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Class Attendance Portal (CAP) using Face recognition

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Abstract: ***Class attendance portal aims at developing software that allows users to see information of the present peoples at a time at a particular region .The system is designed to remove the difficulty of taking attendance manually one by one . To avoid that problem, we have built this application for monitoring attendance in a smart way by using face recognition technology .***
Keywords: Deep learning, face recognition, convolution neural network, image recognition.

I. OBJECTIVE

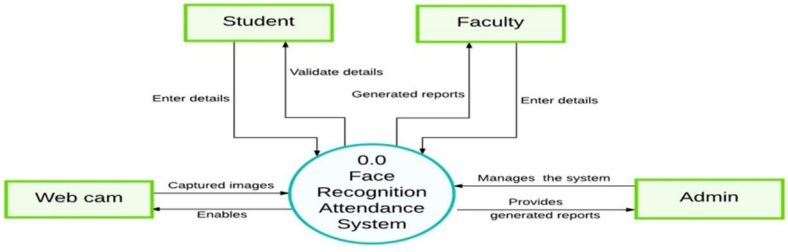
This project aims at developing software that helps the organizations and institutions to monitor attendance of the present students in a smart and flexible manner. The system is developed keeping in mind the problems of taking attendance manually that is really time consuming approach .To get rid of this problem we have designed this system**.**

II. INTRODUCTION

Attendance is a basic and essential thing for both the teacher and student of an educational organization. Taking attendance in the classroom manually is traditional approach and it's really time consuming . So to get a record of present students if teacher takes presence of the student by calling one by one by using student's name or student's roll number then it will not only wastes time, but also it requires more energy. So to overcome this problem it is really nice to install a kind of automatic presence analyzing device /system that can observe the presence of all the present students and maintain a record of the present students . There are different kinds of automatic attendance taking systems in the market which are currently being used by multiple institutions. We can take an example of those kinds of system is the use of biometric technique. Although it is automatic and a step ahead of the traditional method, still it fails to meet the efficiency . The student has to wait in queue for giving attendance, which is time consuming . This project introduces an efficient attendance marking system, that is capable of working silently in one corner in the classroom without disturbing normal teaching procedure. This evolutionary system can also be implemented during various examination and other seminar related activities, other teaching activities where attendance is highly essential. This system also overcome manual student identification, which can not only interfere with the ongoing teaching process but can also be stressful for students during examination time period . An online auto updating attendance monitoring system by facial recognition using machine learning is a smart and organized way for any organization which demands the regular maintenance of the attendance of the employees, worker or students. This approach will not only save the money of organization, but also it will be time saving approach and spare you with the stress of the manual input of attendance, which is being followed since years . The automatic approach of monitoring attendance will increase efficiency, by the implementation of the electronic, integrated time and attendance system resulting in profit in every aspect.

A. Modules

1) Student Login
2) Faculty Login
3) Face Recognition System by Webcam
4) Attendance record
5) Identification



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III. LITERATURE SURVEY

Its a brief explanation about the previous implementations that are done on text recongnition, object recognition and classification. From which one of the study is Attendance System using Image Processing. in this study they discussed that In Image Processing basically consists of four types they are Attendance Monitoring System by Image Processing, An Automatic Attendance System using Image Processing and Automated Attendance System using Image Processing [3].

One another study is "Automatic face naming by learning discriminative Affinity Matrices", in this study the authors explained that In “Attendance Monitoring System using Image Processing”, the attendance of the students is marked using face projections on a feature space that spans the significant variations among known face images. These features are known as “Eigen faces”. The proposed system is a Affinity matrix and low-rank representation for Weakly Labeled Images which names the faces detected by the system by using machine learning algorithms and face detection inside images captured.

IV. PROPOSED SYSTEM

A. Tools, Platform, Software And Hardware Requirements

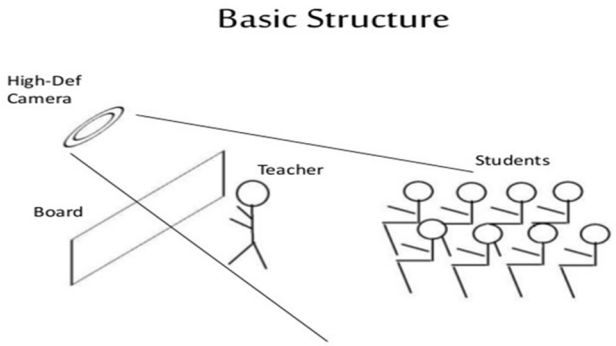
In this project some technologies are used like facial recognition, python, open cv etc.The main aim of the proposed system is that it captures the face of each student and store it in the database for their attendance.

