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# Development of Smart Attendance Monitoring System Using Face Recognition RFID and IOT Technologies for Environment

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**ABSTRACT:** The biometric-based totally attendance monitoring system replaces the manual method of taking attendance and reduces the time to take attendance and avoids proxy. there are many biometric strategies developed based on the fingerprint popularity, DNA matching, face reputation, Iris recognition and voice recognition. Out of all, the techniques primarily based on face popularity are proved to be the fine methods. in this paper we are providing the implementation of attendance monitoring system based totally on the facial popularity. in this approach the photograph database of the classroom is created first and the database is used to train the device. Then in recognition segment the digicam is constant at the focus inside the lecture room and it'll seize the photographs, then from the captured images student's faces are identified & as compared with the database and lastly the attendance is marked primarily based at the faces recognized. The marked attendance is direct said to college students/parents and to the college coping with the respective route. the main motive of this challenge is to build a face recognition-based attendance tracking gadget for academic institution to beautify and improve the modern attendance gadget into more green and powerful as compared to before. The present day antique system has a lot of ambiguity that induced inaccurate and inefficient of attendance taking. at the stop of the day, the excel sheet containing attendance information concerning all individuals are mailed to the respective faculty.

**KEYWORDS:** Automatic attendance, Biometric, Face detection, Face Recognition, Fingerprint, RFID

## I.INTRODUCTION

Many universities, colleges, and schools observe the conventional head to head attendance marking. This traditional method calls for loads of time, now and again college college students can also now not respond to their respective numbers and it includes mistakes within the course of the guide calculation of attendance. in order to overcome those issues there may be a necessity for an automated attendance monitoring machine. This automatic attendance monitoring device entails biometric methods. taken into consideration one of the biometric methods is fingerprint identification [1]. in this approach, the fingerprints of every student is gathered and are saved inside the database. when the thumb is positioned at the fingerprint sensor it compares it with the database and takes attendance. but the drawback in this method is the students have to wait in the queue to gift their prints so it's miles a time taking approach. the alternative method of biometric is iris. on this technique, the eyeball or iris of each student is taken and saved inside the database. whilst eyeballs fits with the database it takes attendance. that is a timeconsuming technique and in exercise, it is hard to put into effect This assignment is all approximately to triumph over on the problems that confronted through using the lecturers when they file the attendance in the establishments or it could be used by in diverse operating region like workplaces in sector and government. quarter. while the academics are taking of attendance of 60-80 university students at a time it's miles a time consuming procedure of round 2-5minutes so this is a extra time consuming if it is belief of it in a long run.

## II.LITERATURE SURVEY

there are numerous feature extraction and recognition algorithms which extract the capabilities from the photo and apprehend them with the existed database .Eigen Faces algorithm became advanced through Sirovich and Kirby (1987) and utilized by Matthew Turk and Alex Pentland in face type [3]. This set of rules captures the variation in the accumulated faces and compares it with individual faces by producing a set of eigenvectors from the photo by means of the foremost factor analysis. The eigenvectors are derived primarily based on the covariance matrix of the possibility

distribution over the high-dimensional vector area of face pix[1]. nearby binary sample histogram algorithm is defined within the 12 months 1994 and become a powerful method for function extraction. in this algorithm, the gray scale photograph is divided into cells of the 3X3 matrix. The obtained matrix is represented with the range of pixel intensities. The middle value of the matrix is considered as the threshold and every pixel price is compared with the threshold. If the pixel price is more than the brink it's miles given 1 in any other case zero. An eight-digit binary cost and is transformed into decimal fee for comfort. Then the histogram is computed over the cells and frequency of every number and concatenate the histogram of all cells to obtain the characteristic vector. this option vector is processed to classify the photos [2], [3]. The research magazine “Fingerprint based Attendance machine the use of Microcontroller an Lab View” (Kumar Yadav, Singh, Pujari, Mishra, 2015) proposed an answer of the use of fingerprint to mark the attendance. This system is the usage of 2 microcontrollers to address the fingerprint recognition manner[4]. A fingerprint is a sort of digital protection machine that makes use of fingerprints for biometric authentication to supply a consumer get admission to to facts or to approve transactions. Human fingerprints are nearly precise, that's why they're a hit at identifying individuals. It's not just regulation enforcement agencies that accumulate and hold databases of fingerprints. Many varieties of occupations that require professional licensing or certification (e.g. economic advisors, stockbrokers, real estate dealers, teachers, medical doctors/nurses, safety, contractors, and so forth.) mandate fingerprinting as a circumstance of employment. it is also regular to provide fingerprints while having documents notarized[5]. in step with the journal “RFID based totally pupil Attendance machine” (Hussain, Dugar, Deka, Hannan, 2014), the proposed answer is almost just like the primary studies magazine wherein RFID technology is used to improve the older attendance device. on this machine, a tag and a reader is once more used as a technique of monitoring the attendance of the students[6]

