FACE RECOGNITION BASED ATTENDANCE MANAGEMENT SYSTEM USING MACHINE LEARNING

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Abstract-***Assistance monitoring is used in various fields, such as educational institutions, IT corporations, government offices, etc. Educational institution requires attendance for scholarships and other essential purposes, so attendance is reported either manually or by roll call list, but such methods can cause non-present students to be proxy or fake in attendance. This would prove injustice to the students who attend their colleges on a regular basis. The remedy is therefore to track attendance in such a manner that there is no indication of incorrect enrollment, and the solution to this problem is to develop a system that would mark the presence of only those students who are actually in the classroom.***

Keywords- **Face Recognition, LBPH, MySQL, Attendance Management System, Python Libraries, PHP Programming language.**

I.INTRODUCTION

In order to keep a record of students or staff, attendance is tracked to educational institutes, government offices and IT firms. There are various ways to accomplish this task as each institution has approved their own way of attending, i.e. calling the names or moving the sheets. RFID, BIOMETRIC are various popular automated attendance systems currently in use. In these situations though, creating queue is necessary and requires more time and is invasive for nature. If there is any harm to the RFID wallet, an inappropriate attendance may result.

Besides this, large-scale installation of these devices is not cost-effective and it also takes a lot of time to report attendance. biometric attendance tracking or maintaining or holding a log book to record attendance from these the most widely employed system in most educational institutes is roll call list, this process is time consuming and can also be classified as false attendance. This becomes unfair to the regular students who regularly attend their lectures. The method is designed in such a way as to capture images of the students in order to address all these problems. This program will save the lecturer's or personnel administrator's time and no false attendance would be reported either.

II.LITERATURE SURVEY

In this paper the concept of two innovations was applied with a machine learning methods namely, Student Attendance and Feedback System. It detects the student's success continuously and keeps documents such as attendance. Hence student participation can be made available by awareness of the name called Automated Attendance System Using Face Recognition.

The Automated Attendance Program using Face Recognition shows that the gadget depends on face ID and acknowledgment calculations that are utilized to perceive the facial understudy consequently when he/she enters the class and the product is equipped for perceiving the participation by characterizing him/her. The LBPH calculation is utilized for face location, face acknowledgment, check or validation of facial pictures, distinguishing proof or facial acknowledgment. It encodes the picture and the group of the human face. The gadget spares time as contrasted and ordinary participation checks and assists with screening understudies as well.

A. Student Attendance System Using Iris Detection:

Right now it is required to remain before the camera to discover and perceive the iris with the goal that the student names are recorded by a screen. A few calculations including gray scale conversion, six segment rectangular filter and skin pixel detection are utilized to order the iris. This stays away from the intermediary issues and effectively keeps up the character of the understand. Yet in every one of the tedious procedures a student or a staff will hold up before the previous initiative is done.

B. Face Recognition-Based Lecture Attendance System:

This paper suggests that the device that takes automated consideration of the attendance acquired by continuous observation. Continuous monitoring helps to measure and enhance attendance efficiency. The locations and facial photographs of the students present in the classroom are collected to gain attendance. By constant monitoring and documenting, the program determines the place and location of each student for attendance labeling. The work focuses on the process by which the various weights of each centered seat are obtained according to their position. The effectiveness of the photo is also being debated to enable the image to be identified more quickly.

C. Existing System:

1) Fingerprint Based Recognition System

A current attendance program focused on Fingerprint includes earlier synchronization of a portable fingerprint computer with the student's fingerprint. The student needs to record the fingerprint on the installed computer afterwards, either during class hours or before, to guarantee their attendance for the day. The drawback with this method is it will interrupt the students focus throughout the lecture time.

2) RFID

The student has to bring a Radio Frequency Identity Card with them in the current RFID-based system and put the ID on the card reader to register their attendance for the day. The scheme will link to RS232 to report the attendance to the saved database. There may be incentives for the fraudulent entry. Some are students may use other student ID to guarantee their attendance when the particular student is unavailable, or sometimes even threaten to abuse it.

