

# R-CNN BASED ATTENDANCE MANAGEMENT SYSTEM BY FACE RECOGNITION

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**Abstract:** In this new world, every day presence marking will be a repeated and main theme of education system, day-by-day owing to the overview of idea of "Class Room" or "examination hall" Though, the system of attendance still leftovers primeval, somewhere the teacher or lecturer requests the name of students to identify this scheme & also must remained used in a varied of variation uses. Exhausting recognition of face built presence pattern system. In this system taking the video in classroom, in this video detect the faces it's using matlab. This methods and technologies are used to the taking the attendance. This proposes paper is a technique of increasing a inclusive class presence scheme by makeover gratitude. In this method Gabor filter is applied for features and RCNN is used for classification.

**Keywords:** Matlab, support vector machine, region based convolution neural networks(R-CNN), Gabor filter, Viola-Jones algorithm.

## I INTRODUCTION:

We are get the example of utilization to the theory is introducing here understudy participation is taking in the schools and universities ,we can take the greater part of time burned through just as understudies and workforce's time .In this days we are utilizing to the fingerprint recognition, face recognition, voice recognition, signature recognition, filtering recognition and others. Participation marking is a major part of utilized in "schools" and "universities" and "assessment corridors". The appearance in picture processing innovation causing computers to perform face recognition has gotten easier. In this first step take the information base. This face recognition second step is capturing of video, and its convert video frames. In this Face recognition is location of face by utilizing Viola-jones algorithm by considering haar features. What's more, this is feature extracted of pictures. In this paper we can utilize matlab, which is given to the results of face discovery and face recognition. In this matlab needs very good quality assignment of a network it order to get a superior results. It doesn't run the little

scale assignment frameworks so in this framework run just little database and compare them with the face required. The face isn't just a great deal of facial features however it is to some degree something important. It is a character of an individual and people conform to reaction more to look than other body portions of human. Among the open biometric procedures face affirmation is an outstanding research point with number of employments in a couple of modern territories including reconnaissance and security, incitement and expanded reality and human-machine associations. With the approach in picture taking care of advancement affecting PCs to perform face affirmation has turned out to be simpler. Keeping up participation record in instructive foundations is a critical bit of improving the nature of training as participation centers are incorporated toward the completion of semester. Customarily participation is checked physically by instructors and they ought to ensure right participation is separate for particular understudy. These entire procedures squander a great arrangement of time of address length and due to far reaching nature of understudies bogus and intermediary cases are not captured.

## II Related work

Attendance Management System (AMS) is the most straightforward approach to monitor attendance for network associations, for example, school clubs, exploring units,[1] church gatherings, business associations and volunteer gatherings. Among the individual identification techniques, face recognition is known to be the most regular ones, since the face methodology is the methodology those utilizations to recognize individuals in regular day to day existences. Utilizing GSM technology.

There are many automatic methods available for this purpose like biometric attendance.[2]All these methods are also takes a lot of time because students have to make a queue to touch their thumb on the scanning device. This work describes efficient algorithm that automatically marks the attendance without human intervention. This system consists of four phases- creation of face database, face detection, face recognition and marking attendance.

The objective of this paper is to instigate a new approach for taking attendance[3][4]automatically, Local Binary Pattern (LBP) and Histogram of Oriented Gradients (HOG) which are used for recognition of faces of respective students from stored database for attendance marking. Support vector machine (SVM) classifier is used for comparing database stored features with extracted features from captured images of students. Keywords local binary pattern, histogram of oriented gradients, matlab, raspberry pi, support vector machine, viola-jones algorithm.

This paper depicts the productive calculation that consequently denotes the attendance[5] without human mediation dependent on embedded Linux. This attendance is recorded by utilizing a camera joined before classroom

that is ceaselessly catching pictures of students recognize the faces in pictures and contrast the identified faces and the database and imprint the attendance.

This work illustrate the productive calculation that naturally denotes the attendance[6] without human intercession. This attendance is recorded by utilizing a camera joined before classroom that is persistently catching images of students, distinguish the faces in images and contrast the identified faces and the database and imprint the attendance. The paper audit the related work in the field of attendance system at that point depicts the system engineering, programming calculation and results.

