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SMART EXAMINATION HALL

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Abstract:- **Attendance System:- At the beginning end of each session, The attendance is an important aspect of the daily classroom Evaluations the teachers normally check it although it's possible that a teacher will miss someone student answers many times. Face recognition- based attendance system is a solution to the problem recognizing face for the purpose of collecting attendance. To address these issues, the paper suggests that a computer-based attendance management system using computer vision technology can be an effective solution. Computer vision involves the use of camera, sensor and algorithms to identify and analyze visual data, including images of individuals.**
First: - It can be faster and more accurate reducing the time and effort needed to manage attendance manually.
Second: - It can provide real-time updates on attendance status, allowing teachers to track students who arrive late or leave early.
Finally: - It can generate reports on attendance status, allowing administrators to identify and Address issues related to student attendance.

Seating Arrangement System:- Examination Hall Seating Arrangement System is developed for the college to simplify examination hall seating arrangement system. It facilitates to access the examination information of a particular student in a particular class. The purpose of developing exam hall seating arrangement system is to computerized the traditional way of conducting exams. Mostly students are facing many problems for finding the exam hall, so a newly invented concept helps to generate their exam hall arrangement easily. It is also very useful for the college where the software may generate the hall separation and concerned reports. Hence manual Excel sheet and paper work is automated based on their departments and register numbers. Another purpose for developing this software is to generate the seating arrangement report automatically during exams at the end of the session or in between the session. The scope of the project is the system on which the software is installed, and it will work for an institute. Mostly students are facing many problems for finding the exam hall and their seats respectively. A newly invented concept can aid for the students for checking their exam halls. This helps them to identify the floor or get directions to their respective halls without delays. The students details have information about all the students who attend the examination. It contains the name of the student, registration number, branch of the student and the examination hall number.

Keywords—Face Recognition, Attendance System, Seating Arrangement System, Data Base

1. INTRODUCTION

Presently, the seating arrangement for the examinations is done manually. Initially the examination section has to collect all student examination registration details name, roll/registration number, semester, branch, year, list of subjects registered for examination. The administrator needs to count the total number of students registered. Then he needs to select the rooms and divide the students among those rooms. After dividing the rooms, he needs to prepare the seating arrangement list for each room based upon the count of the student. All this work needs to be done for each examination and for each branch and year. This is very tedious work and there are many chances for mistakes to occur due to manual work. The “Examination Hall Seat Allotment System” atomizes the existing system of assigning seating arrangement. When a student enter in an examination hall, this system stores student examination registration details such as name, registration number branch, semester, year, & subjects. These details can be efficiently used whenever required. The system takes the details as input from the database depending upon the selected branch, semester and year. The system asks for subject of the examination to be conducted, seat number, room details and allocates room. An automatic seating arrangement detection system using Python in an examination hall is a technology-driven solution designed to monitor and identify unauthorized activities, such as human detection, during examination. This system is typically implemented using a combination of hardware and software components to ensure examination integrity.

2. PROJECT OVERVIEW

Objective:

The primary goal of the smart exam hall project is to automate the attendance tracking during exams using image processing techniques.

Components:

1. Camera System:
   - Install cameras strategically in the exam hall to capture images of the students.
   - Ensure proper lighting conditions to capture clear image.

2. Image Capture:
   - Use high-resolution cameras to capture images of the exam hall.
   - Implement image capture algorithms to ensure the clarity and quality of the images.

3. Face Detection:
   - Employ face detection algorithms to locate and extract faces from the captured images.
   - Popular libraries like OpenCV can be used for face detection.

4. Face Recognition:
   - Utilize face recognition algorithms to match detected faces with a database of enrolled students.
   -Consider using deep learning models like Convolutional Neural Networks (CNNs) for accurate face recognition.

5. Attendance Tracking:
   - Record the attendance of students based on the identified faces.
   - Maintain a real-time or post-exam attendance database.

6. Alerts and Notifications:
- Implement a system to generate alerts or notifications for any anomalies, such as unrecognized faces or multiple detections for the same student.

7. Security Measures:
   - Implement security features to prevent tampering with the system, ensuring the integrity of the attendance data.

8. User Interface:
   - Develop a user interface for administrators to monitor attendance and manage the system.
   - Include features like generating reports and exporting attendance data.

