iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** VI **Month of publication:** June 2022

DOI: https://doi.org/10.22214/ijraset.2022.44212

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue VI June 2022- Available at www.ijraset.com

Automated Attendance System Using Face Recognition

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Abstract: ***In the recent time automated face recognition has become a trend and has been developed very much , this is mainly due to two reasons; first it is due to availability of modern technologies and second is due to the ability to save time using face recognition in the process of taking attendance of students. Its usage will grow vast in the future as it saves a lot of time. It consumes a lot of time to take attendance manually and few might also fake the attendance, in order to prevent time consumption and avoid faking the attendance face recognition is used to identify the person present in the class and mark his attendance , this is done with the help of image or video frame. We proposed an automatic attendance management system using machine learning techniques such as CNN algorithm. The face detection and recognition will automatically detect the students in the classroom and mark the attendance by recognizing the person.. The faculty has access to add the student details such as name, USN, phone number, email-id. Then the image is captured through a high definition camera during the class hours. When the lecturing is going on faces of students are detected, segmented and stored for verification with database using the Convolutional Neural Networks (CNN) algorithm of machine learning technique***

Keywords: Automated face recognition, Convolutional neural networks(CNN),Image or video frame, machine learning(ML).

I. INTRODUCTION

Many scientific advances and technologies have been created in this recent epoch of automation to save time, improve accuracy, and reduce costs improve the quality of our life System of automated help is the advancement that has been made in the field of traditional jobs will be replaced by automation Call action on one presence. Assistive technology Bio-metrics are commonly used in these systems. data, web-based and based on smart cards These In a variety of organizations, systems are commonly employed. The traditional way of calculating attendance time is as follows: When the strength isn't there, it's time-consuming and complicated. The automated attendance system has an advantage over the conventional method because It saves time and can also be utilized for security purposes. This also aids in the prevention of erroneous assistance. A well-developed attendance tracking system The usage of bio metrics, which is costly in our situation, typically consists of image capture and database management. Face detection, pre-processing, and development stages of feature extraction and classification After then, the post-processing phase is completed. Machine learning techniques are used. We can take automatic attendance on paper. Convolutional Neural Networks are used to create this model. Face recognition algorithm in the classroom

The presence and absence of the presence and absence of the presence and absence of the presence and absence of the If the student receives a message, he or she will be notified.

II. EXISTING SYSTEM

Through a high-resolution digital camera that detects and recognizes students' faces, facial recognition technology can be utilized to register presence compares the student's face to the one recognized .The database contains images of people's faces. As soon as the face of the student corresponds to the photograph stored in the database. The attendance database records your presence for the purpose of subsequent calculation If the image you took isn't quite right, does not correspond to the students' faces in the this image is saved as a new image in the database the repository of information There is a potential in this system that the image will not be captured by the camera appropriately, or you might miss the opportunity to catch a few students

III. PROPOSED SYSTEM

The suggested system's goal is to capture each student's face and save it in a database for future reference. The convolutional Neural Networks algorithm is used in this paperwork. A convolutional neural network (CNN, or ConvNet) is a type of deep neural network used to analyse visual imagery in deep learning.

The student's face must be captured in such a way that all of the student's facial traits, including the student's location and posture, are detected. The teacher does not need to physically take attendance in the classroom because the technology takes a video, which is then processed to recognize the face and update the attendance database. The paper's key benefit is that the video data gathered is to detect and recognize the student, the data is turned into an image. Furthermore, attendance includes a recognized image of the student; otherwise, the database is marked as absent. A text message will be sent to the absent student's phone number informing him of his absence.

1. Image capture: The students' images are recorded and forwarded to be detected using face detection.
2. Face Detection: Using a face detection technique, the face identification process is greatly improved.
3. Get the system up to speed

The image captured during enrollment is used to train the system, and the system is trained on these photographs.

The following are the steps for training the system:

Face recognition

Alignment of the face

Create an encoding with Facenet.

In order to improve the SVM classifier, you must first train it.

In this stage, the image acquired in the previous stage is used as input. Face detection is performed first, followed by face alignment, cropping, and storage of the aligned faces.

