# Chapter2

**LITERATURE SURVEY**

**FOR**

**PROBLEM IDENTIFICATION AND SPECIFICATION**

2.1 Introduction

2.2 Research Papers

**2.1 Introduction**

A literature survey represents a study of previously existing material on the topic of the report. This includes (in this order):

1) Existing theories about the topic which are accepted universally.

2) Books written on the topic, both generic and specific.

3) Research done in the field usually in the order of oldest to latest.

4) Challenges being faced and ongoing work, if available. The literature survey should be structured in such a way as to logically (and chronologically) represent the development of ideas in that field. The size (length) of the literature survey depends a lot on whether you're writing a project report to submit for publication in a journal or for a college assignment. It can range from a review of just a few research papers on the topic to a full-length discussion of significant work done in the field till date.

**2.2 Objectives**

Gaining an understanding on the fundamentals and state-of-the art of the area.

• Learning the definitions of the concepts.

• Access to latest approaches, methods and theories.

• Discovering research topics based on the existing research

• Concentrate on your own field of expertise: Even if another field uses the same words, they usually mean

completely different thing.

• It improves the quality of the literature survey to exclude side-tracks– Remember to explicate what isexcluded

**2.2 RESEARCH PAPER.**

**1] Title:** Facial Recognition Attendance System Using Python and OpenCv

**Authors:**

Dr. V Suresh, Srinivasa Chakravarthi Dumpa, Chiranjeevi Deepak Vankayala, HaneeshaAduri, Jayasree Rapa.

**ABSTRACT:** The main purpose of this project is to build a face recognition-based attendance monitoring system for educational institution to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The current old system has a lot of ambiguity that caused inaccurate and inefficient of attendance taking. Many problems arise when the authority is unable to enforce the regulation that exist in the old system. The technology working behind will be the face recognition system. The human face is one of the natural traits that can uniquely identify an individual. Therefore, it is used to trace identity as the possibilities for a face to deviate or being duplicated is low. In this project, face databases will be created to pump data into the recognizer algorithm. Then, during the attendance taking session, faces will be compared against the database to seek for identity. When an individual is identified, its attendance will be taken down automatically saving necessary information into a excel sheet. At the end of the day, the excel sheet containing attendance information regarding all individuals are mailed to the respective faculty.

# 2.] Title: Smart Attendance System using OPENCV based on Facial Recognition

**Authors**: Sudhir Bussa , Ananya Mani , Shruti Bharuka , Sakshi Kaushik

**Abstract** – Face is the crucial part of the human body that uniquely identifies a person. Using the face characteristics as biometric, the face recognition system can be implemented. The most demanding task in any organization is attendance marking. In traditional attendance system, the students are called out by the teachers and their presence or absence is marked accordingly. However, these traditional techniques are time consuming and tedious. In this project, the Open CV based face recognition approach has been proposed. This model integrates a camera that captures an input image, an algorithm for detecting face from an input image, encoding and identifying the face, marking the attendance in a spreadsheet and converting it into PDF file. The training database is created by training the system with the faces of the authorized students. The cropped images are then stored as a database with respective labels. The features are extracted using LBPH algorithm.

**3.] Title:** **Face Recognition Based Attendance System using Python**

**Authors**: Divya Pandey,Priyanka Pitale, Kusum Sharma

**Abstract:** Automatic face recognition (AFR) technologies have made many improvements in the changing world. Smart Attendance using Real-Time Face Recognition is a real-world solution which comes with day to day activities of handling student attendance system. Face recognition-based attendance system is a process of recognizing the students face for taking attendance by using face biometrics based on high - definition monitor video and other information technology. In my face recognition project, a computer system will be able to find and recognize human faces fast and precisely in images or videos that are being captured through a surveillance camera. Numerous algorithms and techniques have been developed for improving the performance of face recognition but the concept to be implemented here is Deep Learning. It helps in conversion of the frames of the video into images so that the face of the student can be easily recognized for their attendance so that the attendance database can be easily reflected automatically.

