

FACIAL RECOGNITION-BASED ATTENDANCE MANAGEMENT SYSTEM: DESIGN, IMPLEMENTATION, AND EVALUATION

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ABSTRACT: Schools are concerned about a probable reduction in the number of kids interested in attending. Even when there is an outbreak, it is critical to obtain new information. Students used to raise their hands at roll call or sign a paper to show that they were present in class. Each one demanded more effort and time than the previous one. Instead than keeping attendance records by hand, teachers should use an electronic system. We were able to create a system that could fully track involvement for this project using Tkinter and Python. In the end, a "Automated Attendance System based on Face Recognition" would be created. Face recognition expands the app's utility in a new way. Because the system is now automated, the natural world is better off. Face recognition is utilized as a biometric to ensure that this technology does not allow for bogus attendance. This indicates that the strategy can be employed in situations when the audience must be particularly active. The suggested system is built on TKINTER and is supported by a PYTHON script and a SQL database. The camera takes a picture of a face, and an algorithm inside the gadget instantaneously compares it to a previously saved picture with the same encoded information. The system generates Excel spreadsheets.

KEYWORDS: Attendance system , Python , Machine Learning , Tkinter , MySQL.

1. INTRODUCTION

Face Recognition is currently employed in the Attendance System, a more sophisticated method of tracking attendance. MySQL and the Python/Tkinter combo are recommended. This strategy works successfully even when the school only has one teacher. The plan is to establish this system physically using face authentication. Biometrics completely eliminates the possibility of fraud as compared to traditional methods of tracking attendance. Because it is critical to monitor students' progress, all institutions utilize the same approach for tracking attendance. Each school group approaches this question differently. Some of their schools employ biometric technologies to automatically track which kids are present, but others continue to rely on paper or files, as well as time-consuming human techniques. Facial recognition software is a type of computer program that can detect who someone is only by glancing at their face. HOG, a well-known face recognition library, will be used to determine who is in the video footage captured by

the system camera. To find characteristics in this system, OpenCV and Face Recognition, two of the most prominent face recognition applications, were employed. If the picture in the frame is off, the Face Landmark Estimation method will be utilized to correctly line up the face. When it finds a face, the system encrypts the image and every image in the database. Before employing the Deep Convolutional Neural Network technique, each face was subjected to 128 distinct measurements. To determine which frame is best, the face size of the photo in the database is compared to the face size of the frame that was discovered. The system will then employ a basic linear SVM algorithm to locate the individual in the database (the one who was photographed at the start of the project) whose measurements are most similar to those in the camera image. When a match is found, the application generates a CSV file containing the person's name, the date, the time, and the current time stamp. Users then entered them into the database so that they could be quickly found in Excel and other spreadsheet programs that functioned similarly.

2. LITREATURE SURVEY

Real-time computer vision techniques are employed in automated time and attendance systems. In this paper, we discuss a novel approach of using computer vision to improve automatic reporting systems. The proposed system uses face recognition algorithms and an existing LMS to identify and record students in the classroom during a presentation. By integrating machine learning with customizable techniques for monitoring their pupils' facial progress, the technology provides teachers with a new tool.

Teachers will know who is present by using face recognition to keep track of who is in the room and paying attention in class. Keep track of attendance automatically by recognizing students by face. Individual data does not provide a complete picture of attendance due to the poor rate of facial recognition. This article demonstrates how to leverage massive amounts of facial recognition data acquired by continuously monitoring a large population. RFID is an abbreviation for "radio frequency identification." RFID is currently one of the most used methods of automatically identifying objects. The majority of the research and development effort on making technology more useful is done here. There will be a lot of new research and real-world applications in the coming years.

Artificially intelligent facial recognition software for tracking attendance and grading Keeping accurate attendance records is difficult for any firm. We investigated the issues that arise with face identification in biometric systems in real-world conditions such as illumination, movement, and scale. We made the argument for employing a digital approach of attendance tracking.

3. METHODOLOGY

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time-consuming human techniques.

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When it finds a face, the system encrypts the image and every image in the database. Before employing the Deep Convensional Neural Network technique, each face was subjected to 128 distinct measurements. To determine which frame is best, the face size of the photo in the database is compared to the face size of the frame that was discovered.

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4. PROPOSED SYSTEM IMAGE ACQUISITION

The photographs are taken with a high-definition camera set up in the lab or lecture hall. This photograph will be stored in the database. The title and author should be placed in the center of one column.