The face of the student needs to be captured in such a manner that all the feature of the students' face needs to be detected, even the seating and the posture of the student need to be recognized. With the use of the proposed system the teachers don't need to take manual attendance in the class since the system is capable of recording a video with the help of a high resolution Webcam and through further processing steps the face is being recognized and the attendance gets updated in the database associated with the proposed system .

The proposed system consist of various processing phases can be discussed as:

B. Capture Video

The Webcam is fixed at a certain position inside a classroom to capture clear videos of the frontal images of the entire students of the whole class.



C. Separation of Whole Video file into the Frames

The video that is recorded by the Webcam is need to be converted into frames per second for easier detection and recognition of the students faces .

D. Face Detection

Face Detection is the process of image acquisition ,where image is need to be given as an input (picture) is searched to find any face, after getting the desired face structure the image processing is used to clean up the facial image for easier recognition of the face. CNN algorithm can be implemented in the proposed system to detect the faces.

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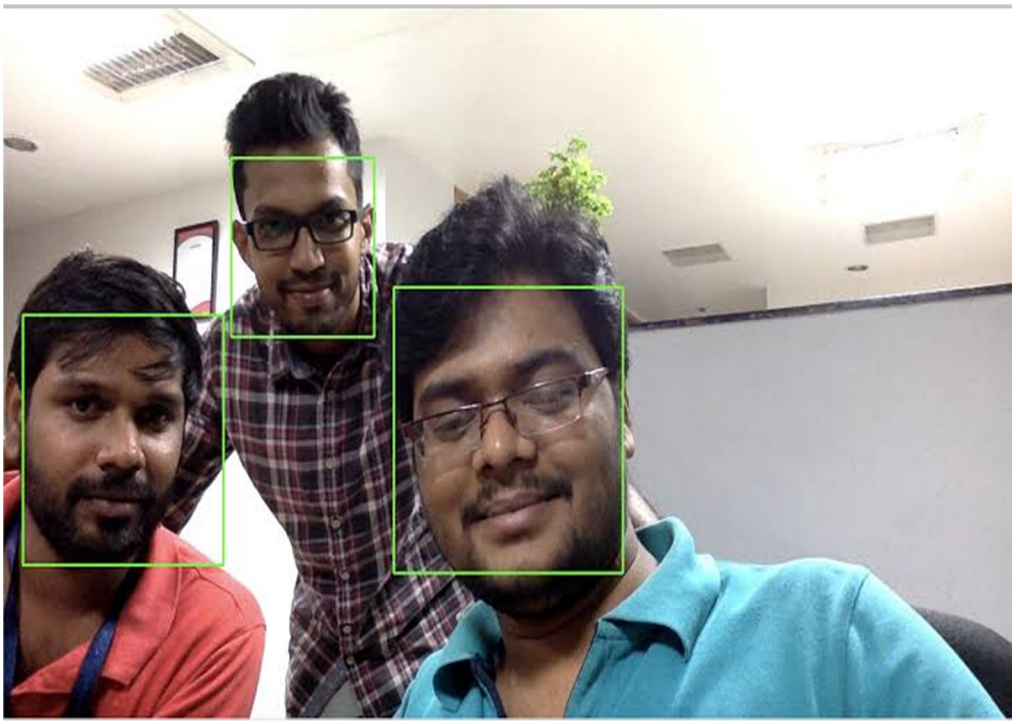

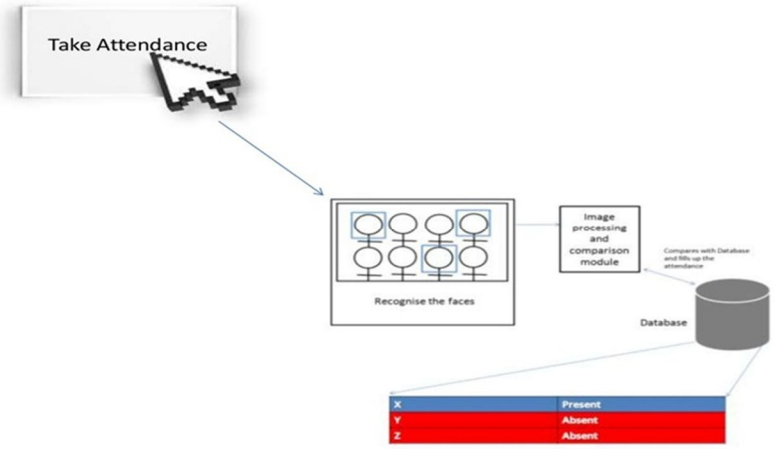

When the process of face detection and face recognition get complete , it is compared to the faces present in the students' database to update the attendance of the students in the database used in the proposed system .