9. Integration with Database:
   - Integrate the system with a database to store and manage student information and attendance records.

10. Scalability:
   - Design the system to be scalable for larger exam halls or multiple exam rooms.

11. Testing and Calibration:
   - Conduct extensive testing to ensure the accuracy and reliability of the system.
   - Implement calibration processes to handle variations in lighting and environmental conditions.

3. LITERATURE SURVEY

This Research work concentrates on face recognition problem as a part of biometric attendance system. Face recognition has been an active research area over last 30 years. This Research spans several disciplines such as image processing, pattern recognition, computer vision and neural networks. Face recognition has applications mainly in the fields of biometrics, access control, law enforcement, and security and surveillance systems. The problem of face recognition can be stated as follows:
Given still images or video of a scene, identifying one or more persons in the scene by using a stored database of faces. The face recognition system with images from the known individuals and classifying the newly coming test images into one of the classes is the main aspect of the face recognition systems. This Problem seems to be easily solved by humans where limited memory can be the main problem, whereas the problems for a machine face recognition system are:

- Change in facial expression
- Illumination Change
- Aging
- Pose change
- Scaling factor
- Occlusion due to scarf, mask or obstacles in front.

The problem of automatic face recognition (AFR) is a composite task that involves detection of faces from a cluttered background, facial feature extraction, and face identification. A complete face recognition system has to solve all sub problems, where each one is a separate research problem. This research work concentrates on the problem of facial feature extraction and face identification. Most of the current face recognition algorithms can be categorized into two classes, image template based and geometry feature-based. The template based methods compute the correlation between a face and one or more model templates to estimate the face identity. Whereas feature based methods extract local facial features and use their geometric and appearance properties. The face is our primary focus of attention in social intercourse, playing a major role in conveying identity and emotion. We can recognize thousands of faces learned throughout our lifetime and identify familiar faces at a glance after years of separation. Computational models of face recognition, in particular, are interesting because they can contribute not only to theoretical insights but also to practical applications. Computers that recognize faces could be applied to a wide variety of problems, including criminal identification, security systems, image and film processing, and human computer interaction. Unfortunately, developing a computational model of face recognition is quite difficult, because faces are complex. Eigen face is a face recognition approach that can locate and track a subject's head, and then recognize the person by comparing characteristics of the face to those of known individuals

4. PROBLEM STATEMENTS

In existing system allocation of seating arrangement is done manually, making lot of paper work. Most of the students feel augean to search their allotted seat during examination.

Seating Arrangement Generation:

The system must generate a seating arrangement for candidates taking an exam in an examination hall.

Attendance Tracking:

Monitoring candidate attendance during the examination hall.

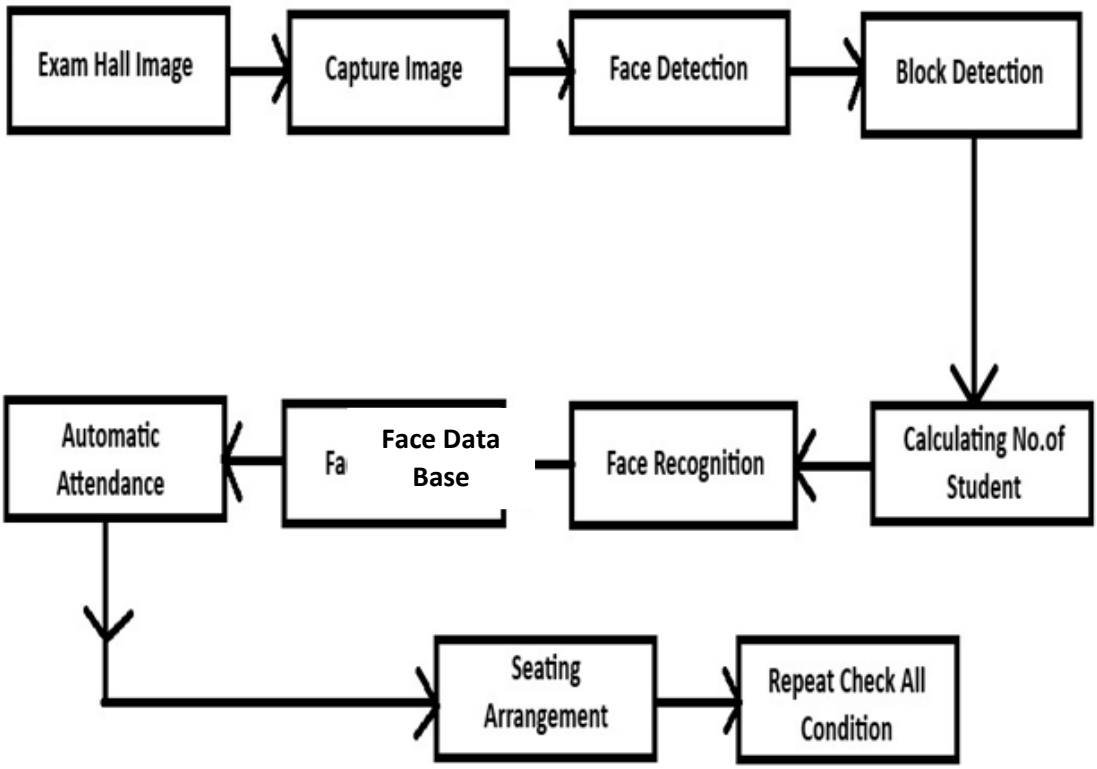
Real-Time Monitoring:

