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# FACERCLASSROOM: SMART ATTENDANCE SYSTEM

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*Abstract:* **Traditional attendance management systems in higher education institutions are time-consuming, intrusive, and error-prone. Manual attendance marking systems, such as calling out student names or passing around an attendance sheet, are inefficient and can lead to inaccuracies in attendance records. Automated attendance management systems using face recognition are a promising solution to these problems. These systems use cameras to capture images of students and then compare them to a database of enrolled faces. If a match is found, the student is marked as present. Face recognition attendance systems are less intrusive, more efficient, and more accurate than traditional methods. They also provide teachers with an up-to-date record of attendance. Researchers are developing new face recognition attendance systems that a retailored to the specific needs of higher education institutions. For example, one system uses a computer vision and deep learning algorithm to mark the attendance of students as they sit in class. It considers various factors such as head pose sharpness, resolution, and brightness of face images to compute a comprehensive quality score. Additionally, the authors present a deep learning-based face representation technique for extracting low-dimensional features from images, enhancing further processing efficiency. In the realm of attendance systems, previous methodologies including punch card systems and modern RFID or NFC technology have been widely explored for efficient record-keeping in institutions. Face recognition attendance systems have the potential to improve attendance management in higher education institutions by making it more efficient, accurate, and less intrusive.**

*Keywords:* **Automated attendance management, Facial recognition technology, Enhanced efficiency and accuracy, Non-intrusive and seamless attendance tracking, Real-time attendance data and insights, Improved student engagement and performance, Reduced administrative burden for educators Promising solution for traditional attendance methods Tailored for higher education institutions, Revolutionizing attendance management practices, Attendance management, Higher education Face recognition, Traditional methods Intrusiveness, Efficiency, Accuracy, Computer vision, Deep learning.**

## I. INTRODUCTION

A smart attendance system represents a technological advancement in shadowing and managing attendance in colorful sectors, including education and business. This system leverages innovative technologies to automate and streamline the attendance recording process, offering multitudinous advantages over traditional homemade styles. It plays a pivotal part in enhancing effectiveness, delicacy, and security, making it an essential tool for ultramodern associations. The conventional system of taking attendance manually through paper records or physical check- sways is prone to crimes, time- consuming, and frequently hamstrung, especially in large institutions or associations. In discrepancy, a smart attendance system harnesses digital results and data- driven approaches to give a further accessible and dependable way of monitoring attendance. These systems can incorporate colorful technologies similar as biometrics (like facial recognition), RFID, QR canons, or mobile operations to insure that attendance data is captured directly and in real- time. By automating the process, it reduces the executive burden on staff, minimizes the liability of crimes, and allows for flawless data operation and reporting. Smart attendance systems are protean and adaptable to different surroundings, offering benefits like bettered responsibility, data security, and the capability to induce comprehensive attendance reports painlessly. As technology continues to advance, these systems are poised to come an integral part of effective attendance operation in educational institutions, businesses, and colorful other sectors.

## II. LITERATURE SURVEY

A novel method for evaluating face quality in attendance systems is presented in this paper. The suggested method can be used to instantly evaluate the quality of a facial image and is based on the Original Double Pattern (LBP) driver. To calculate a final quality score, the method

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considers the head disguise, sharpness, clarity, and brilliance of the facial image. Additionally, the authors suggest a face representation system based on deep literacy that can be used to identify low-dimensional elements in face photos and prioritize them for additional processing. It has been demonstrated that the suggested method, which estimates a real-world dataset of face photos, can high delicacy in face quality assessment. In early times a punch card system was used for data storehouse, also known as Hollerith cards, through which companies were suitable to store and pierce via entering the card into the computer system It's also generally used currently as an attendance system in educational institutions. workers waive their individual cards near a anthology to punch in and out, icing the presence of the hand. There are relatively several former inquiries in the field of computer wisdom developed scholars' attendance shadowing system to ameliorate record taking in class using different technologies. For illustration, RFID or near field communication (NFC) technology. Another paper proposed an automatic attendance operation system exercising real- time computer vision algorithms. It employs non-intrusive cameras to compare facial images with a database, exercising HAAR CLASSIFIERS and grayscale conversion. Another system implements automatic attendance using face recognition, employing MATLAR with PCA for object birth, yielding promising results. The paper introduces FACER CLASSROOM (SMART ATTENDANCE SYSTEM), a new approach to streamline attendance operation by exercising facial recognition technology. ASAS employs the LBP(Original double Pattern) algorithm for image representation and bracket, chosen for its robustness against variations in disguise and illumination. The system captures images of individuals, compares them to a database of enrolled scholars, and marks attendance when a match is set up. The database is streamlined automatically upon pupil registration, including their name and roll number. By automating the attendance process, FACER CLASSROOM minimizes trouble and efficiently tracks pupil presence, offering a practical result for day- to- day attendance operation.