V. IMPLEMENTATION

1) *Collection of Dataset:* To train our model, we need a large amount of data so that our machine can learn from them by recognizing out certain relations and features related to the objects. Here we created our dataset which consists of 500 images.
2) *Importing Libraries and splitting the Dataset:* For effective use of the libraries, we first need to import them. After importing the libraries, we need to divide our data into two parts- one is training_set and another is test_set. The training set has 300 images of two persons while the test set has 80 images of each.
This will help in training and also testing of the model.

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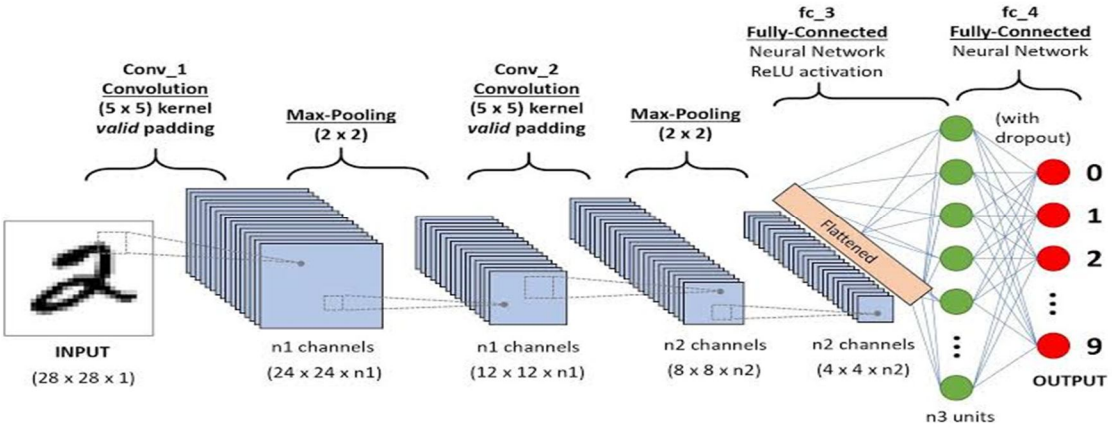
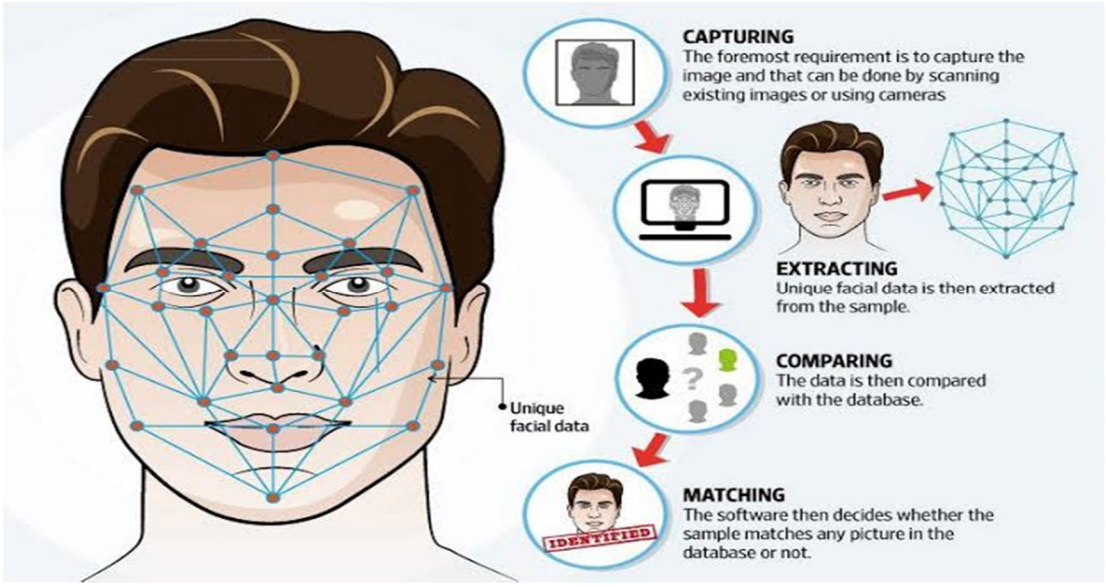
3) *Convolution Neural Network:* A CNN (Convolution Neural Network) uses a kind of processing system like a multilayer perceptron that has been designed to process the requirements efficiently . The CNN layer is composed of an input layer, an output layer and a hidden layer that includes multiple convolution layers, pooling layers, fully connected layers, and normalization layers. After removing the limitations and increasing the efficiency for image processing we gets an updated system that is far more effective, simpler to trains limited for image processing and natural language processing(NLP).



4) *Building CNN:* The Full connection is connecting our convolutional network to a neural network and then compiling the network.
5) *Training the Network:* Upto now all the steps of construction are completed and now it's time to train our model. Now train the system with the help of a training set which consist of large no. of image files. It will help to store all the information related to a particular face on the basis of the Face's nodel points,distance between the eyes and posture.Then after collecting all the information it will store the information in the database for mapping.
6) *Testing:* Yes, the network correctly predicted the image of the person!! Though it is not 100% accurate it will give correct predictions most of the time and stores the attendance of a person. Adding more convolutional and pooling layers might get high accuracy results.