Second, Facenet, the system's brain, generates 128-dimension unique encoding each image. Finally, the 128 Dimension encoding is used to train the SVM classifier.

4. Make a test image

Our system is placed in the classroom after it has been trained on the database. The camera is set up in such a way that everything is visible.

5. Face recognition

Face detection algorithms have been proposed in a variety of ways.

In Viola – Jones is proposed. The face detection algorithm of our proposed system is based on the work of Navneet Dalal and Bill Triggs. For face detection, we find the gradient vector of each pixel by calculating the image's gradient in both the x and y directions. The magnitude and angle of the gradient vector are included. The magnitude and angle are both kept as matrices.

IV. SYSTEM DESIGN

The structure and behavior of a system is defined by its architecture, which is a conceptual design. A formal description of a system designed to support reasoning about the system's structural attributes is known as an architectural description. It specifies the system components or building blocks and lays out a strategy for purchasing products and developing systems that will operate together to implement the overall system. This will enable you to manage your investment in a way that matches your company's requirements.

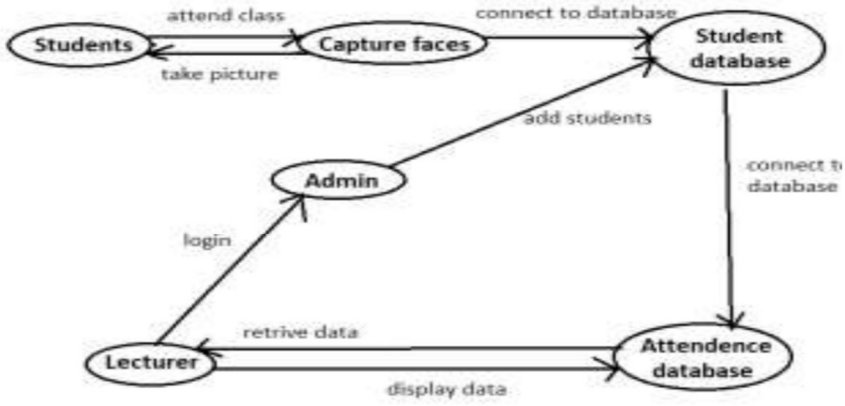

Figure 1 System architecture

Fig 4.1: system architecture

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
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V. IMPLEMENTATION

All students in the class are marked present, and a database in the form of a csv file is delivered to the email address provided, along with the date the attendance was taken.

The smart attendance system has been demonstrated to be an effective classroom attendance system. This technique is non-intrusive and helps to eliminate the use of proxies and fraudulent attendance. Many ways to a smart attendance system have been presented, but the optimum option for a smart attendance system has been discovered to be a face recognition-based approach. It is necessary to have a dependable method for taking attendance. We have successfully applied the same in a classroom. Our system is simple to set up and use, requiring only a simple camera module and a computer to do facial recognition. Our system can also be run on a Raspberry Pi with internet access.

VI. UML DIAGRAMS

USE CASE DIAGRAM:

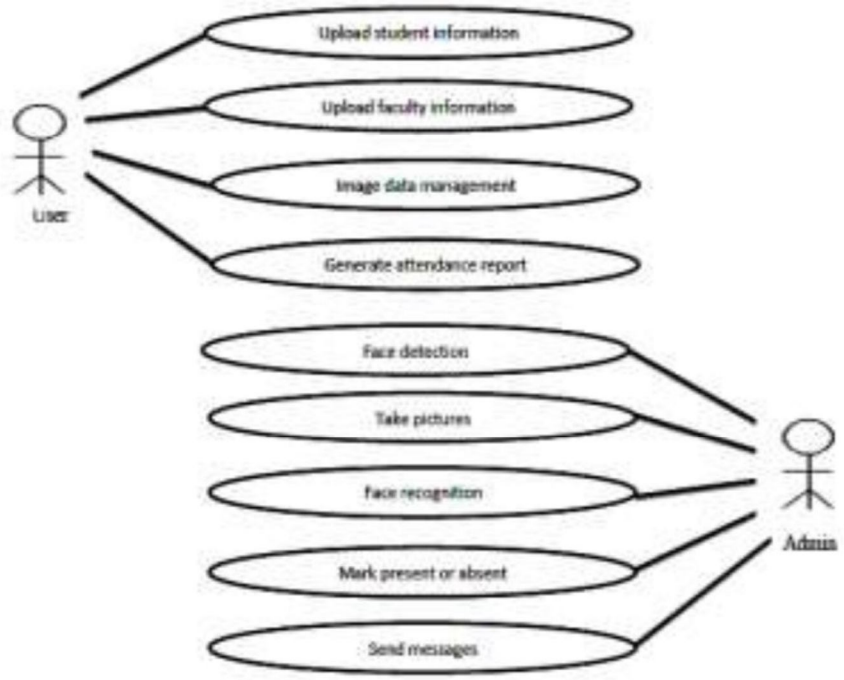

Fig 6.1: use-case diagram

In UML, use-case diagrams model the behavior of a system and help to capture the requirements of the system. Use-case diagrams describe the high-level functions and scope of a system. These diagrams also identify the interactions between the system and its actors.

1) *Class Diagram:* In the Unified Modeling Language, a class diagram depicts the relationships and source code dependencies between classes (UML). A class defines the methods and variables in an object, which is a specific entity in a programme or the unit of code that represents that entity in this context.
2) *Sequence Diagram:* A sequence diagram is a diagram created with the Unified Modeling Language (UML) that depicts the flow of messages between objects in an interaction. A sequence diagram is made up of a group of objects connected by lifelines, as well as the messages they exchange over time during the interaction.

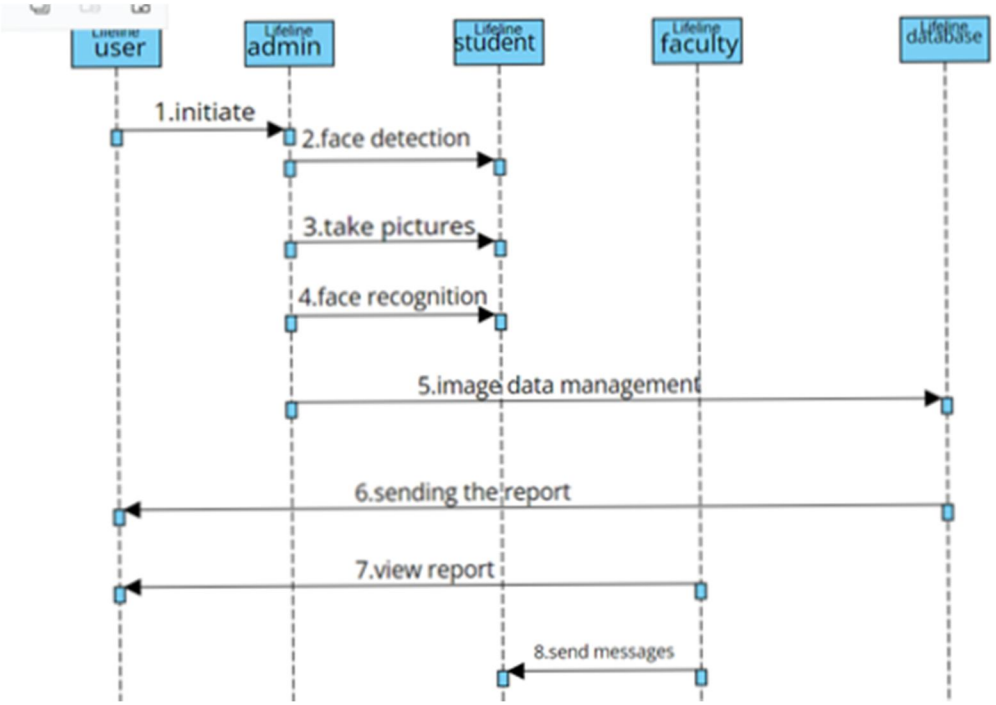

Fig 6.2: Sequence diagram

VII. CONCLUSION

In this research, we use the CNN algorithm to create an automatic attendance system for a classroom, which identifies students' faces in the classroom, section, or laboratory and records their attendance automatically. It saves time and effort, especially if there are a large number of students in the class. The proposed method is a simple approach to track a student's attendance by using face recognition and a camera. Once the faces are matched, they are recorded in a database to assure their presence or absence. It automatically stamps the student's attendance in the classroom after comparing the saved photographs in the database. The faculty can use the date to monitor the status of a student's attendance and be notified through email. When they are not available, send a text message to his or her phone number. Students are automatically and indirectly monitored in this way throughout courses and lectures, which is a better way to keep track of attendance.