**4.] Title:** **FACIAL RECOGNITION-BASED ATTENDANCE SYSTEM USING PYTHON**

**Authors:** Rudrasinh Ravalji, Nilaykumar Shah, Heet Patel, Maulik Patel

**Abstract:**

The most backbreaking task in any organization is attending marking. during this paper we've got projected an automatic attending management system that tackles the difficulty of recognition of faces in biometric systems subject to completely different real time situations like illumination, rotation and scaling. The main purpose of this project is to create a facial recognition-based attending marking system for institution to reinforce and upgrade the present attending system additional economical and effective. The present system incorporates a ton of uncertainty that causes inaccurate and inefficient of attending marking and even maintaining the attending knowledge. Several issues arise once the authority is unable to enforce the regulation that exists within the current system. Thus, by means that of technology, this project can resolve the failings existed within the current system whereas conveyance attending marking to a full new level by automating the majority the tasks. The technology operating behind are the face recognition system. The face is one in every of the natural traits which will be establish the individual unambiguously. Therefore, it's wont to trace identity because the prospects for a face to vary or being duplicated is very low. During this project, face knowledgebases are created to pump data the out into the recognizer rule. Then, throughout the attending marking session, faces are compared against the info to hunt for identity. Once a personal is known, its attending are marked mechanically saving necessary data into a info system. At the tip of the day, the attending data relating to a personal are often accessed from an internet server hosted by the raspberry pi. In short, this upgraded version of attending watching system isn't solely saved in several resources, however will offer Brobdingnagian convenience to the authority as several method area unit automatic.

**5.] Title: Face Recognition based Attendance System using Machine Learning**

**Authors:** Amritha(Student), Sudhakar(Assistat professor)

**Abstract:**

Attendance is an important part of daily classroom ascertainment for the teacher for his or her smooth running of class. At the beginning and ending of the class, usually teacher check the attendance, but the manual attendance system may leads to appear that a teacher may miss someone or some students may answer multiple times. Now a days, Machine Learning has been highly explored for computer vision applications. So, we use the concept of machine learning in Face – recognition for automatic attendance systems. In this project, we perform the face recognition and face detection algorithms, to provide the computer systems the ability of finding and recognizing human faces fast and precisely in images or videos so that the systems can used in giving attendance.

6.] **Title:** Smart Attendance System using Face Recognition

**Authors:** Ghalib Al-Muhaidhri , Javeed Hussain

**Abstract:**

To maintain a discipline and let students grasp utmost knowledge in schools, colleges and universities the attendance system was introduced. There are two conventional techniques to mark attendance of students in a particular class. One of them is by calling the roll number and the second is to take students sign on a piece of paper against their roll number. Hence there was a need to evolve this system in such a way that it could become user friendly, less time consuming and efficient. This is an automated system to assist the faculty in taking attendance of the whole class without any disturbance or time waste. The idea can encompass a large number application one of which include face identification, it will help save time and efficiently identifies and eliminates the chances of proxy attendance. The main purpose of this project is to built automated attendance system using Raspberry pi 3B+ with OpenCV/Python libraries and recognizer algorithm have been implemented. The proposed system can be implemented in any field where attendance system is present and plays a vital role. In addition, as the project objectives and the design criteria all met, it’s greatest to say this project is an engineering solution for all university and colleges to track and manage the attendance.

# 7.] Title: Face Recognition based Attendance System

**Authors:** Neha Kumari Dubey , Pooja M. R. , K Vishal , Dhanush Gowda H. L, Keertiraj B. R

**Abstract:**

 The management of the attendance can be a great burden on the teachers if it is done by hand. To resolve this problem, smart and auto attendance management system is being utilized. By utilizing this framework, the problem of proxies and students being marked present even though they are not physically present can easily be solved. This system marks the attendance using live video stream. The frames are extracted from video using OpenCV. The main implementation steps used in this type of system are face detection and recognizing the detected face, for which dlib is used. After these, the connection of recognized faces ought to be conceivable by comparing with the database containing student's faces. This model will be a successful technique to manage the attendance of students.