Continuously monitoring the examination hall to detect suspicious behaviour or irregularities.

Data Security and Privacy:

Ensuring the security and privacy of candidate data and images.

5. PROPOSED SYSTEM MODEL



1) Framework:

For the implementation of the above steps, you can use a combination of Python libraries and frameworks:
OpenCV: For image processing, face detection, and basic computer vision tasks.
Dlib: For more advanced face recognition tasks.
TensorFlow: For implementing deep learning models for face recognition.
Face Detection: The first step is to detect faces in an image or video frame. This involves locating the position and size of faces in the input data.

2) Camera

1. Resolution:
- Choose cameras with sufficient resolution to capture clear and detailed images. Higher resolution allows for better face recognition and license plate extraction. Full HD (1080p) or higher resolutions are generally recommended.

2. Frame Rate:
- Consider a camera with a higher frame rate, especially if you need real-time monitoring. Higher frame rates can improve the accuracy of face recognition systems.

3. Field of View (FOV):
- Select cameras with an appropriate field of view to cover the required areas effectively. Wide-angle lenses may be suitable for capturing images of an entire exam hall or parking area.

4. Low Light Performance:
- Opt for cameras with good low-light performance, as exam halls may have varying lighting conditions. Infrared (IR) capabilities can enhance visibility in low-light situations.

5. Mounting and Positioning:
- Ensure that the cameras can be mounted securely and positioned appropriately to capture faces and license plates without obstructions. Consider both ceiling-mounted and wall-mounted options.

6. Connectivity:
- Choose cameras with compatible connectivity options, such as Ethernet or Wi-Fi, depending on your infrastructure requirements. Wired connections are generally more reliable for critical applications.

7. Smart Features:
- Some modern cameras come with built-in smart features, such as analytics, motion detection, and object tracking. These features can be useful for enhancing security and monitoring capabilities.

8. Weather Resistance:
- If cameras are placed outdoors for monitoring parking areas, ensure they are weather-resistant and can withstand environmental conditions like rain, snow, or extreme temperatures.

9. Power Supply:
- Consider the power supply options for the cameras. Some cameras support Power over Ethernet (PoE), simplifying installation and reducing cable clutter.

3) Graphics

1. Brand and Model:
   - The manufacturer of the graphics card, such as NVIDIA, AMD, or others.
   - The specific model, like NVIDIA GeForce RTX 3080 or AMD Radeon RX 5700 XT.

2. GPU (Graphics Processing Unit):
   - The actual processing chip that powers the graphics card.

3. CUDA Cores or Stream Processors:
   - For NVIDIA and AMD GPUs, respectively, the number of processing units that handle parallel tasks.

4. Base and Boost Clocks:
   - Clock speeds at which the GPU operates, usually given in megahertz (MHz) or gigahertz (GHz).

