EasyChair Preprint

№ 7841

# Face Recognition Based Attendance System

Rahul Jadhav, Rupesh Padature, Sanchit Kulkarni,
Padmanabh Kale and Mansi Bhonsle



April 27, 2022

# Face Recognition Based Attendance Management System

Rahul Jadhav, Rupesh Padature, Sanchit Kulkarni, Padmanabh Kale, Mrs. Mansi Bhonsle

G H Raisoni College of Engineering and Management, Pune, Maharashtra, India

jadhav.rahulb8@gmail.com, rupeshpadatureoo7@gmail.com,sanchitkulkarni04@gmail.com, padmanabhkale27@gmail.com, mansi.bhonsle@raisoni.net.

**Abstract**

*In this age of modern technology, which is developing at a rapid pace, there is no reason why such an important event in education as attendance should be done in the old, boring and traditional way. Face Recognition Attendance Management System saves a lot of time and energy for both the teaching staff and the students. Attendance is monitored by the face recognition algorithm by recognizing only the face of the students from the other objects and then marking the students as present. The system is fed in advance with the images of all the students enrolled in the class. Using this data, the algorithm recognizes the students present and matches the features with the already stored images of the students in the database. It uses the image of a student and compares it with a dataset of images provided during registration. Then it identifies the students and marks their attendance. Also, the attendance report of the students is automatically generated and forwarded to the respective recipient.*

**Key Words:** Facial Recognition, Local Binary Pattern Histogram, OpenCv,Haar Cascade, Tkinter.

## 1. Introduction

The purpose of the attendance control system with facial recognition is to simplify the attendance control process, which saves the lecturer a lot of time and effort that can be used for teaching. It is also a convenient and easy way for students. The system takes photos of the students present in the classroom and marks the attendance on the sheet using a face recognition algorithm [1].In this way, attendance is marked in the class without spending time on roll call, resulting in proxy attendance. The users of this system are lecturers, administrators and students. The system allows the instructor to control attendance, i.e., determine when to begin taking pictures. The system also allows the administrator to update the database when a new student enrolls. Students are helped by the system to monitor their attendance. Students can only view their own attendance and do not have the ability to edit or review the system's database. The administrator of the system has the authority to check, upload and update the entries[4].

The teacher spends a lot of time marking attendance manually and wastes a lot of time that could have been spent on other constructive things like teaching and clarifying doubts. Therefore, this system will mainly benefit education, but also other industries such as IT companies, offices, banks, airports and other places where security and identity are particularly important.

## 2. Related Work

### 2.1 Existing System

Manual student attendance marking is currently plagued by numerous challenges and is a time-consuming operation. Names of students are called from a data sheet by teachers or faculty, and pupils react. Traditional method of attendance marking is a tedious task in many schools and colleges. It is also an extra burden to the faculties who should mark attendance by manually calling the names of students which might take about 15 minutes of entire session. This is time consuming. There are some chances of proxy attendance

Students are given an attendance sheet to fill out and return to the teacher. This is a time-consuming procedure as well. However, in large courses with a huge number of pupils, the existing process becomes quite complicated. Students frequently mark proxies by responding to a phoney identity. This causes disruption in the classroom and distracts pupils during exam periods.

### 2.2 Literature Survey

[1] Clyde Gomes, Sagar Chanchal, Tanmay Desai, Dipti Jadhav has explained “Class Attendance Management System using Facial Recognition” which is published in ITM Web of Conferences January 2020. This piper introducer a now approach in automatic attendance management systems, extended computer vision algoritms.

[2] L.B.S. Sasank, K. Sravani, D.Savithri, and S. Maloji has explained “Design and Implementing Lab Attendance System Using RFID” .Published a paper in International Journal of Engineering and Advanced Technology(JEAT), vol. 8, no.4, 2019. This paper describes how to take student's attendance using RFID recognition. The RFID is implemented with the help of lot.

[3] K. P. Mohamed Basheer, C. V. Raghu described “Fingerprint attendance system for classroom needs” in India Conference (INDICON), 2012 Annual IEEE. This paper describes how Fingerprint attendance system device works for classroom. They developed portabla device for marking the attendance.

[4] S. Chintalapati and M. Raghunadh, explained "Automated attendance management system based on face recognition algorithms" in 2013 IEEE International Conference on Computational Intelligence and Computing Research, 2013. 10.1109/ITNEC.2019.8729496

[5] Varadharajan, E., et al. "Automatic attendance management system using face detection." 2016 Online International Conference on Green Engineering and Technologies (IC-GET). IEEE, 2016.

[6] Akbar, Md Sajid, et al. "Face Recognition and RFID Verified Attendance System." 2018 International Conference on Computing, Electronics & Communications Engineering (iCCECE). IEEE, 2018.

[7] Hapani, Smit, et al. "Automated Attendance System Using Image Processing." 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA). IEEE, 2018.