In this paper means to stray from such customary systems[7] and acquaint another methodology with distinguish a student utilizing a face recognition system for example the age of a 3D Facial Model. This paper depicts the working of the face recognition system that is destined to be conveyed as an Automated Attendance System in a classroom condition.

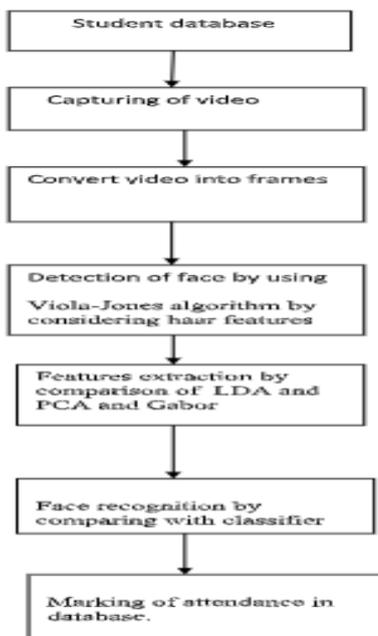
Face recognition is one of them. By utilizing this system, the issue[8][9] of phony attendance and intermediaries can be unraveled. In the past face recognition based attendance system, there were a few impediments like force of light issue and head present issue. In this manner to defeat these issues, different procedures like light invariant, Viola and Jones algorithm, Principle component analysis are utilized.

This paper surveys three classical techniques Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), and Elastic Bunch Graph Matching (EBGM).[10] Three algorithms are executed with Matlab. The algorithm execution is assessed on three unique databases. Situations and execution

benchmarking are analyzed for every one of the algorithms regarding recognition precision, computational expense, and recognition resistance.

This paper first survey the related works in the field of attendance management and face recognition.[11] At that point, it presents our system structure and plan. At last, tests are executed to give as proof to help our arrangement. The outcome shows that consistent perception improved the presentation for the estimation of the attendance.

**III RELATEDWORK**



**Fig (1): Flow chart of existing method**

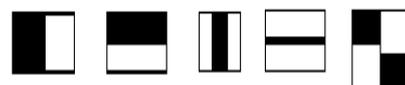
The Fig (1) shows above explain about the flow chart of existing method.attendance management framework by face acknowledgment utilizing matlab first we take the standard understudy date base previously put away database in matlab and we take the catching of understudies attendance video and it's proselyte into video outlines, after that we utilize the viola-jones calculation is to be identified the countenances by considering the haar highlights and this procedure include extraction by utilizing Gabor filter and PCA

and LDA, and this procedure proceeds with face acknowledgment by utilizing with help support vector machine classifier, And this procedure whole procedure is finished, stamping of attendance and its stores the information here we shows the hierarchal methodology of this base paper.

**IV METHODOLOGY**

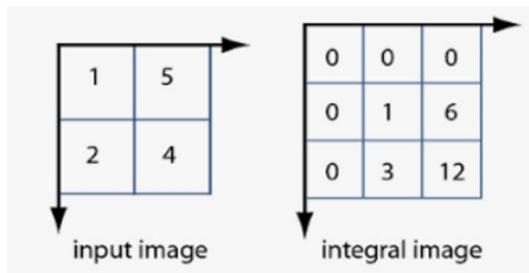
Viola-Jones algorithm is utilizing of Face detection. This face detection of this picture handling Detection is another importance is recognizable proof of faces and additionally extraction of faces from a picture. In this viola-Jones technique is a most celebrated technique utilized for identifying objects albeit basically utilized for face detection. In the event that rectangular highlights choice with grouped preparing and chiasitic decide to utilize the Adaboost technique. On the off chance that the finish of Declination tree of its classifier is built up. In this algorithm is utilized for four principle steps.

Haar-like features are advanced picture features utilized in object acknowledgment. They owe their name to their natural likeness with haar wavelets and were utilized in the primary genuine – time face indicator. Working with just picture forces made the undertaking of highlight figuring computationally costly.