D. Proposed System:

In proposed system marking the attendance by using input images these input images are captured by using HDR cameras and after capturing images it can be encoded and classified by using the algorithm that is Local Binary Pattern Histogram (LBPH) and after encoding the image it can be compare the against the recognized faces with the database and then matching the results. suppose if the faces are recognized, then it marks the attendance and generates the excel sheet here the attendance will be stored in the database and it provides the following features such as marking the attendance for students based on open electives and recruitment of placement positions, identification of attendance by their subject names followed by subject codes, calculating the attendance percentage of each and every student in the class.

III.WORKING PROCEDURE

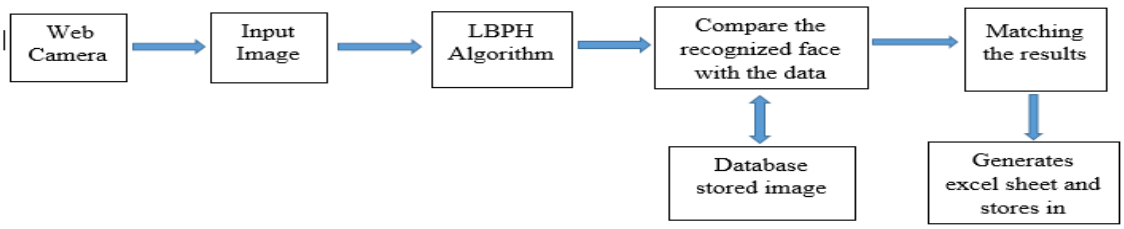

Fig 1: Working procedure of attendance management system

A. Web Camera

A web camera is a device used to film footage and take images, although usually web cameras are the tiny scale these devices are sat on the monitor and used in many ways as well, so it is helpful to collect the pictures through this system.

B. Input Images

These images are taken as the feedback for this device and in general terms after taking photos from the web camera these are data for the program.

Fig: Input image

Local Binary Patch (LBP) is a basic yet exceptionally viable surface administrator marking the pixels of a picture by thresholding the area of every pixel and indicating the yield as a twofold number. This was first depicted in 1994 (LBP) and from that point forward has been seen as an integral asset for surface characterization. It has likewise been realized that when LBP is coupled, the distinguishing proof effectiveness on such datasets is essentially improved with Directed Gradient Descriptor Histograms (HOG). Alongside histograms we may utilize the LBP to characterize the facial pictures utilizing a straightforward information vector. Since LBP is a visual indicator, since can be found in the join bit by bit definition, it can likewise be utilized for facial acknowledgment exercises.

C. Parameters of LBPH Algorithm:

The LBPH makes use of four parameters to the following:

1) Radius

The distance is used to render the local circular binary line, representative the field around the central pixel. General, it is set to 1.

2) Neighbours

The sampling numeral points to find the circular sequences of the local binary. Bear in mind. The bigger the statistical cost, the bigger the sample scores, set commonly to 8.

3) Grid X

In horizontal track the cell totals. The more row, the slenderer the grid, the greater the dimensionality of the connected vector signature. Generally, set at 8.

4) Grid Y

Amount of cells placed vertically. The more columns, the thinner the row, the bigger the dimensionality of the accompanying vector signature. Typically set at 8.

D. Training the Algorithm:

Right off the bat, we will set up the calculation. To do this, we are going to utilize a record that contains the facial pictures of the people we need to review. With each picture, we would need to develop an ID (which might be a number or the name of the individual) and the calculation will utilize this data to characterize an info picture and give you an exit. Pictures of a similar individual will have indistinguishable distinguishing proof. How about we see the LBPH formal stages, with effectively arranged preparing bundle.