## 3. Proposed System

. The aim of proposed system is to develop an automated system for recording student attendance in lectures and examinations, which would prove to be a better alternative to manual attendance recording on paper. This system provides the user with the ability to access their attendance information and student data. An attendance management system based on facial recognition is used in educational institutions. A simple and cost-effective solution to detect fake attendance or fake student data. A facial recognition based attendance management system is deployed in educational institutions**.**The lop-level diagram is often called context diagram. It consists a single process bit, which plays vital role in studying the current system. The process in the context level diagram is exploded following diagram.

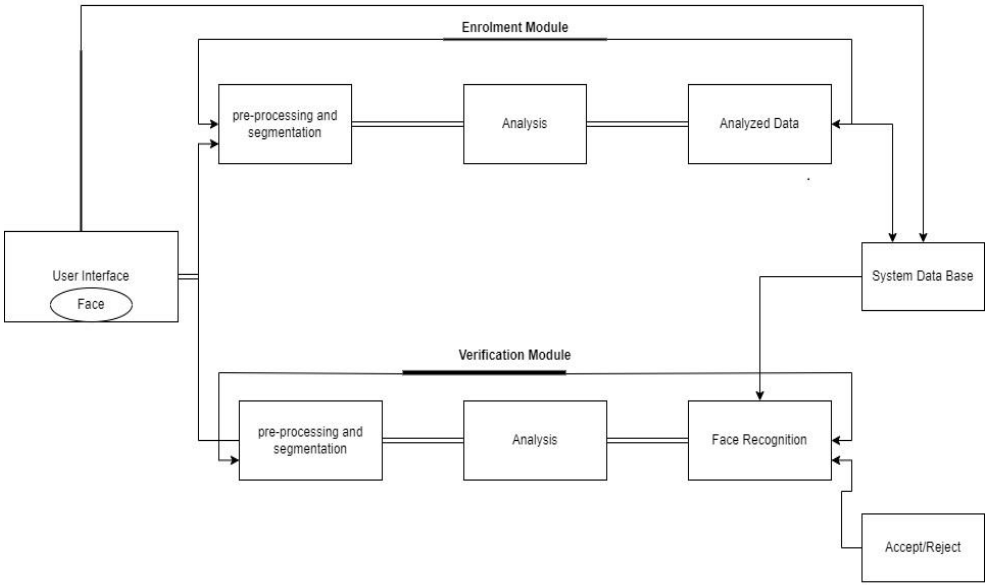


Fig.System Architecture

**Fig.System Architecture**

### 3.1 Data Pre-processing – Images

The system will convert each image into a fixed-sized vector that can subsequently be provided as input to the neural network(NN) because we have images of various sizes. Face detection is a process where the image given as the input is searched to find any face, after finding the face the image processing cleans up the facial image for easier recognition of the face. LBPH , Open CV algorithm can be implemented for detecting the face[8].

### 3.2 Data Pre-processing – Captions

LBPH (Local Binary Pattern Histogram) is a Face Recognition algorithm it is used to recognize the face of a person. It is known for its performance and how it is able to recognize the face of a person from both front face and side face.To do so, we need to use a dataset with the facial images of the people we want to recognize. We need to also set an ID (it may be a number or the name of the person) for each image, so the algorithm will use this information to recognize an input image and give you an output[9].

.

### 3.3 Methodology

The system consists of an algorithm that recognizes only the student's face from the rest of the rooms and body parts, and then matches this recognized image with previously entered data. This data will be retrieved when students enroll in college or in a particular class. The system will operate in three distinct phases. The second phase of the attendance monitoring system with face recognition is face recognition. This is the dynamic phase in which the camera will only capture the images of the faces and with the help of the previously inputted data, it will recognize the captured image. The last phase of this system is updating the attendance list. The detected faces are marked as present and the other students are marked as absent.

The data of student information like roll number. Address and other information are stored in MySQL database which we use for this purpose.Proxy is a kind of very big problem while attending any school or organization. Without entering the correct credentials, which are communicated to the system by face and other parameters like pixels, no one can grant a proxy. To solve such problems, we have introduced a modern attendance system with face recognition. First we take all the data of students and store it in our MySQL database. Then we use different libraries like OpenCV, Tkinter and different algorithms to recognize the right images for the right person. With the algorithm we use in this system.