So later software then decides whether the sample image matches with any of the picture in the database or not.

If match found then it will automatically mark the attendance for that particular match.

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VI. CONCLUSION AND FUTUREWORKS

This application is user friendly. The prime working principle of the project is that, the video captured datais converted into image to detect and recognize it. Further the recognized image of the student is provided with attendance, else the system marks the database as absent.The online automatic Classroom Attendance monitoring portal helps in increasing the accuracy and high processing speed ultimately achieve the high- precision real-time attendance to meet the need for automatic classroomevaluation.
This auto updating attendance monitoring System can be implemented in larger areas like in a seminar hall where it helps in sensing the presence of large amount of people with the help of a high resolution camera for capturing .

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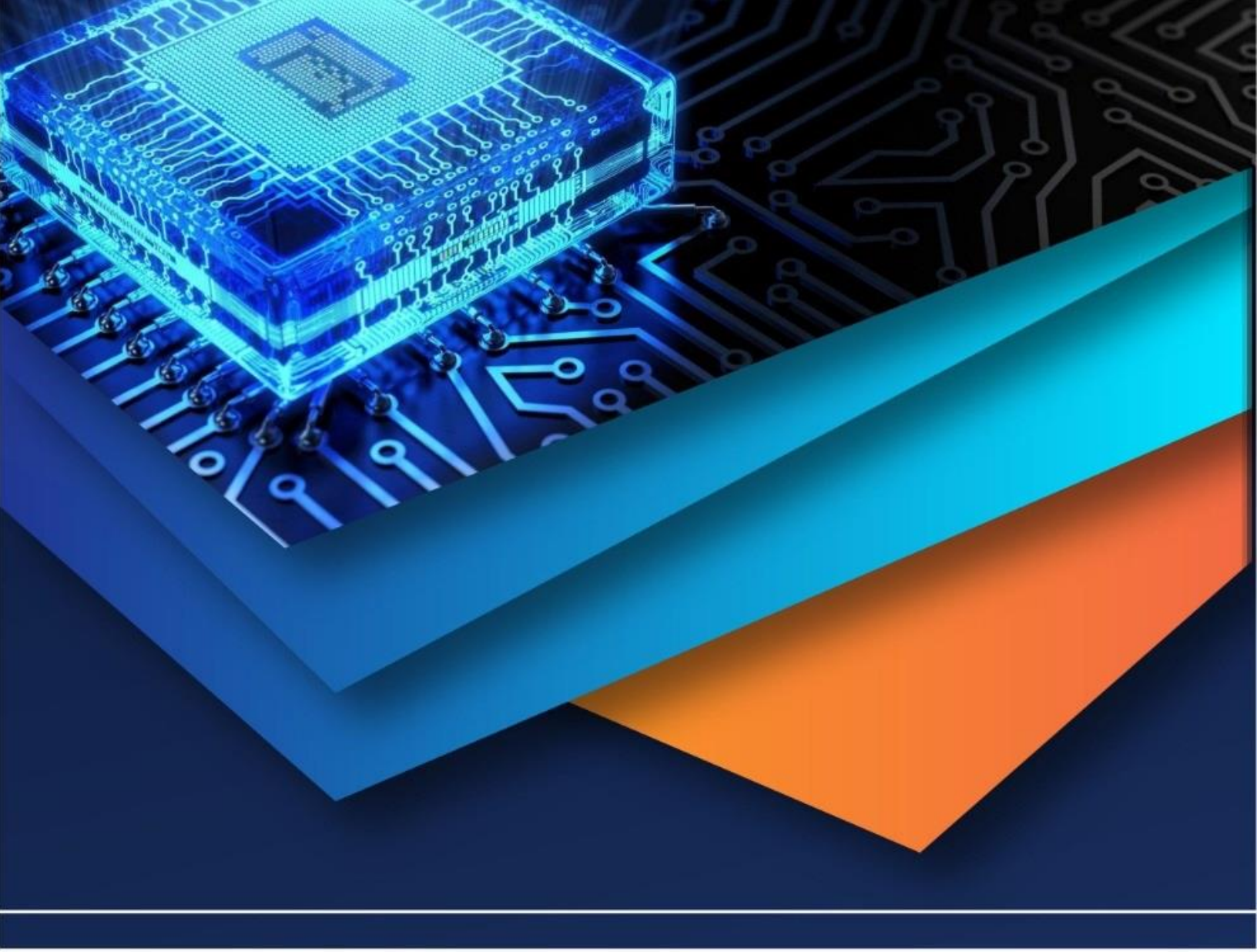

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