## III. PROPOSED METHODOLOGY

In the proposed system shown in Figure 5, the dataset is created for all scholars registered in the class, The scholars were ladies and males between the periods of 18 to 28. The system directors input the scholars' data(name and pupil ID) and also upload the scholars' typical images to the system, using a mobile videotape camera with 12 mp wide detector f/1.6 orifice 26 mm focal length linked to the system. The single videotape for each pupil is divided into thirty frames, which include images of the pupil's face from five different positions which are from the front, 45 ° to the right side, 90 ° to the right side, 45 ° to the left side, 90 ° to the left side in real classroom terrain under multiple lighting conditions where three lighting conditions used(high, medium, low). The dataset of the proposed model includes 3900 faces images belong to 130 scholars, 30 faces images for each pupil. This dataset is divided in to 80 samples for training and 20 samples for testing. The dataset consists of 64 males and 36 ladies. Haar Cascaded Classifier is used to descry the position of the face in the image. The value of1.2 is specified for the drone factor of the Haar Cascade hunt box, which is used while searching for (features) of the face in the image. Where the hunt begins with a small box and also grows by and continues to increase by this value each time. While the coming hunt box is set two pixels down from the first box, and so on.

There are too numerous Haar Cascade features (160.000) that identify the face in the image and by searching for these (features), the position of the face is detected in the image.

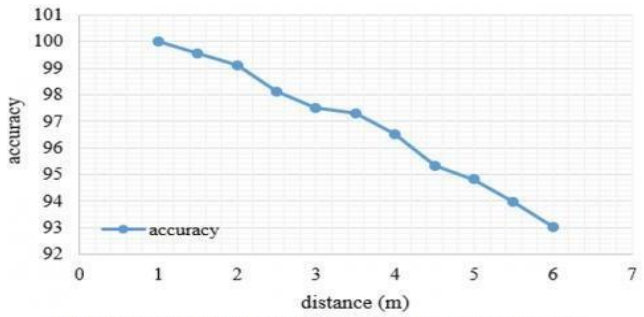


**Figure 8.** Inversely proportional to the accuracy of the system with distance

$$D= (\sum(hist1_i\text{-}hist2_i)^2)^{1/2} \quad (1)$$

By changing the lowest distance (D) between(CD) and( ED), can specify which embedding belong to which person. The process of comparing the embedding of the image from the camera will be repeated with the number of embeddings saved in the (embeddings database), until it's set up the lowest distance (D). SQLite3 is used in the proposed model

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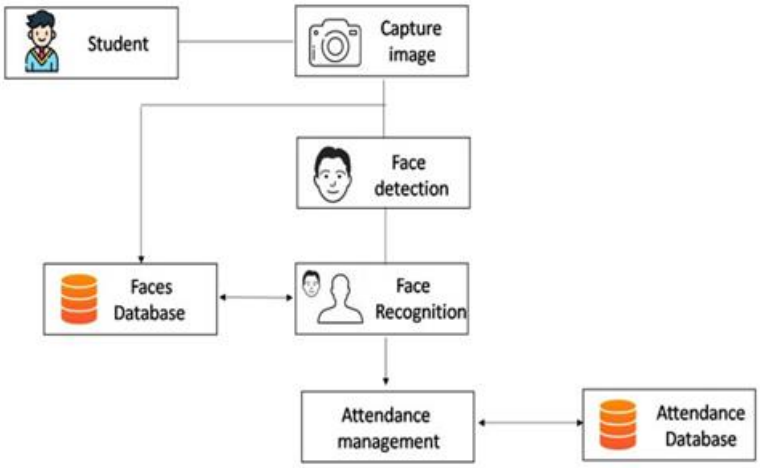
for database operation. The list of names of attendees and absent scholars is saved using SQLite3. Where, each face coming from the camera and honored (with the smallest distance value), will take the name attached to the embedding, which matches this face. The names are saved in the list of known faces (names of attendees). A comparison is made between the list of all scholars' names and the list of those present (given faces) to identify the names of the absent scholars and save them in the database. The proposed system was tested using a real time videotape, where a group of scholars and non-registered persons shared in the test. Results and Discussion-First, the schoolteacher uses their mobile device to capture real time videotape for the scholars in the classroom. The proposed system operation allows the mobile device to be linked to the system computer, to use the mobile device camera. The operation of the proposed system also allows preceptors to pierce the system computer, where attendance data is collected and stored. Directly the Haar Cascade algorithm is enforced on captured videotape, to get individual faces by using line and edge features. The Haar Cascade algorithm focuses on the corridor of the face that are useful for discovery (region of interest). By cropping, the algorithm discards the other corridor of the image that aren't useful in discovery and matching operations. Once the faces are detected, they're uprooted and stored. The proposed system was tested using a real time videotape, where a group of scholars and non-registered persons shared in the test. The pupil attendance database is created after the face recognition process is completed, and it's dealt with using a simple web operation. In addition, the attendance operation system can be penetrated either via a mobile phone or a computer, as SQLite3 lines are collected and uploaded to the pall garçon. The operation of the proposed system uses the SMTP protocol to shoot e-mail and is characterized by a clear and easy to use interface.