**8.] Title:** **Face Recognition Based Attendance System**

**Authors:** Nandhini R, Duraimurugan N, S.P.Chokkalingam

**Abstract:**

Automatic face recognition (AFR) technologies have made many improvements in the changing world. Smart Attendance using Real-Time Face Recognition is a real-world solution which comes with day to day activities of handling student attendance system. Face recognition-based attendance system is a process of recognizing the students face for taking attendance by using face biometrics based on high - definition monitor video and other information technology. In my face recognition project, a computer system will be able to find and recognize human faces fast and precisely in images or videos that are being captured through a surveillance camera. Numerous algorithms and techniques have been developed for improving the performance of face recognition but the concept to be implemented here is Deep Learning. It helps in conversion of the frames of the video into images so that the face of the student can be easily recognized for their attendance so that the attendance database can be easily reflected automatically.

# 9.] Title: Face Recognition Based Attendance System Using Cv2

**Authors:** Vedant Khairnar , C. M. Khairnar

**Abstract:**

Face recognition based attendance based system will be used in the near future in classrooms instead of the traditional system; it may replace even biometric attendance systems. The purpose of the present work is to devise a novel attendance system using cv2. Facebook also uses face recognition technology as it tags the names of faces as soon as you upload photos which have been tagged by you previously. The algorithm identifies the unique features of the faces in the database and encodes them into pattern image. Python modules are used to Then the machine learning algorithm called classifier is used to find the name of the person. Image capture, facial features, face recognition and attendance system, are the stages of the procedure.

**10.] Title: FACE RECOGNITION BASED ATTENDANCE MARKING SYSTEM**

**Authors:** K.Senthamil Selvi , P.Chitrakala2, A.Antony Jenitha

**Abstract:**

Automatic face recognition (AFR) technologies have seen dramatic improvements in performance over the past years, and such systems are now widely used for security and commercial applications. An automated system for human face recognition in a real time background for a college to mark the attendance of their employees. So Smart Attendance using Real Time Face Recognition is a real world solution which comes with day to day activities of handling employees. The task is very difficult as the real time background subtraction in an image is still a challenge (6). To detect real time human face are used and a simple fast Principal Component Analysis has used to recognize the faces detected with a high accuracy rate. The matched face is used to mark attendance of the employee.Our system maintains the attendance records of employees automatically. Manual entering of attendance K.Senthamil Selvi et al, International Journal of Computer Science and Mobile Computing, Vol.3 Issue.2, February- 2014, pg. 337-342 © 2014, IJCSMC All Rights Reserved 338 in logbooks becomes a difficult task and it also wastes the time. So we designed an efficient module that comprises of face recognition to manage the attendance records of employees. Our module enrols the staff’s face (3). This enrolling is a onetime process and their face will be stored in the database. During enrolling of face we require a system since it is a onetime process. You can have your own roll number as your employee id which will be unique for each employee. The presence of each employee will be updated in a database. The results showed improved performance over manual attendance management system. Attendance is marked after employee identification. This product gives much more solutions with accurate results in user interactive manner rather than existing attendance and leave management systems.

**11.] Title: Face Recognition based Attendance Management System**

**Authors:** Smitha, Pavithra S Hegde, Afshin (Student)

**Abstract:** In this digital era, face recognition system plays a vital role in almost every sector. Face recognition is one of the mostly used biometrics. It can used for security, authentication, identification, and has got many more advantages. Despite of having low accuracy when compared to iris recognition and fingerprint recognition, it is being widely used due to its contactless and non-invasive process. Furthermore, face recognition system can also be used for attendance marking in schools, colleges, offices, etc. This system aims to build a class attendance system which uses the concept of face recognition as existing manual attendance system is time consuming and cumbersome to maintain. And there may be chances of proxy attendance. Thus, the need for this system increases. This system consists of four phases- database creation, face detection, face recognition, attendance updation. Database is created by the images of the students in class. Face detection and recognition is performed using Haar-Cascade classifier and Local Binary Pattern Histogram algorithm respectively. Faces are detected and recognized from live streaming video of the classroom. Attendance will be mailed to the respective faculty at the end of the session.