1. Applying the LBPH Operation

The principal diagnostic advance of the LBPH is to develop a middle of the road picture that better mirrors the first one, by featuring the highlights of the countenances. The technique in light of the separation and neighboring parameters, utilizes a sliding window design for that.

The accompanying picture outlines this procedure:

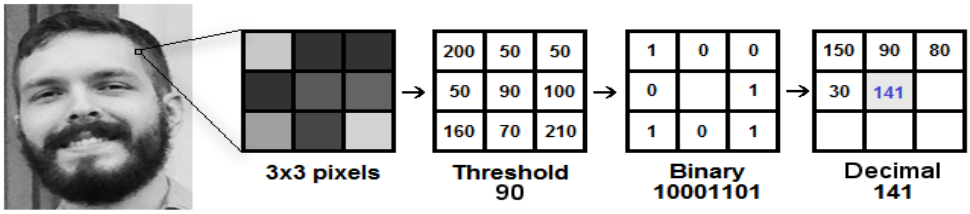

Fig 2: LBPH operation

Based on the above delineation, how about we split it into numerous little advances with the goal that we can unmistakably comprehend.

- Suppose we have a gray scale facial picture.
- Portion of this image can be seen as 3x3 pixel camera.
- This can likewise be deciphered as a 3x3 framework, every pixel quality (0~255).
- Instead, the fundamental belief of the framework to use as the measure will be taken.
- The new qualities for the 8 neighbors will be determined for this number.

We set another parallel an incentive for each neighbor of the focal worth (limit). We set 1 for values proportionate to or over the limit and 0 for values beneath the edge. Presently, the lattice can just incorporate twofold qualities (which come up short on the fundamental worth). We have to link every paired worth line by line from every area in the framework into another parallel worth (for example 10001101). Note: a few journalists utilize exchange strategies to connect parallel qualities (for example development the clockwise way), yet the last item continues as before. We at that point convert the parallel an incentive to a decimal esteem and appoint it to the framework's main issue, which is really a pixel of the first picture. Endless supply of this methodology (LBP system), we have another form that best mirrors the qualities of the first one.

Note: The LBP system has been reached out to incorporate a specific number of sweep and neighbors, roundabout LBP is named that.

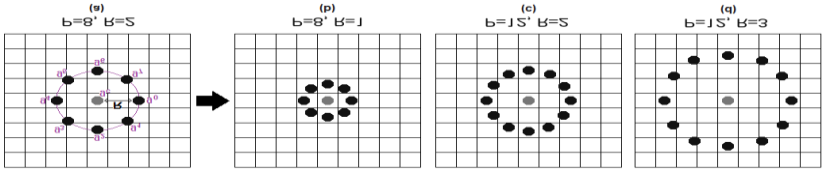

Fig 3: Applying LBPH operation

This can be accomplished by the use of bilinear introduction. At the point when an information point lies between the pixels, the total of the new information point lies decided utilizing the qualities from the 4 nearest pixels (2x2).

2. Extracting the Histograms

Presently, utilizing the picture made in the last advance, we can isolate the picture into different lattices utilizing the Grid X and Grid Y parameters, as can be found in the accompanying outline:

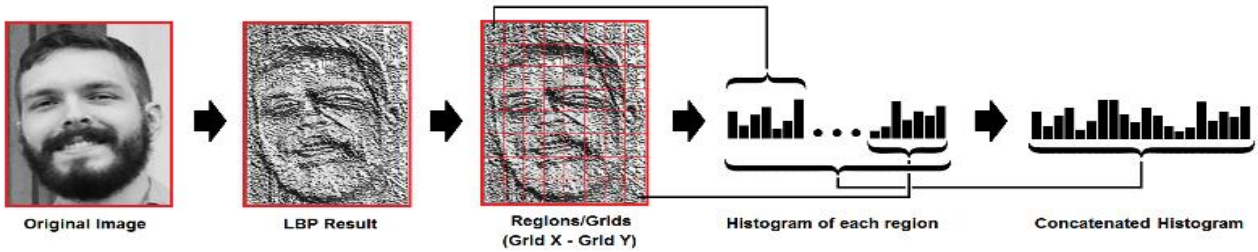

Fig 4: Extracting the histograms

In light of the above graph, we will get the histogram from every territory since follows:

As we have a gray scale map, every histogram (from every framework) would incorporate only 256 positions (0~255) mirroring every pixel quality events. Rather, to develop another and greater histogram, we should connect each histogram. Assume we have 8x8 lines, in the last histogram we would have 8x8x256=16,384 areas. The last histogram speaks to the highlights of the underlying record. That is basically the LBPH calculation.

3. Performing the Face Recognition

The calculation is as of now prepared in that stage. Each histogram created from the preparation dataset is utilized to mirror each realistic. What's more, given an information picture, with this new picture we execute the means again and build a histogram that mirrors the image. At that point we just need to liken two histograms and return the image to the closest histogram to decide the image that fits the info one. To analyze the histograms, we may utilize different strategies (compute the distinction between two histograms) for instance: Euclidean contrast, chi-, total worth and so forth. Right now on the accompanying recipe, we may utilize the Euclidean separation (which is extremely known):

$$D = \sqrt{\sum_{i=1}^{n}(hist1_i - hist2_i)^2}$$

Estimation of the calculation is, the image ID that has the closest histogram. The calculation will likewise restore the deliberate hole, which can be utilized as a proportion of trust.

Note: Don't be deceived by the word 'trust,' since lower confidences are more grounded since it demonstrates more noteworthy hole between the two histograms. So we will utilize an edge and the 'trust' to consequently decide if the image is seen accurately by the calculation.

4. Compare the Recognized Face with Database

The embedded artifacts can be categorized using the LBPH method, and the target identification can be efficiently achieved by utilizing this method. The previously recorded photos in the database can be correlated with the image classification, whether the image classification is when the saved image can be compared.

IV.MODULES

This system has the following modules:

A. Admin Panel

In admin panel it contains the following aspects:

- Username
- password

B. Student Details

In student details it contains the following:

- Student ID
- Student name

C. Take Images

In take images panel it captures the student images.

D. Train Student

In train student all the captured images can be trained.

E. Automatic Attendance

- Choose subject
- Fill attendance
- Send mail

F. Manual Attendance

- Student ID
- Student name
- Enter data
- Convert to CSV

V.RESULTS

The following results shows the process of attendance management system using face recognition

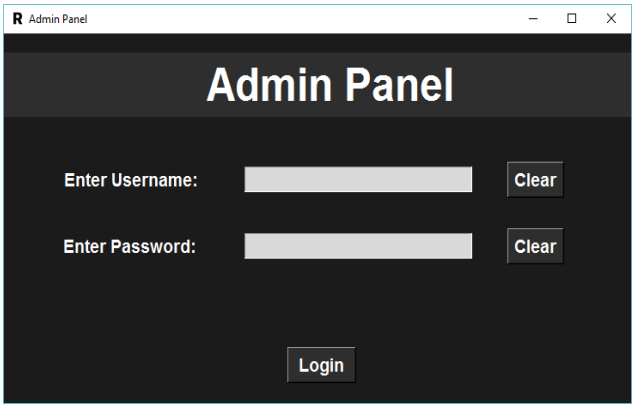

Fig 5: Admin panel (Enter the username and password)

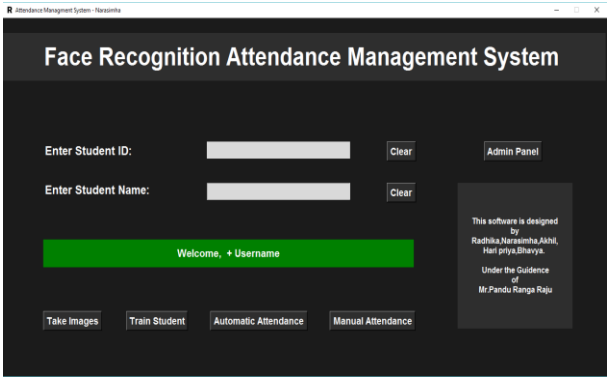

Fig 6: Automatic attendance (Enter the Student ID and name)