### III. IMPLEMENTATION SYSTEM

human beings has a completely unique biometric got from nature that its face ,human face has masses of different variant inside the form of facial factors that looks in another way and specific if we document that facts in the form of virtual records collected its seems in particular for each man or woman character. so we are having programming code set of rules on the way to work as a good judgment for face detection The implemented machine may be used for taking the attendance in universities, faculties, and offices. The structure of the gadget is shown in Figure1

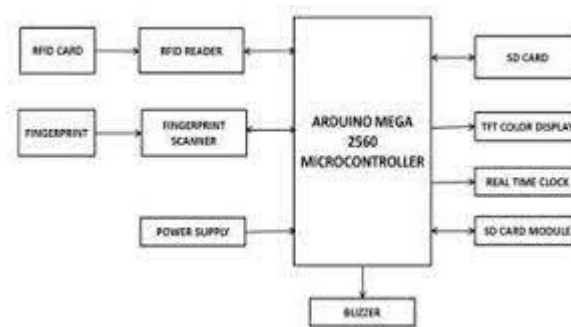


Fig. 1. Block diagram of the system

Then recognize the faces with the existing database through library files present in the openCV. The steps involved are as follows.

#### A. Capturing photos

The camera module is positioned at the focal point within the study room or workplace. A digicam module is used for taking pictures the samples of the lecture room. these samples are used for recognition of faces and to mark the attendance.

#### B. Growing database

As biometric method has been chosen for marking the attendance it is crucial for enrolment of every individual whose attendance must be taken. The face of every person is captured, converted into grayscale and are stored in the database which incorporates a person's identity range. Here a couple of samples are taken for every individual with extraordinary facial expressions.

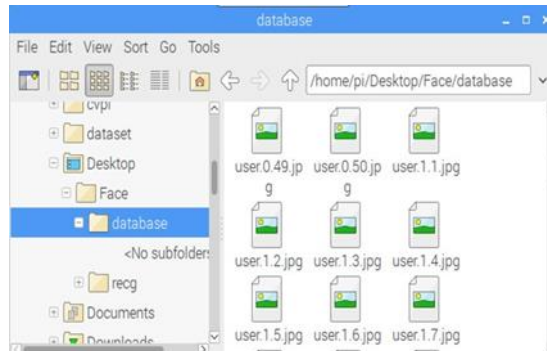


Fig. 2. Database of the captured faces

C. Detecting faces

The faces within the picture are detected by Haar cascade classifier. This method turned into approach proposed via Paul Viola and Michael Jones. Haar cascade classifier is to be had in OpenCV source library which contains pre-educated classifiers for face, eye, smile, and so on. Haar cascade classifier especially classifies the face based totally on the edge functions and corner capabilities. This classifier has high detection accuracy and coffee fake effective rate.

D. Preprocessing

The captured photograph may also comprise useless history noise and factors other than faces. it is vital to put off such factors. function extraction is the technique that reduces the photograph to handiest face available within the photograph. by using this approach, the photograph is decreased to a size of 150x150

E. Face recognition

Face reputation involves steps of schooling and feature extraction. To recognize faces we have to educate the algorithm with pix and their respective identity numbers. feature extraction is finished through many face popularity algorithms to be had inOpenCV like eigenfaces, Fisher faces, neighborhood binary pattern histogram(LBPH).LBPH set of rules is simple and broadly used to understand faces. in this algorithm, each image is analyzed independently. in this set of rules, the grayscale photograph is divided into cells of the 3X3 matrix. The obtained matrix is represented with the range of pixel intensities. The center value of the matrix is considered as the edge and each pixel price is in comparison with the brink. If the pixel cost is more than the edge it's far given 1 otherwise zero. An 8-digit binary value and is transformed into decimal fee for comfort. Then histogram is computed over the cells and frequency of each numbers and concatenate the histogram of all cells to obtain the characteristic vector. this selection vector is processed to classify the pix [5], [7], [8]. An photo in neighborhood binary pattern histogram is mathematically represented as,

$$LBP(Xn, Yn) = \sum_{p=0}^{P-1} 2^p S(i_p - i_c) \tag{1}$$

ip is the central pixel intensity and ic is the intensity of the neighbouring pixel. S is the signum function defined as

$$S(x) = \begin{cases} 1 & x \geq 0 \\ 0 & else \end{cases} \tag{2}$$

This description enables to capture very satisfactory grained info inpics. This to align an arbitrary number of pals on a circle with a variable radius, which allows to capture the neighborhoods proven in Fig: 3.