**Fig(2): Haar-features**

An integral image supports you quickly analyse summaries over image sub areas. Each pixel in an integral image is the summary of the pixels overhead and to the left of it. To analyse the summary of a sub area of an image, we can usage the consistent region of its an integral image.



Fig(3): Integral image

Ad boost is likewise called as versatile lift. Develops a "strong" classifier as a straight blend of weighted basic "Weak" classifiers.

$$F(x) = \alpha_1 f_1(x) + \alpha_2 f_2(x) + \alpha_3 f_3(x) + \dots \quad (1)$$

In this equation(1) F is "strong classifier" and x is a image

And  $\alpha_1$  denotes the weight and also  $f_2$  is a weak classifier.

In this equation (1) F is "strong classifier" and x is a picture. Cascade classifiers are the finish of viola jones calculation. This cascade classifier comprise of stages, where each stage is an outfit of feeble students. The powerless students are basic classifiers called choice stumps.....boosting gives the capacity to prepare an exceptionally precise classifier by taking a weighted normal of the choices made by the frail student.

**Gabor filters:** Gabor channels are beams with band transfers that are used for the extraction of highlights, surface analysis and stereo unique estimate during image processing. Through Gaussian involve work and problematic amplitude, the motivating reaction of these channels is produced. Gabor said these minimal characteristics restrict the risk object (space (time)). When these capacities are extended to two observations, channels that are particular to the position can be created. The Gabor filters reaction process is loosely lined up under certain conditions. This subject is enslaved by sound system methods, in order to determine the differentiation in stereo photographs that use stage difference of a left and right filters. The account of second-cell fields affordable in the neurons could be

described by several researchers.. It was showing by numerous academics. That the profile of the fields of the mammalian cortex that are easily accessible can be represented by the two-dimensional orientation Gabor uses.

$$g_{mn}(x) = \frac{1}{2\pi a_n b_n} e^{-\frac{1}{2}x^T A_{mn} x} e^{jk_{0mn}^T x} \quad (2)$$

Here, equation (2) is the matrix A determines the bandwidth and the orientation selectivity of the filter.

$$A_{mn} = \begin{bmatrix} \cos \phi_m & -\sin \phi_m \\ \sin \phi_m & \cos \phi_m \end{bmatrix} \begin{bmatrix} a_n^{-2} & 0 \\ 0 & b_n^{-2} \end{bmatrix} \begin{bmatrix} \cos \phi_m & \sin \phi_m \\ -\sin \phi_m & \cos \phi_m \end{bmatrix} \quad (3)$$

If the modulation frequency vector  $k_0$  is in the same direction as one of the envelopes axes, with

$$K_{0mn} = K_{0n} \begin{bmatrix} \cos \phi_m \\ \sin \phi_m \end{bmatrix} \quad (4)$$

The transfer function  $G(k)$  of a Gabor filter (Fourier transform of the impulse response) is given by:

$$G_{mn} = e^{-\frac{1}{2}(K - K_{0mn})^T (A_{mn}^{-1})^T (K - K_{0mn})} \quad (5)$$

Where equation (5) is a  $k = [k_1 k_2]^T$  the spatial frequency The picture can be processed with a series of filters of N Gabor with multiple frequencies and modulation frequencies to establish a multi-resolution technique. If the frequencies of modulation are measured

$$k_{0n} = \frac{\pi}{2^{n+1}}; \dots n \in [0 \dots N - 1] \quad (6)$$

So for all filters that the image decomposes, the relative bandwidth is chosen to be constant.