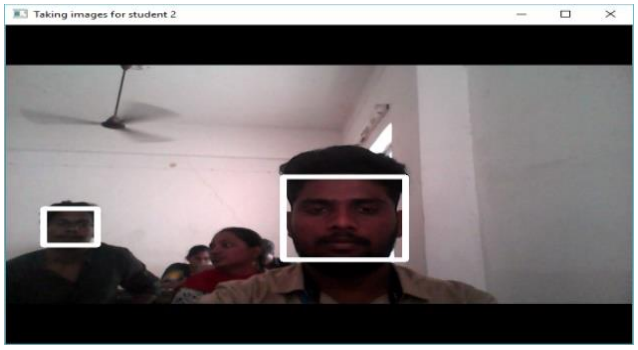

Fig 7: Taking and training the images

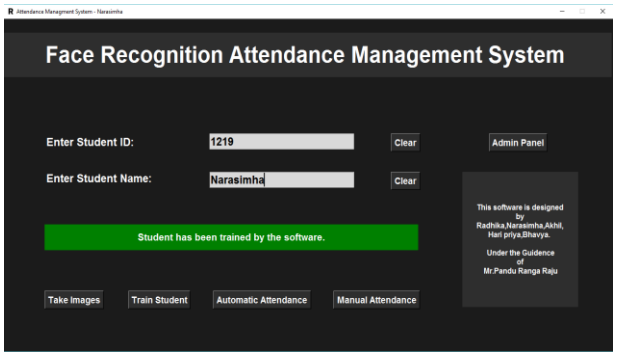

Fig 8: Automatic attendance (Entering the Student ID and name)