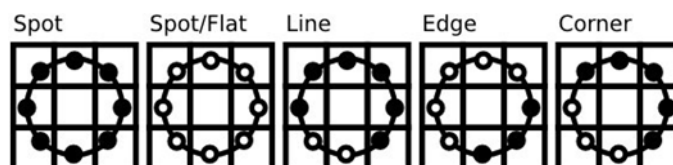


Fig. 3. Neighbourhood with variable radius to extract features



For a given Point (xn, yn) the position of the neighbor (xp, yp) can be calculated by using the following equation

$$Xp = Xc + R \cos\left(\frac{2\pi p}{P}\right) \quad (3)$$

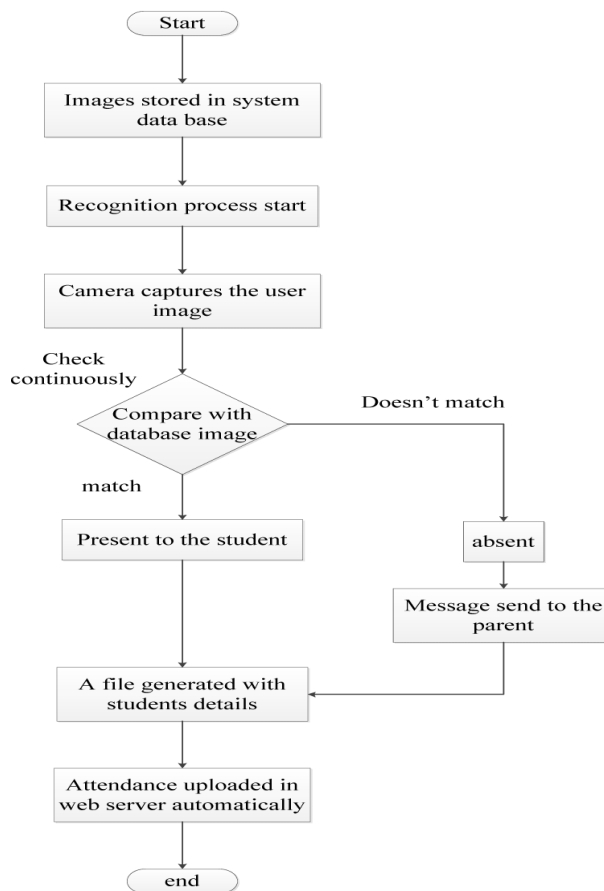
where R is the radius of the circle and P is the number of samplepoints.

F. RFID based Student Attendance System

In line with the fourth research journal “RFID based student Attendance device” (Hussain, Dugar, Deka, Hannan, 2014), the proposed answer is sort of just like the primary studies journal wherein RFID era is used to improve the older attendance gadget. in this machine, a tag and a reader is again used as a way of tracking the attendance of the scholars. The difference among the first journals with this is wherein attendance’s statistics can be accessed through an internet portal. It offers extra convenient for facts retrieval. again, this system is imperfect within the sense that, first off, it isn't always transportable, as the RFID reader can most effective work when it's miles connected to a laptop. Secondly, the RFID tag isn't always a guanine records which could uniquely become aware of a scholar, accordingly, ensuing inside the inaccuracy of the collected attendance records.

In end, a higher attendance tracking gadget ought to be evolved primarily based on its portability, accessibility and the accuracy of the accumulated attendance information.

FLOW CHART OF ALGORITHM



**IV.EXPERIMENTAL SETUP AND RESULT**

in this task we have used a combination of three parameters for the recording of the attendance particularly Fingerprint biometric , Face recognition and RFID gadget. The wirelessngerprint and face are the 2 most common biometric tendencies of the attendance gadget due to convenience and high acceptability rate in comparison to the iris recognition. A sensor inside the form of a digital camera is needed for the iris, wi-fingerprint, or face photo acquisition. CMOS is via a ways the accepted sensor in nearly all digicam Time saving is potential via face recognition-primarily based attendance gadget in that scholars do now not need to queue and call with the sensor. The verbal exchange channel performs an critical role in transferring attendance information.