Dataset Creation:

Before a child is recognized, a profile is created for them. To demonstrate this approach, we will create a file with each student's name, registration number, fields, and a variety of poses. A dataset is created using student photographs and data. Deep learning is used to determine 128-dimensional

facial features for each face in the dataset. Each student has a website with images and information about them. This method is used to handle all images that require registration.

Face Detection and Extraction:

Face recognition technology is commonly used to allow a computer to deduce specific characteristics about a person from a photograph. Many face detection technologies have been developed to aid with picture processing. Each person in the shot was located using the HOG approach.

Face Positioning:

A person's face is composed of 68 distinct features. This can be seen in 68 different places. The key tasks at this step are to locate the image and distinguish important face landmarks. Python-based apps can automatically detect faces and remove distortion.

Face Encoding:

After locating the faces in the training image, the next step is to discover what distinguishes each face. When we receive a face localization, we record the 128 best facial coordinates from each image as data files so that we can use them in face recognition later.

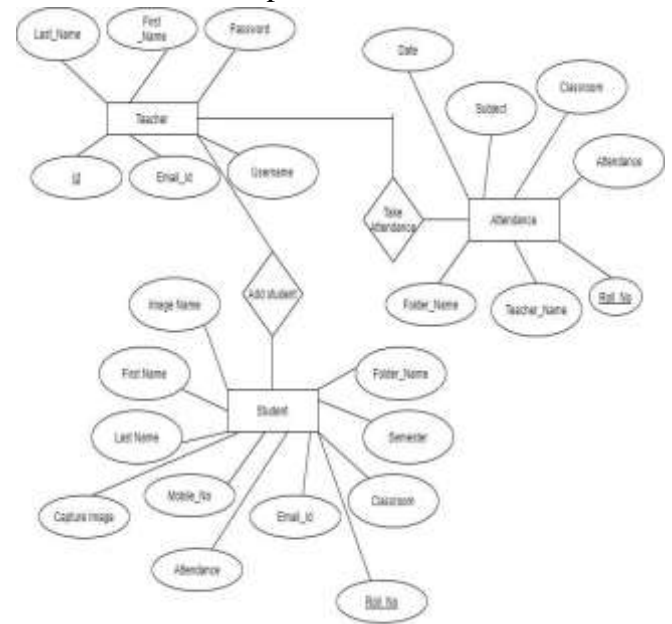
Face matching:

The facial analysis is now complete. The researchers picked deep measure learning because it produces high-quality feature vectors. It's an excellent teaching tool. The suggested method generates a unique 128-bit embedding (verification) for each face to ensure its authenticity. How different are photoshopped faces from photoshopped faces in a database? This is shown by an internal comparison of features. If at least 60% of the parts in the image match those in the current database, it will be recognized as an existing one.

Attendance Marking:

When data is received, a table is created that includes the subject ID, name, roll number, and date and time of the occurrence. This stage follows the completion of facial recognition and image storage in a SQL database. After being passed to Python, it is saved to a file as a set of

comma-separated values (CSV). Because it is based on Excel, it is simple for letter staff to make modifications and updates as needed.



ER Diagram of the attendance Management system using face recognition

Fig 1. ER-DIAGRAM

Figure 1 depicts the entity-relationship diagram of the proposed design.

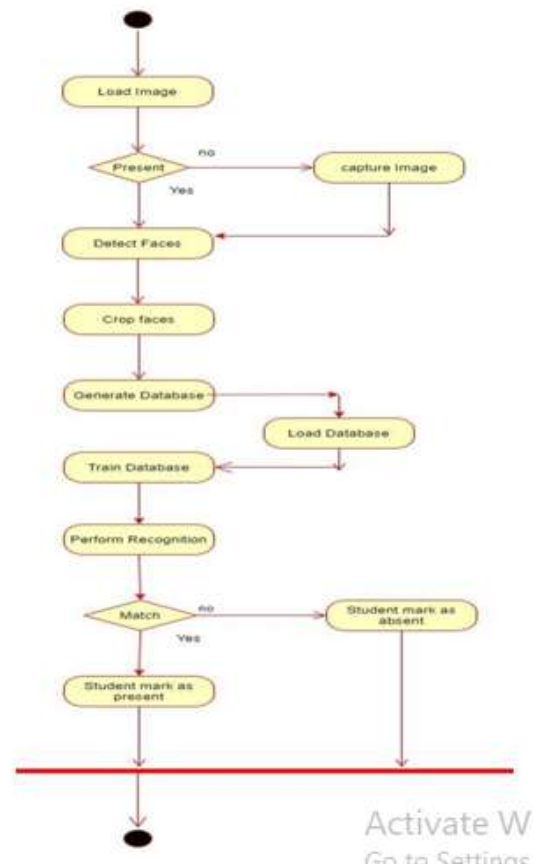


Fig 2. ACTIVITY DIAGRAM

Figure 2 depicts the action diagram for the system under consideration.