5. Memory:
   - Type of memory (GDDR6, GDDR5, etc.).
   - Amount of video RAM (VRAM) in gigabytes.

6. Memory Bus Width:
   - The width of the data bus connecting the GPU to its memory.

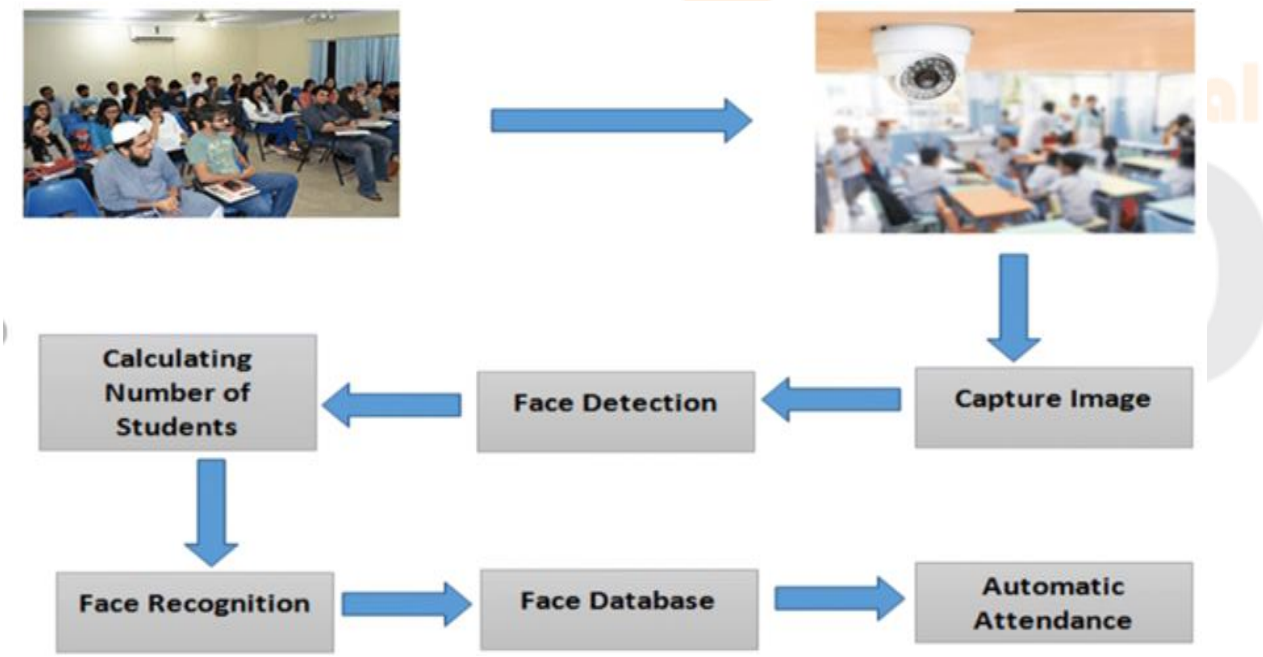
7. Memory Speed:
   - The speed at which the GPU's memory operates, often measured in gigabits per second (Gbps).

8. Connectivity:
   - Types and number of ports (HDMI, Display Port, etc.).
   - Support for technologies like NVIDIA G-Sync or AMD Free Sync.

9. TDP (Thermal Design Power):
   - The maximum amount of power the graphics card is designed to consume in watts.

10. DirectX and OpenGL Support:
    - Versions of DirectX and OpenGL that the graphics card supports, which are API standards for rendering graphics.

6. SYSTEM DESIGN



7. ADVANTAGES

1) Speed of Retrieval of Data.
2) More Flexibility.
3) Faster Processing.
4) Reduces Manual Work.
5) Not Time Consuming.
6) It's User Friendly.
7) No Human Intervention Is Required for Marking Attendance
8) System Recognizes Face and Marking Attendance.

8. CONCLUSION

It provides various features like storing student's details for arranging seats for examination hall seating arrangement according to time table and for different branches and different sections. This application is great advantage to all the educational institutes as it is simplifying the seating arrangement by automatically generating the seats for the students, block allocation for the staff. Project results in reduction of man power & work load on students & staff. It benefits all the educational institutes by reducing the complexity involved while allocating the exam duty for the staff, examination rooms for the students. Data can be accessed any time as it is stored in centralized data base. Thus we are concluding that we have completed our project with the above future enhancements to be done. We thank everybody who helped us successfully completing our project.