- **OpenCV :**

  Python is a library of Python bindings designed to solve computer vision problems. cv2.imread() method loads an image from the specified file. If the image cannot be read (because of missing file, improper permissions, unsupported or invalid format) then this method returns an empty matrix.
- **Tkinter:**

  Python provides a standard GUI library named Tkinter . Tkinter module helps in creating GUI applications in a fast and easy way. Tkinter provides 15 types of widgets. Some common ones are Button, Label, Frame, Menu. The message, Radiobutton, Text, Scrollbar, and so on.
- **Local Binary Pattern Histogram:**

  Local Binary Pattern Histogram(LBPH) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number. Each pixel is composed of Three values are R, G, and B, which are the basic colours red, green, and blue.
- **HAAR CASCADE:**

  The HAAR feature continuously traverses from the top left of the image to the bottom right to search for the particular feature. For a single rectangle on either side, it involves 18 pixel value additions (for a rectangle enclosing 18 pixels).

## 4. Implementation

The system consists of an algorithm that recognizes only the student's face from the rest of the rooms and body parts, and then matches this recognized image with previously entered data. This data will be retrieved when students enrol in college or in a particular class. The system will operate in three distinct phases. The second phase of the attendance

monitoring system with face recognition is face recognition. This is the dynamic phase in which the camera will only capture the images of the faces and with the help of the previously inputted data, it will recognize the captured image. The last phase of this system is updating the attendance list. The detected faces are marked as present and the other students are marked as absent. For this we use OpenCV, LBPH, Har Cascade Algorithm for training Data set. And analyse the result.

Student images are stored in the database, normalized in size and centered. This makes it an excellent dataset for evaluating models and allows the developer to focus on machine learning with very little data cleaning or preparation required. Then, the system recognizes the faces using the camera and compares these images with the student image data in the dataset. When the system recognizes a particular student, attendance is marked for that student.

## 5. Results And Discussion

The main working principle of the project is that, the video detected data is 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. First we take all the data of students and store it in our MySQL database. Then we use different libraries like OpenCV, Tkinter and different algorithms to recognize the right images for the right person. With the algorithm we use in this system. With the help of openCV libraries we capture the images and pass through the system to process it.Then with the help of LBHP algorithm we can it is used to recognize the face of a person. It is known for its performance and how it is able to recognize the face of a person from both front face and side face.To do so, we need to use a dataset with the facial images of the people we want to recognize.

After that we use Haar cascade algorithm to identify the faces between that we are captured and which is stored in the database and mark the attendance if captured images is match otherwise it is mark absent. Then we use Tkinter libraries for GUI(Graphical user interface)with the help of this we build GUI Page for our System.