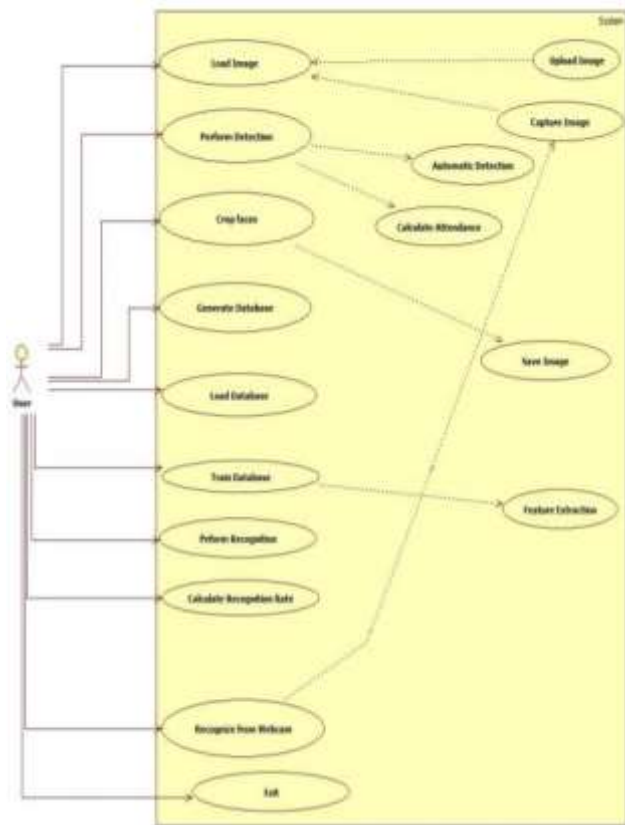
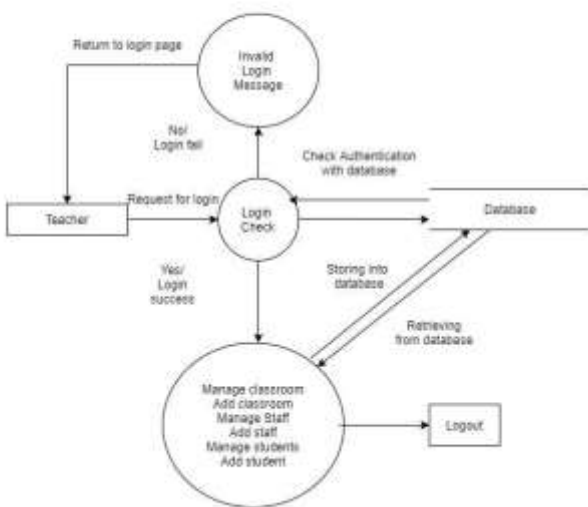


Fig 3. USE-CASE DIAGRAM

Figure 3 depicts how users would interact with the proposed system.



Data Flow Diagram (Level 0)



Data Flow Diagram of Admin (Level 1)

Fig 4. DATA FLOW DIAGRAM (LVL 0 & LVL 1)

Figure 4 depicts the transmission of level 0 and level 1 data in great detail.



Fig 4 , 5, 6, 7 OUTPUTS
 Lines 4–6 depict the result screen.

5. ADVANTAGES OF THE SYSTEM

This system enables you to perform things in a more understandable and efficient manner. The approach works better when it is embedded in a user-friendly framework. A better formula and a simpler technique to create databases are also presented. The approach is intriguing since it is applicable to any system.

6. CONCLUSION

This design allows you to keep track of who enters and exits the building. Many firms benefit from this arrangement. The proposed equipment would monitor the building's entrances and exits in real time as students entered and exited. Our pilot results suggest that our approach outperforms others in predicting how many people will attend.

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