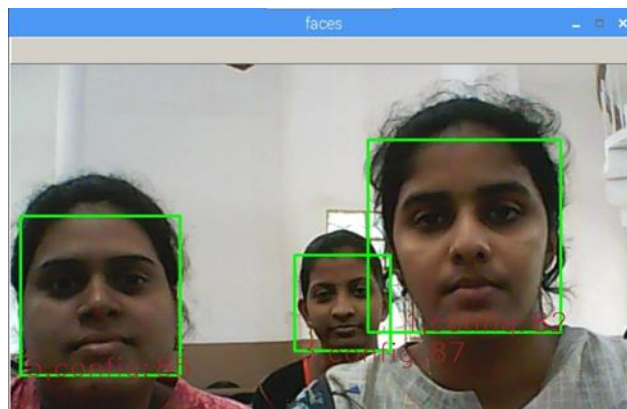


Fig. 6. Face recognition and attendance recording phase

	A	B	C
1	Roll no of student	Present/absent	Date
2	158W1A1096	Present	29/10/2018
3	158W1A1072	Present	29/10/2018
4	158W1A1076	Absent	29/10/2018
5	158W1A1071	Present	29/10/2018
6	158W1A1074	Present	29/10/2018
7	158W1A1067	Absent	29/10/2018
8	158W1A1080	Present	29/10/2018
9	158W1A10A0	Absent	29/10/2018
10	158W1A1081	Present	29/10/2018
11	158W1A1068	Present	29/10/2018
12	158W1A1087	Absent	29/10/2018

Fig. 7. Attendance recorded to excel sheet

**V.APPLICATIONS**

- Check in college students and workforce with RFID or Biometric attendance machine.
- At each elegance, the teacher has to mark attendance the use of the web and cellular gadgets.
- Analyze attendance data.
- Identify absent & tardy college students.
- Proportion attendance statistics with mother and father

**VI. ADVANTAGES**

- This system is fast, fully automated, dependable, accurate, does now not required bodily website online of touch.
- Reducing paper based work, saving the time of attendance name, actual attendance, no proxy attendance, can not forged information, students would have a purpose to go to class.
- Smooth way to allow mother and father recognize if a baby is skippingclass.



## VII.CONCLUSION

The implemented attendance monitoring device is acting with 96 percent accuracy. The gadget is the usage of haar classifier and LBPH algorithms for face detection and face popularity. there are many algorithms developed within the current years based on wavelet transforms, guide vector machines, neural networks and deep studying techniques. however those advanced techniques calls for the maximum sophisticated hardware which include excessive stop CPU's and GPU's. The fee of the device is also increases with the advanced hardware. So the implemented device is most economical and really beneficial to enforce with low fee.

## REFERENCES

- [1] M. Turk and A. Pentland, "Eigenfaces for recognition," Journal of cognitive neuroscience, vol. 3, no. 1, pp. 71–86, 1991.
- [2] T. Ahonen, A. Hadid, and M. Pietikainen, "Face description with local binary patterns: Application to face recognition," IEEE Transactions on Pattern Analysis and Machine Intelligence, vol.28, pp. 2037–2041, Dec 2006.
- [3] T. Ojala, M. Pietikainen, and T. Maenpaa, "Multi resolution gray-scale and rotation invariant texture classification with local binary patterns," IEEE Transactions on pattern analysis and machine intelligence, vol. 24,no. 7, pp. 971–987, 2002
- [4]. "Fingerprint Based Attendance System Using Microcontroller and LabView" (Kumar Yadav, Singh, Pujari, Mishra, 2015)
- [5] Face Recognition and Fingerprint based Attendance Monitoring System Prof. Mohini Mohan Sawarkar Department of Instrumentation, BharatiVidyapeeth College of Engineering, Belpada, Navi Mumbai Volume: 07 Issue: 03 | Mar 2020
- [6]. "RFID based Student Attendance System" (Hussain, Dugar, Deka, Hannan, 2014)
- [7] T. Ahonen, A. Hadid, and M. Pietikainen, "Face description with local binary patterns: Application to face recognition," IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 28, pp. 2037–2041, Dec 2006
- [8] P. Viola and M. Jones, "Rapid object detection using a boosted cascade of simple features," in Computer Vision and Pattern Recognition, 2001
- [9]CVPR 2001.Proceedings of the 2001 IEEE Computer Society Conference on, vol. 1, pp. I–I, IEEE, 2001



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