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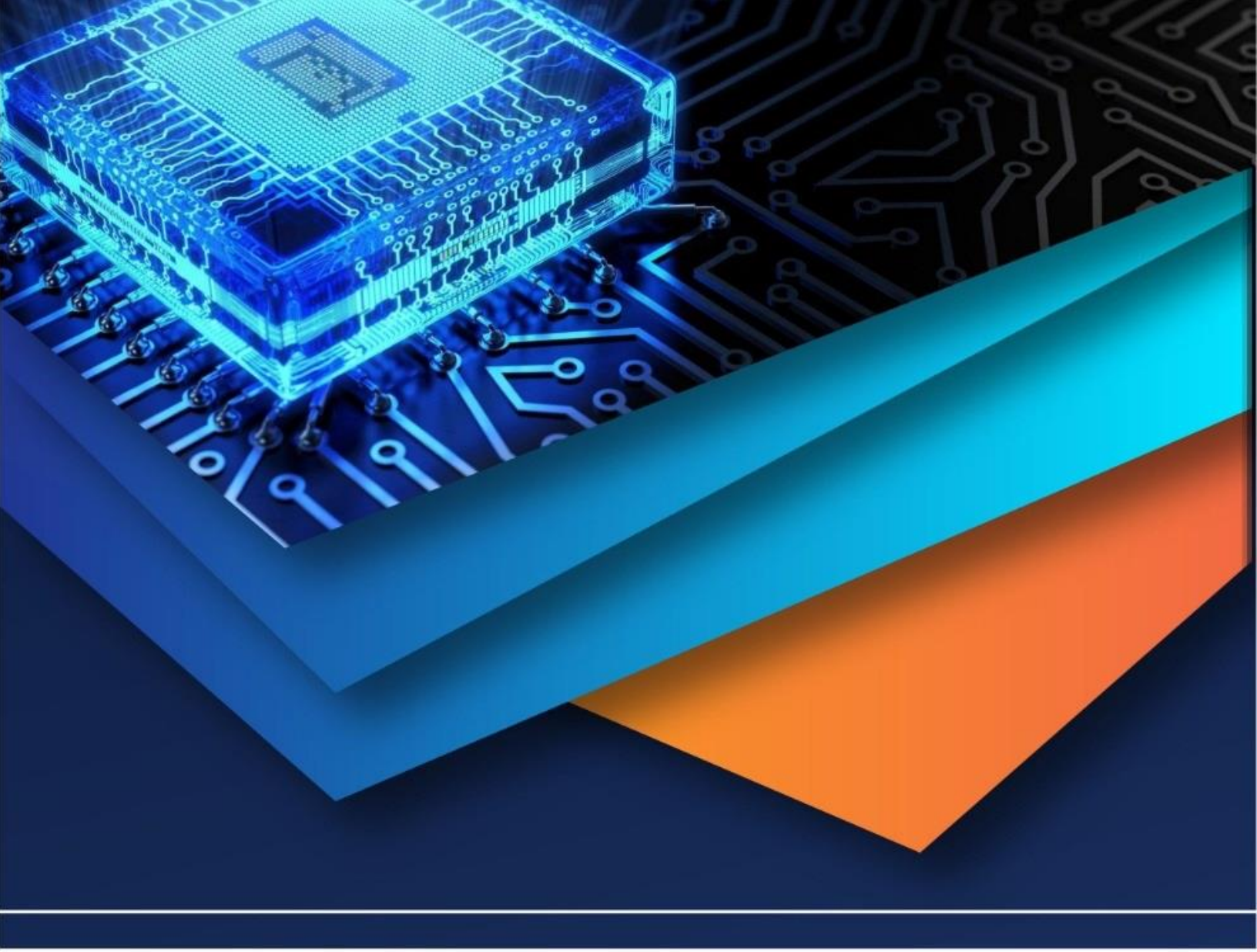

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