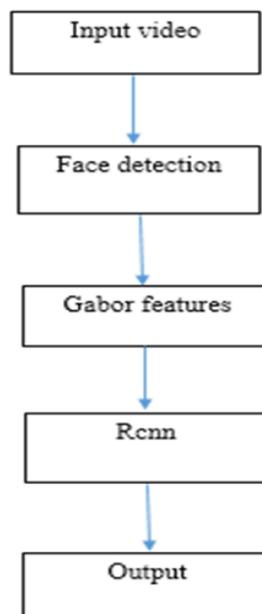
#### PCA & LDA:

PCA utilizes a symmetrical change to change over information into a lower-dimensional space while expanding the difference of the information. The variety reflects contrasts in information. The subsequent highlights are an

uncorrelated symmetrical premise set, called principal components. The element vector relating to the biggest eigenvalue contains the most monstrous measure of data. On the off chance that a couple of eigenvalues of certain highlights are little, it implies that there is little data in these highlights. By and by, we normally dispose of these highlights to expand the thickness of tests and expelling clamor. The possibility of LDA is very basic. Given the preparation test set, LDA attempts to extend the example onto a straight line with the goal that the projection purposes of interclass tests are as close as could be expected under the circumstances and the projection purposes of the infraclass tests are as far separated as would be prudent. While classifying another example, we anticipated it onto a similar line. The classification of this example is resolved dependent on the situation of the anticipated point. Not at all like PCA, which attempts to keep up information data however much as could reasonably be expected, LDA is to make the information focuses progressively discernible after measurement decrease. PCA augments the inalienable data of the information after measurement decrease, and choose the significance of the heading by estimating the variance of the information in the projection bearing. Nonetheless, such projections may not be adequate to separate classes of information. Rather, they may make information focuses work together and undefined. PCA mostly discovers better projection strategies from the point of view of covariance of highlights.

LDA considers. The point is the separation between information purposes of various classifications after projection increasingly huge and the separation between the information purposes of a similar class progressively compact. In this manner, LDA is progressively helpful for arrangement issues.

## V PROPOSED METHOD



**Fig (4): Flow chart of proposed method**

The Fig(4) shows above explain about the flow chart of proposed method Now a days different methods of attendance management system.those are the familial methods and latest.

This module explains the algorithms used for this system. In this module separated into four parts as:

- Firstly we take the classroom video.
- Viola-jones algorithm is used for face detection.
- Pre-processing of image.
- R-CNN is used for the features extraction.
- Support vector machine is used for face recognition (SVM).

**RCNN:** The objective of R-CNN is to take in a picture, and correctly recognize where the fundamental articles (by means of a jumping box) in the picture.

R-CNN uses a process known Consistent Search to produce these spinning boxes or local

proposals. Specific Check (submitted in the above picture) takes the picture by windshield of different sizes and, by means of shape, Colour or marking powers, the R-CNN attempts to band contiguous pixels for each measurement as recommendations are produced to warp the area to a standard square size and moves it into a modified version of Alex Net (the successful version)

R-CNN includes a Support Vector Machine (SVM) that basically groups whether this is an article, and if so what object. This is stage 4 in the image above.

**Improving the Bounding Boxes:** Presently, having discovered the article in the case, would we be able to fix the case to fit the true elements of the item? We can, and this is the last advance of R-CNN. R-CNN runs a basic linear regression on the region proposal to generate tighter bounding box coordinates to get our conclusive outcome. Here are the data sources and yields of this regression model:

- Inputs: sub-regions of the image corresponding to objects.

- Outputs: New jumping box coordinates for the item in the sub-region. So, to summarize,

1. R-CNN is just the associated steps: Produce many slide box proposals.
2. Over a pre-trained Alex Net, run pictures in the hopping boxes and secondly interpret the object the photo is in.
3. Run a stronger case non-ordinates into the container with a regression analysis model once the product has been shipped.
4. Throughout the functionality the Gabor filter was used to evaluate the video acquisition and image conversion. The RCNN provided the performance of the Gabor filter for improved efficiency. Involvement was recorded at that level.

**Face Recognition:**

The isolated aspects of the picture are distinguished and also the functions in the application are designed using SVM. If the framework sees the elements, investing in the

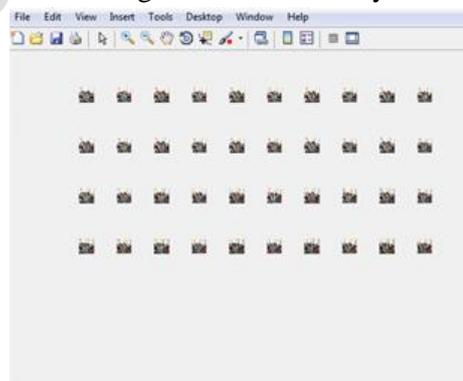
understudies finer details data will check for the naming with the features set.