## IV. COMPARISON ANALYSIS

**1. Accuracy and Real-time Tracking:**
Proposed System: The proposed system offers enhanced accuracy and real-time attendance tracking through multiple methods, including machine learning algorithms.

Existing System: The existing system may rely on manual attendance capture methods, which are prone to errors and may involve significant delays in data entry.

**2. Multiple Capture Methods:**
Proposed System: The proposed system integrates various attendance capture methods, such as biometrics, QR codes, and mobile apps, offering flexibility to users.

Existing System: The existing system may have limited attendance capture options, such as manual methods or a single technology.

**3. Automated Notifications and Alerts:**
Proposed System: The proposed system automatically notifies parents, guardians, teachers, and administrators of attendance events.
Existing System: The existing system may not have automated notification systems in place.

**4. User Personalization and Insights:**
Proposed System: The proposed system offers personalized user experiences and data-driven insights into attendance patterns.
Existing System: The existing system may lack personalization features and analytical capabilities.

## V. RESULT

The Smart Attendance System interface has been successfully developed and enforced. It efficiently captures high- quality images of individual scholars, icing clarity and delicacy for recognition purposes. These images are also

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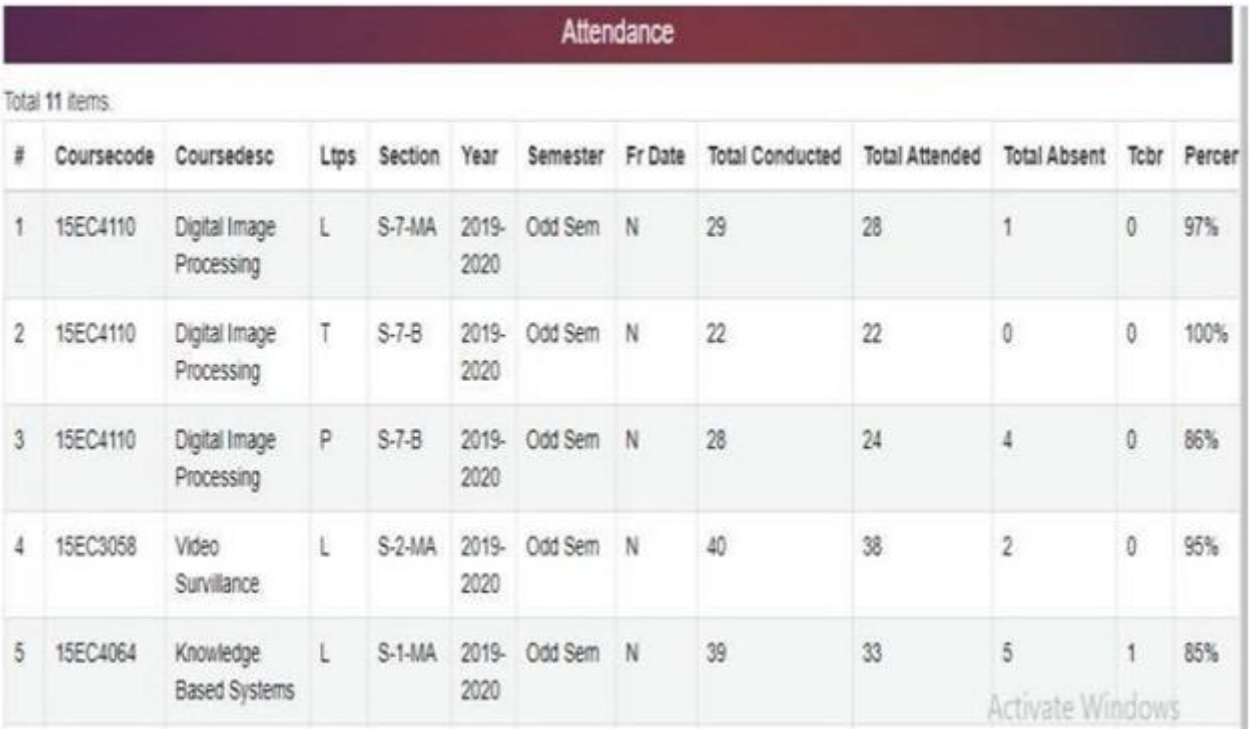
stored securely in the training dataset, easing nonstop literacy and enhancement of the recognition algorithms. likewise, the system's advanced shadowing capabilities enable real- time monitoring of pupil attendance. By assaying and matching the captured images with the stored dataset, the system can instantly identify and mark pupil attendance, furnishing a dependable and effective result for classroom operation.



