# Automated Attendance System using Machine Learning Approach

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*Abstract*— Limited functionality of face detection algorithm are still facing problems in real environment. This problem is solved by Viola Jones. The paper discuss about machine learning method for visible object detection which attain high detection rates. initiation of new image description called Internal Image which uses features to detect more efficiently. Viola Jones works efficient when the size of data file is limited.

***Key words:*** Face Recognition, Principal Component Analysis, Voice Conversion, SIFT, Viola Jones

## I. INTRODUCTION

Traditional way of marking attendance involves a typical situation of students sitting in a classroom and the teacher calling out the names of the students individually to mark their attendance. The attendance is usually marked using hard resources - pen and paper. The huge attendance records that maintained are then used for later references. Nowadays, biometrics traits has become very popular in playing a vital role in security related aspects from lower to higher grade such as, attendance system, physical and digital data entry access, login control, passport, national identity card, border line, etc. Biometric is a physiological or behavioral feature of an individual used to identity or verify his/her identity in an efficient manner. With regard to this existence and development of this research field, every manual system is taking an evolution converting into an automated digital world to reduce the manual errors and obtaining the work effortlessly. In such case, in reducing manual entry and hard resources, with less time consumption, attendance system is transforming into a biometric application for an efficient task of teacher to mark attendance for the students of class using fingerprint or face recognition methods. Various research works had been attempted in developing an automated attendance system using biometric traits in recent years. Hence, our proposed system aims to mark attendance automatically by means of face recognition. The teacher can mark the attendance of the students with just the click of a button. The names of the absentees are called out by voice conversion using speech technology. Hence the teacher can easily mark the attendance of the absentees.

## II. LITERATURE REVIEW

### *A. Paper Name: Implementation of Classroom at- Tendance System Based on Face Recognition in Class*

Author: Ajinkya Patil, Mrudang Shukla

The face is the identity of a person. The attendance is necessary in every schools, colleges and library. Traditional method for attendance is professor calls student name record attendance. It takes some time to record attendance. Suppose duration of class of one subject is about 50 minutes to record attendance takes 5 to 10 minute s. For each lecture this is wastage of time. Image processing can be helpful to avoid this. The new way to record attendance is by using face detection. The Raspberry pi module is used for face detection recognition. The camera will be connected to the Raspberry pi module. The student database is collected. The database includes name of the students, there images roll number. This raspberry pi module will be installed at the front side of class in such a way that we can capture entire class. Thus with the help of this system, time will be saved. With the help of this system, it is so convenient to record attendance. We can take attendance on any time.

### *B. Paper Name: Rapid Object Detection using a Boosted Cascade of Simple Features*

Author: Paul Viola Michael Jones, Michael Jones

The paper discuss about machine learning method for visible object detection which attain high detection rates. Three key contributions are used for this task. First is initiation of new image description called Internal Image which uses features to detect more efficiently.

### *C. Aim*

Our goal is to design an efficient attendance monitoring system the system can be extended to respond to the presence of newcomers in the classrooms. Also, means to mark attendance without the intervention of teachers in a classroom i.e. automatically marking attendance at the beginning of every hour can be implemented. And records are maintained easily and more effienctly using email service.

### *D. Statements and Scope*

In order to reduce the frauds of ATM it is recommended to prepare the database of all the ATM customers with the banks and deployment of high resolutions camera and face recognition software at all. To avoid the duplicate voters, a database of all voters of all constituencies is recommended to be prepared. Then at the time of voting resolution camera and the face recognition equipments at the voting site could help in identifications of the voters. In defense ministry and all other important places the face recognition technology can be deployed for better security.

### *E. Problem definition OR statement*

Traditional way of marking attendance involves a typical situation of students sitting in a classroom and the teacher calling out the names of the students individually to mark their attendance. The attendance is usually marked using hard resources - pen and paper. The huge attendance records that maintained are then used for later references.