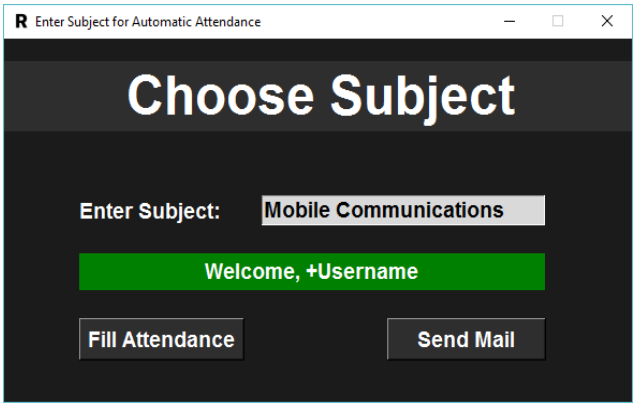

Fig 9: Entering the subject name

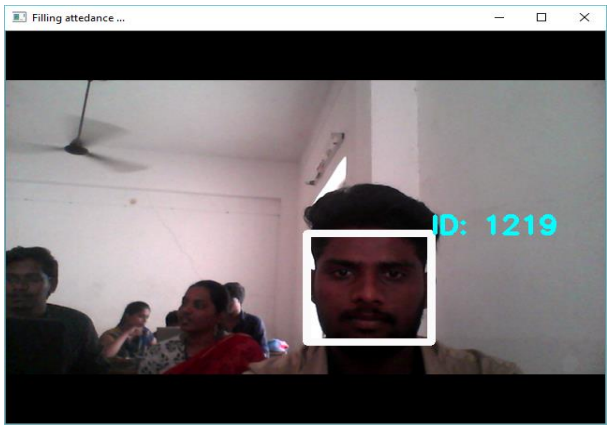

Fig 10: Face can be recognized

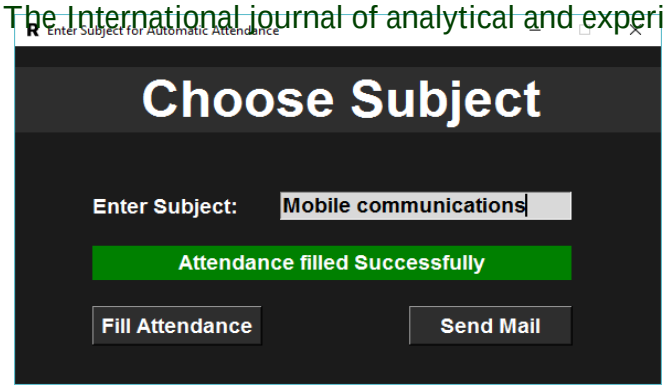

Fig 11: Attendance can be marked successfully

Fig 12: Manual attendance (Enter subject name)

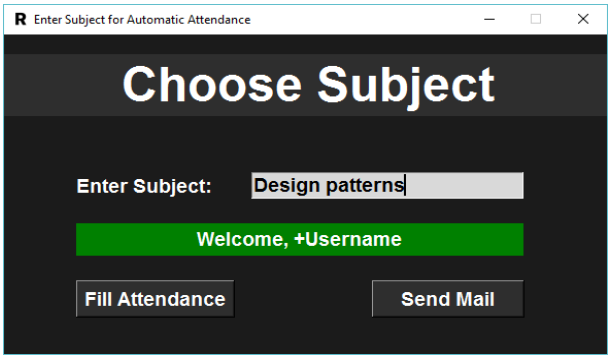

Fig 13: Manual attendance (Entering subject name)

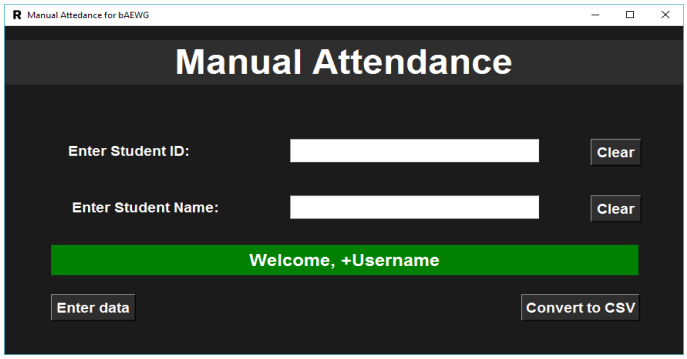

Fig 14: Manual attendance (Enter student ID and name)