Attendance

Total 11 items.

| # | Coursecode | Coursedesc | Ltps | Section | Year | Semester | Fr Date | Total Conducted | Total Attended | Total Absent | Tcbr | Percer |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15EC4110 | Digital Image Processing | L | S-7-MA | 2019-2020 | Odd Sem | N | 29 | 28 | 1 | 0 | 97% |
| 2 | 15EC4110 | Digital Image Processing | T | S-7-B | 2019-2020 | Odd Sem | N | 22 | 22 | 0 | 0 | 100% |
| 3 | 15EC4110 | Digital Image Processing | P | S-7-B | 2019-2020 | Odd Sem | N | 28 | 24 | 4 | 0 | 86% |
| 4 | 15EC3058 | Video Survillance | L | S-2-MA | 2019-2020 | Odd Sem | N | 40 | 38 | 2 | 0 | 95% |
| 5 | 15EC4064 | Knowledge Based Systems | L | S-1-MA | 2019-2020 | Odd Sem | N | 39 | 33 | 5 | 1 | 85% |

Activate Windows

## VI. CONCLUSION

The relinquishment of smart attendance systems represents a significant shift in how institutions and associations manage attendance. Unlike traditional homemade styles, which are prone to crimes and frequently bear tedious paperwork, smart attendance systems streamline the process by automating attendance recording. This robotization not only saves time but also enhances delicacy, as it reduces the liability of mortal error in data entry. One of the name features of these systems is their capability to give real- time shadowing of attendance. This means that directors can pierce up- to- the- nanosecond data on who is present or absent, allowing for prompt intervention if necessary. For illustration, in an educational setting, real- time attendance shadowing enables preceptors and academy directors to identify scholars who may be skipping classes regularly and take applicable measures to address the issue. likewise, the convenience offered by smart attendance systems benefits both directors and attendees likewise. scholars or workers can fluently check in using colorful styles similar as biometrics, QR canons, or mobile apps, barring the need for homemade attendance- taking processes. This not only simplifies the process for attendees but also reduces the executive burden on staff responsible for managing attendance records. The digital nature of smart attendance systems also ensures data security. Attendance records are stored in secure databases, reducing the threat of tampering or loss. This is particularly important for associations that handle sensitive information, similar as seminaries or businesses, as it helps maintain the integrity and confidentiality of attendance data. also, the capability to induce comprehensive attendance reports and analytics empowers institutions and businesses to hold individualities more responsible for their attendance. By having access to detailed attendance data, directors can identify trends, track performance, and address any issues that may arise instantly. Another advantage of smart attendance systems is their rigidity. They can be customized to suit the specific needs and conditions of different surroundings, whether it be a classroom, office, or event venue. This inflexibility ensures that the system can seamlessly integrate into being workflows and processes without causing dislocation. Looking to the future, smart attendance systems hold the implicit for farther inventions. As technology continues to advance, we can anticipate to see advancements in areas similar as biometric recognition, prophetic analytics, and integration with other systems. These advancements will further ameliorate the effectiveness and effectiveness of attendance operation, making smart attendance systems an

essential tool for institutions and associations seeking for excellence in this aspect of their operations.

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