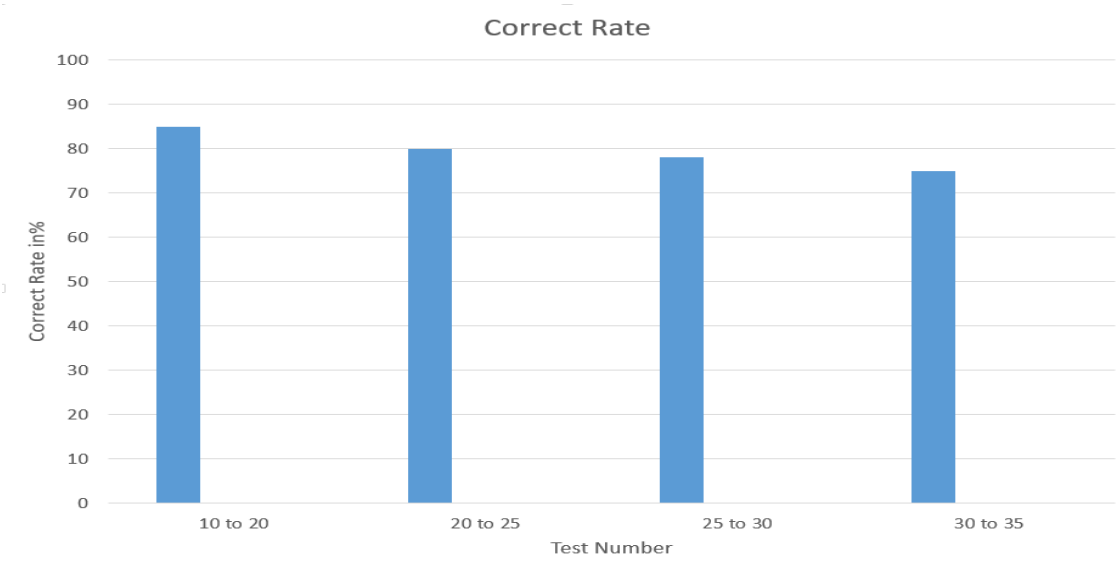


Fig 1

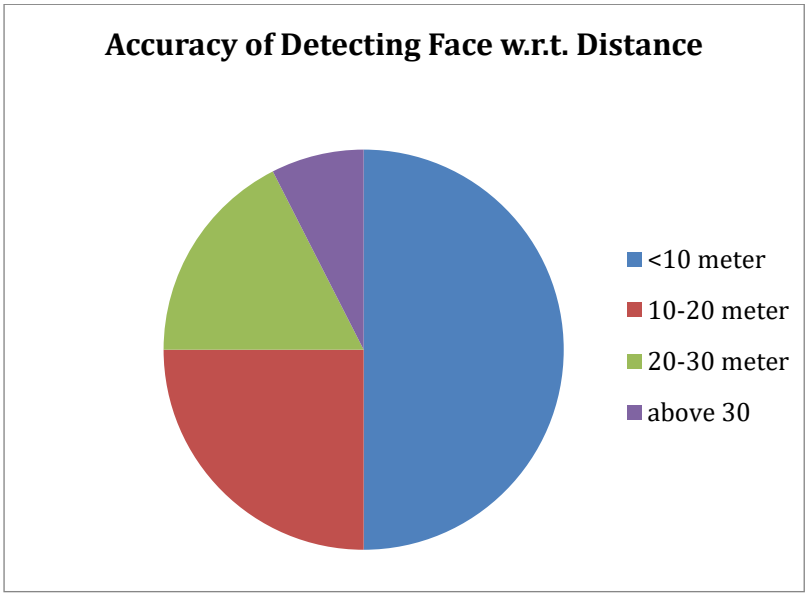


Fig 2

## 6 Conclusion

The face database is successfully constructed by Proposed System. Apart from that, the face recognition system performs admirably. Finally, the system not only resolves the issues that existed in the previous model, but it also allows the user to obtain the information collected by submitting the attendance sheet to the respected faculty.

Automated Attendance System can implement in wide range areas like in a seminar hall, big events where it helps in sensing the presence of many people. This system provides users with the ability to control attendance via facial recognition. Focus on fake presence Sometimes the less lighting condition of the classroom may affect image quality which indirectly degrades system performance, this can be overcome in the latter stage by improving the quality of the video or by using some various algorithms.

## References

[1] Clyde Gomes, Sagar Chanchal ,Tanmay Desai, Dipti Jadhav “Class Attendance Management System using Facial Recognition” ITM Web of Conferences January 2020.

[2] Minakshi N. Vharkate “Automatic Attendance system using Face Recognition Technique International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277 3878, Volume9 Issue-1, May 2020.

[3] L.B.S. Sasank, K. Sravani, D.Savithri, and S. Maloji International Journal of Engineering and Advanced Technology (IJEAT), vol. 8, no.4, 2019.

[4] Radhika C. Damale, Prof.Bageshree.V. Pathak. “Face Recognition Based Attendance System Using Machine Learning Algorithms." IEEE 2018, Proceedings of the Second International Conference on Intelligent Computing and Control Systems (ICICCS 2018) IEEE Xplore.
[5] S. Chintalapati and M. Raghunadh, "Automated attendance management system based on face recognition algorithms", 2013 IEEE International Conference on Computational Intelligence and Computing Research, 2013. 10.1109/ITNEC.2019.8729496
[6] K. P. Mohamed Basheer, C. V. Raghu he published” fingerprint attendance system for classroom need.” India Conference (INDICON), 2012 Annual IEEE:
[7] N. Gupta et.student Attendance centralized server structure 2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), 2020.
**[8]** CH. VINOD KUMAR , DR. K. RAJA KUMAR PG Scholar, Dept of CS& SE, Andhra University, Vishakhapatnam, AP, India. Assistant Professor, Dept of CS& SE, Andhra University, Vishakhapatnam, AP, India. Face Recognition Based Student Attendance System with OpenCV 15/12/2014]
[9] Siswanto, Adrian Rhesa Septian, Anto Satriyo Nugroho, and Maulahikmah Galinium. "Implementation of face recognition algorithm for biometrics based time attendance system." 2014 International Conference on ICT For Smart Society (ICISS). IEEE, 2014.

[10] Lukas, Samuel, et al. "Student attendance system in classroom using face recognition technique." 2016 International Conference on Information and Communication Technology

Convergence (ICTC). IEEE, 2016.

[11] A. Pentland, B. Moghaddam, and T. Starner, “View-based and modular eigenspaces for face recognition,” IEEE Conf. on Computer Vision and Pattern Recognition, MIT MediaLaboratory Tech. Report No. 245 1994
[12] Rathod, Hemantkumar, et al. "Automated attendance system using machine learning approach." 2017 International Conference on Nascent Technologies in Engineering (ICNTE). IEEE, 2017.
[13] Varadharajan, E., et al. "Automatic attendance management system using face detection." 2016 Online International Conference on Green Engineering and Technologies (IC-GET). IEEE, 2016. n. In Proceedings of IEEE on International Conference on Pattern Recognition.

[14] Akbar, Md Sajid, et al. "Face Recognition and RFID Verified Attendance System." 2018 International Conference on Computing, Electronics & Communications Engineering (iCCECE). IEEE, 2018.
[15] Hapani, Smit, et al. "Automated Attendance System Using Image Processing." 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA). IEEE, 2018.