*1) Advantages of Proposed system:*

We perform a detailed security study and capability assessment of the proposed data

- Latency is reduced
- More ordered
- improves correctness

### *F. Existing System*

Traditional way of marking attendance involves a typical situation of students sitting in a classroom and the teacher calling out the names of the students individually to mark their attendance. The attendance is usually marked using hard resources - pen and paper. The huge attendance records that maintained are then used for later references.

*1) Disadvantages of Existing System:*

- It is cumbersome to maintain a huge set of records.
- It is time Consuming
- Error-prone
- Its leads to wastage of Resources.

## III. IMPLEMENTATION

The process is carried out using many languages.

### *A. Algorithms*

*1) SIFT (Scalar Invariant Feature Transform):*

There are mainly four steps involved in SIFT algorithm. We will see them one-by-one.

Scale-space Extrema Detection From the image above, it is obvious that we can't use the same window to detect keypoints with different scale. It is OK with small corner. But to detect larger corners we need larger windows. For this, scale-space filtering is used. Key point Localization Once main idea is found, they have to be refined to get more accurate results.

They used Taylor series expansion of scale space to get more accurate location of extrema, and if the intensity at this extrema is less than a threshold value it is rejected. This threshold is calledcontrast Thresholdin OpenCV If this ratio is greater than a threshold, calledgeThresholdin OpenCV, that keypoint is discarded.

Orientation Assignment Now an alignment is assigned to each keypoint to achieve invariance to image rotation. A part is taken near the keypoint position depending on the scale, and the value of slope degree and direction is calculated in that region. It creates keypoints with same position and scale, but different directions. It contribute to stability of matching.

Now keypoint descriptor is created. A 16x16 neighbourhood around the keypoint is taken. It is devided into 16 sub-blocks of 4x4 size. For each sub-block, 8 bin orientation histogram is created. So a total of 128 bin costs are available. It is represented as a vector to form basis.

### *B. Viola Jones*

Haar basic functions are used. Two rectangle feature-dissimilarity between the sum of the pixels within two rectangular regions three-rectangle feature: difference between sum within two outside rectangles and sum in a center rectangle four-rectangle feature: difference between diagonal pairs of rectangles.

The integral image at location x , y contains the addition of the pixels above and to the left of x , y, inclusive:

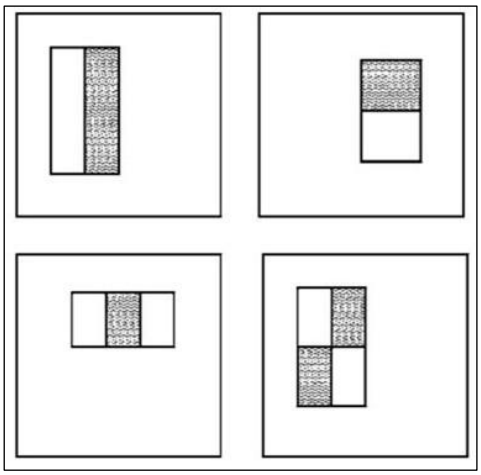


Fig. 1: Rectangle pixels

$$ii(x, y) = \sum_{x' \le x, y' \le y} i(x', y'),$$

$$s(x, y) = s(x, y-1) + i(x, y)$$

$$ii(x, y) = ii(x-1, y) + s(x, y)$$

Fig. 2: Formula

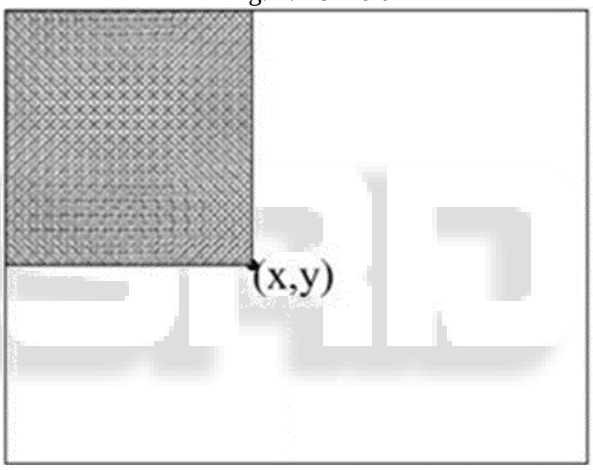


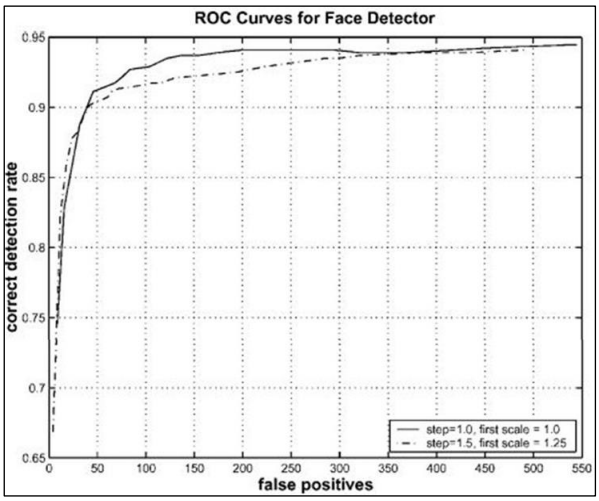

Fig. 3: pixel feature

Position and scale invariance the last detector is scanned across the image at common scales and locations: Scaling is achieved by scaling the detector itself, rather than scaling the image (features can be evaluated at any scale with the same cost) by shifting the window some number of pixels the detector is scans the location

Preprocessing Sub-windows were variance normalized during training to minimize the effect of different lighting conditions. The same is done during detection as well.

Final postprocessing it is useful to post working the detected sub-windows in order to combine overlapping detections into a single detection.

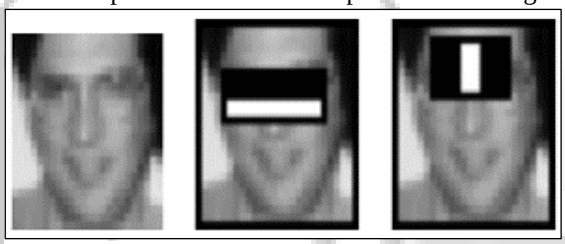
 




### *C. Haar Features*

This algorithm trains the computer to extract the features from image. It guess the face using Image Features such as eigen values. Har feauters are similar to kernel convolution. This signifies black region is +1 and white region is -1.

We subtract white region from black region so the value is single digit. It sums ups the total white region and total black region. The difference between them is called har features. This process is done on all pixels in the image



## IV. RESULT

The result analysis is based upon the accuracy of algorithm. The probability of correct image detection and matching is the result of the project. The features extracted are matched with the all the image dataset in the database where the trained image features are maintained. The difference between the captured and stored image feature is calculated. And on that basis the matching process takes place.

## V. CONCLUSION

This paper focuses on developing an automated attendance system it saves time and effort, especially if it is a lecture with huge number of students. This attendance system shows the use of facial recognition technique for the purpose of student attendance and for the further process this record of student can be used in exam related issues. It is not possible to identify faces having similar facial features. The system can be extended to respond to the presence of newcomers in the classrooms. Also, means to mark attendance without the intervention of teachers in a classroom i.e. automatically marking attendance at the beginning of every hour can be implemented. It can be extended to video surveillance to detect frauds at crowded areas such as bus stands, theatres, railway stations where in by face recognition techniques, the identity of the culprits can be found.

## VI. FUTURE SCOPE

The result of preliminary experiment shows improved performance in the estimation of the attendance compared to the traditional black and white attendance systems. Current work is focused on the face detection algorithms from images or video frames. In future work, authors intend to improve face recognition effectiveness by using the interaction among our system, the users and the administrators. On the other hand, our system can be used in a completely new dimension of face recognition application, mobile based face recognition, which can be an aid for common people to know about any person being photographed by cell phone camera including proper authorization for accessing a centralize database.

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