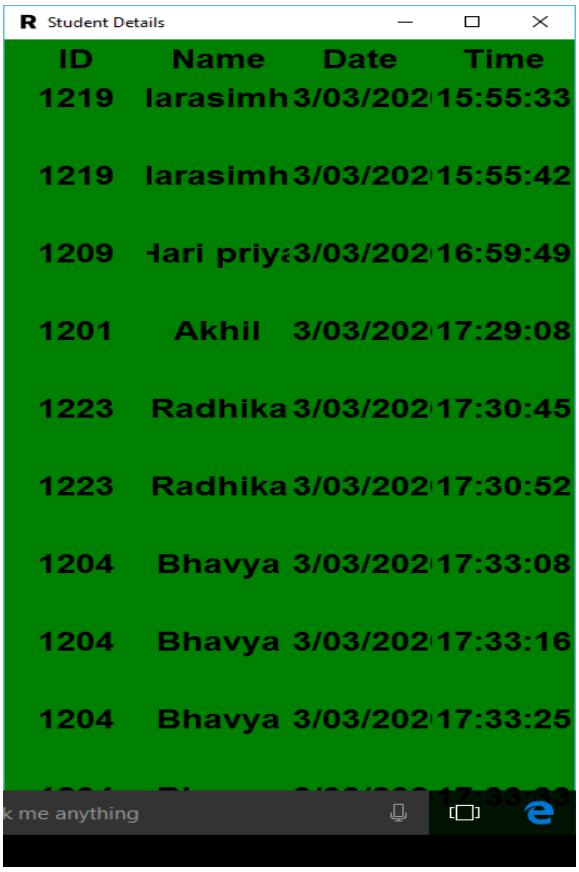

Fig 15: Attendance details can be displayed on screen

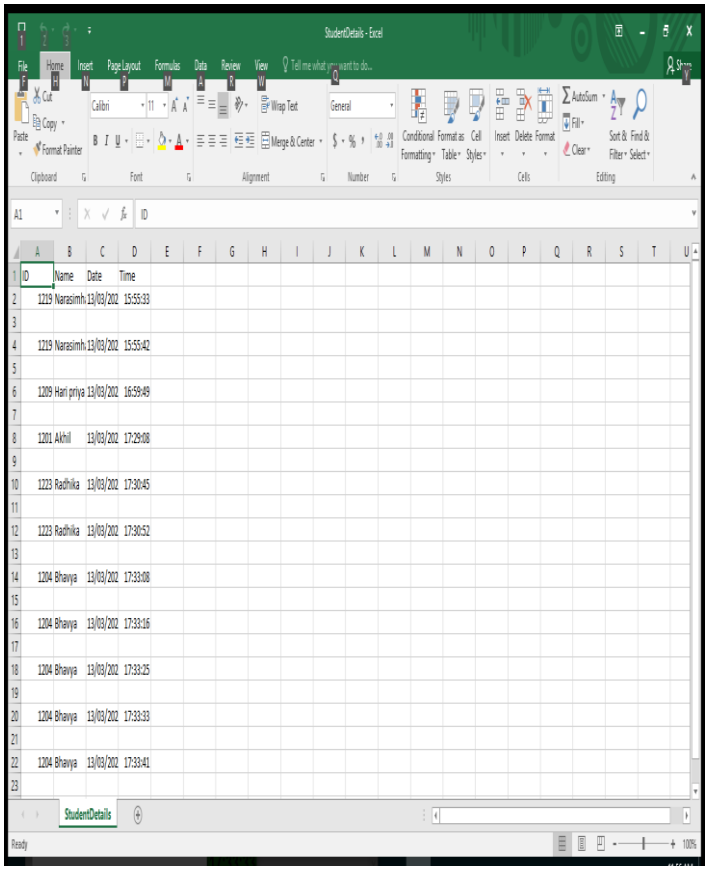

Fig 16: Attendance can be stored in Excel sheet

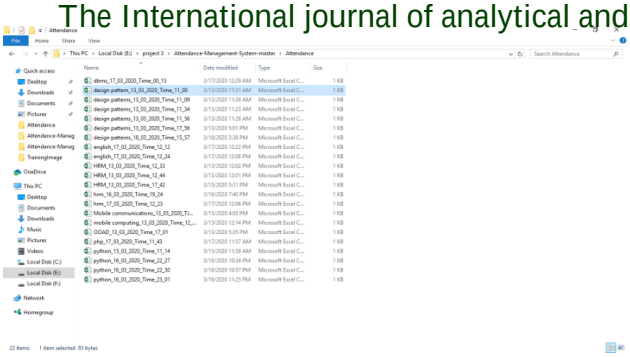

Fig 17: Information can be stores in the memory disk

Fig 18: Attendance can be stored in the database

VI.CONCLUSION

Therefore, Facial acknowledgement Machine Learning centred attendance control technology has proven time intensive and cost-effective. LBPH outperforms other algorithms in real time situations with higher detection performance and a small false positive score. Even tend to be greater than distance classificatory. Potential research is to increase the identification rate of algorithms when accidental adjustments arise in an individual such as the tonsuring head.

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