The identification of the Facial is a system for observing a human face finished invention. A facial identification n Frame Work utilizes Biometrics to delineate High Lights from a photo or video. It distinctions the Data and Data Base of realized countenances to discover a match. Facial response can help check separate personality however it moreover increases security matters.

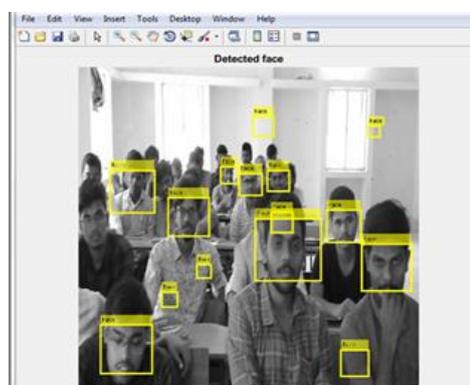
**VI RESULTS**

The performance of the method that is used for enhancing the video has been accessed by using MATLAB software tool and runs at 40frames. We use the standard student dataset. The proposed method is tested for different videos and in each case the performance of the detected faces by roll number wise by using R-CNN method followed by SVM classifier.

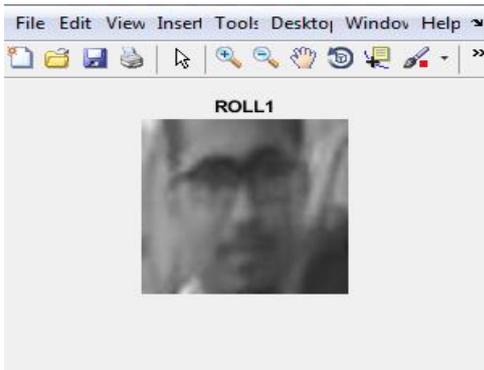
Compare to existing method, proposed method R-CNN gives better accuracy.



