the functionality to detect multiple faces and count frames at the same time.

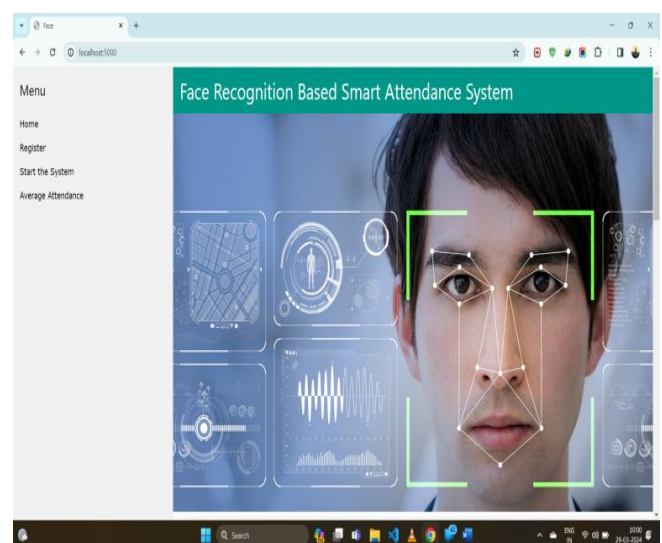


Figure 2: Home Page

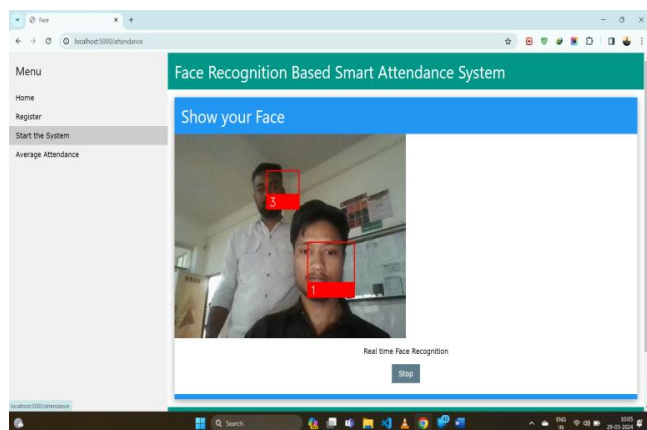


Figure 3: Face Recognition

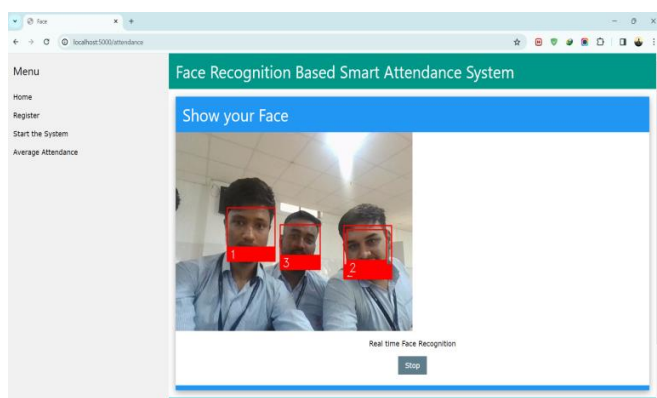


Figure 4: Multi Face Recognition

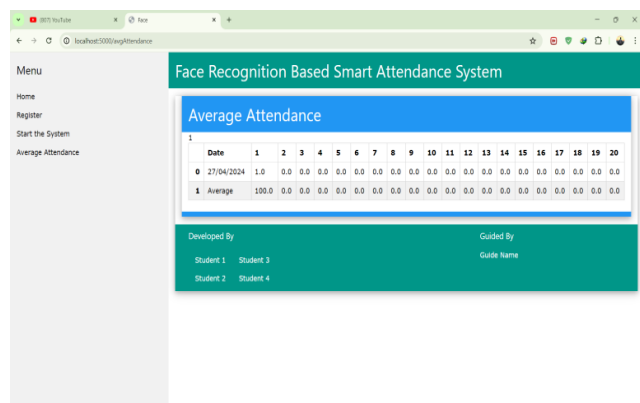


Figure 5: Final Output

## V. CONCLUSION

The face detection attendance system is a software solution that uses facial recognition technology to automate the traditional attendance taking process. It identifies the faces of students or employees in real-time and accurately records their attendance, eliminating the need for manual tracking and reducing the administrative burden. The system is user-friendly, convenient, and more secure than traditional attendance recording methods. Implementation of the system provides benefits that extend beyond attendance tracking,

including enhanced security, real-time tracking, and notifications. Overall, the system provides a significant improvement in accuracy, efficiency, cost and time savings for organization.

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**Citation of this Article:**

Abhishek Nikam, Girish Devgirikar, Kunal Nikam, Sangharshpal Thorat, Prof. Renuka Kanojiya, "Automated Face Detection System for Attendance Management in Educational Institutions", Published in *International Research Journal of Innovations in Engineering and Technology - IRJIET*, Volume 8, Issue 4, pp 218-222, April 2024. Article DOI <https://doi.org/10.47001/IRJIET/2024.804031>

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