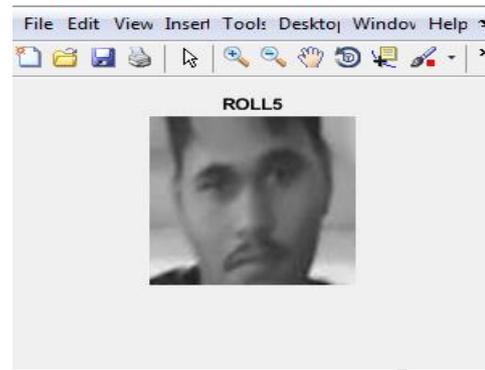
**Fig (5): Video converted to frames**



**Fig (6): Frames by Detected faces**



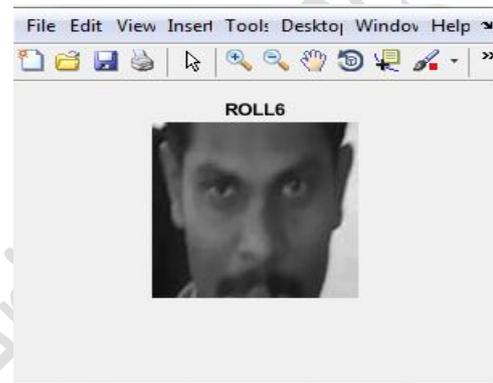
**Fig (7): Roll number 1 is present**



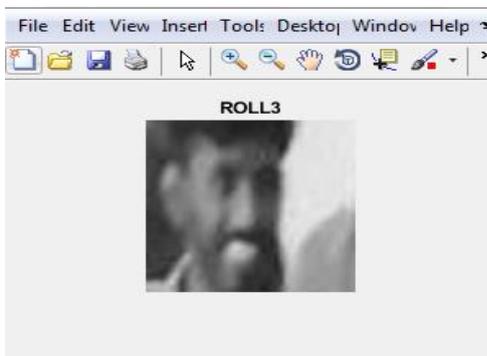
**Fig (11): Roll number 5 is present**



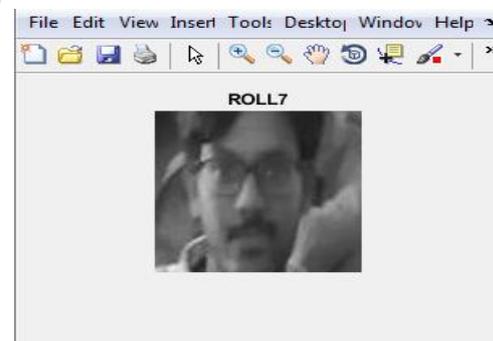
**Fig (8): Roll number 2 is present**



**Fig (12): Roll number 6 is present**



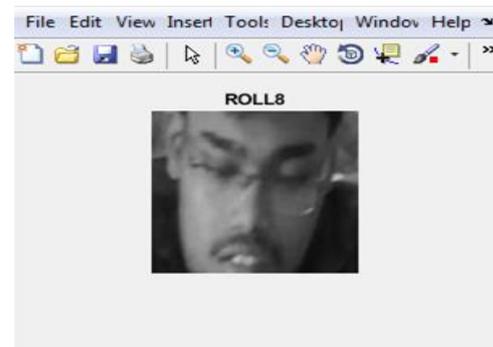
**Fig (9): Roll number 3 is present**



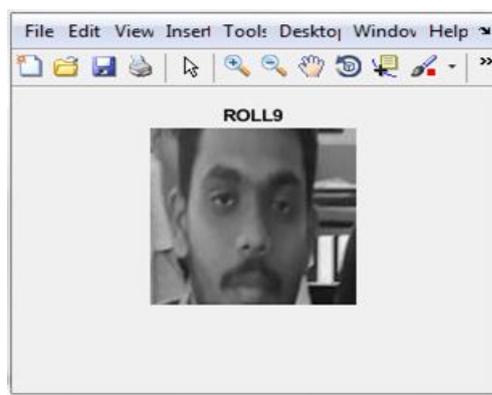
**Fig (13): Roll number 7 is present**



**Fig (10): Roll number 4 is present**



**Fig (14): Roll number 8 is present**



**Fig (15): Roll number 9 is present**

The above results are showing the performance of the different videos, when the target undergoes detected faces and illumination change.

fig (5) is shows a video converted to frames i.e., video is change to the frames and the next figure (6) is shows

a detected faces i.e., frames by the mark the faces and figures (7-15) shows a Roll numbers are here (1-9) i.e., mark the faces are represented by roll numbers up to 1-9 and figure (16) is a shows total attendance table.

**Table:** Taking results of face recognition by using Region Convolution Neural Networks and Support Vector Machine classifier for different videos.

DATE	ROLL NO	1HR	2HR	3HR	4HR	5HR	6HR	7HR	8HR
	1	Present							
	2	Present							
	3	Present	Absent	Absent	Present	Present	Absent	Present	Absent
	4	Present	Absent	Absent	Present	Present	Absent	Present	Absent
11/11/19	5	Present	Present	Present	Present	Present	Absent	Present	Absent
	6	Present							
	7	Present	Absent	Absent	Present	Present	Absent	Present	Absent
	8	Present	Absent	Absent	Present	Present	Absent	Present	Absent
	9	Present							

**Fig (16): Attendance marking table**

## VII CONCLUSION:

In this work, we have presented a novel approach to face location and face recognition of particular understudies in the classroom. On the off chance that the Facial recognition capacity to the considerable judge of this and oversees of in this presence Unthinking in fixed technique. Regardless of in this

technique improves the better accuracy of its face recognition and ID as it is differentiate to in this another biometric office. Utilizing this R-CNN technique we can replace all the old strategies. Effective and programmed participation the board is introduced in paper. This paper proposes a strategy for building up a comprehensive class participation framework utilizing facial recognition. Here we are utilized RCNN for better recognition of face.

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