**12.] Title:** [Attendance System with Face Recognition](https://www.researchgate.net/publication/346474915_Attendance_System_with_Face_Recognition?enrichId=rgreq-41df7f359b5c2977e717d4df94c9630d-XXX&enrichSource=Y292ZXJQYWdlOzM0NjQ3NDkxNTtBUzo5NjMzODUwNzIwMjU2MDBAMTYwNjcwMDMwODU3Mw%3D%3D&el=1_x_3&_esc=publicationCoverPdf)

**Author:** Maulana Dimas Iﬀandi, Rangga Nata Adiningrat, Jeremia Rizki Pandapota,

Jihad Fahri Ramadhan, Bayu Kanigoro

and Edy Irwansyah

**Abstract:**

For every organization, today attendance is the most important thing to record the presence of someone. The presence of someone in an organization is a sign that the person is carrying out their obliga- tions to come to the agency or organization. Usually, attendance is done manually. It can be signed or called one by one. In this digital age, there must be a change from this absence to be able to accelerate and provide time eﬃciency. We can use face recognition to record attendance from everyone present in an organization. In this face recognition, many algorithms are performed to dissect and capture images of someone’s face, such as Machine Learning and Deep Learning. With this algorithm, the system can recognize a person’s face and record attendance from that person so that attendance activities are more eﬃcient and faster.

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**13.] Title:**

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| **Face Recognition Based Attendance Management System Using Machine Learning** |

**Author:**

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| Anju V Das, Anjana Shyju, Thomas Varghese, Nisha Mohan P M |
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**Abstract:**

Attendance is a compulsory requirement of every organization. Maintaining attendance register daily is a difficult and time consuming task. There are many automated methods for the same available like Biometric, RFID, eye detection, voice recognition, and many more. This paper provides an efficient and smart method for marking attendance. As it is known that primary identification for any human is its face, face recognition provides an accurate system which overcomes the ambiguities like fake attendance, high cost, and time consumption. This system uses face recognizer library for facial recognition and storing attendance. It has a camera that captures input image, an algorithm to detect a face from the input image, encode it and recognize the face and mark the attendance in a spreadsheet. The system camera of an android phone captures the image and sends it to the server where faces are recognized from the database and attendance is calculated on basis of it. The purpose of reducing the errors that occur in the traditional attendance taking system has been achieved by implementing this automated attendance system using deep learning. Face recognition system have been presented using deep learning which exhibits robustness towards recognition of the users with accuracy of 98.3% and result is converted into a PDF.

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**14.] Title: Automatic Attendance System Using Face Recognition Technique**

**Authors:** Mayur Surve, Priya Joshi, Sujata Jamadar, Minakshi Vharkate

**Abstract:**

Attendance system is very important in schools and colleges’ Manual attendance system has many difficulties like it may less accurate and critical to maintain. So, attendance system using face recognition technique increase the accuracy and also it required less time than other methods. There are many existing system for attendance such as face recognition using IoT, PIR sensors and so on. For face recognition, hardware devices also helpful. But challenge is that to maintain all the sensors properly without get damage. After studying all method and techniques we are trying to implement a system with Haar Cascade Algorithm which has highest accuracy among all. It is able to capture the images from 50-70cm. We are creating graphical user interface which capture the images, create the dataset and train the dataset on single click. After recognizing the face it will display name of student and roll number. That information stored in attendance sheet automatically with time and date.

**15.] Title: Face Recognition for Attendance Management System Using Multiple Sensors**

**Author:** Dulyawit Prangchumpol

**Abstract:**

The problem about checking attendant is the main problem of teacher in nowadays. In order to solve this problem, Many systems have been completely changed due to this evolve to achieve more accurate results. However, in my study, these study still lack of the efficiency about correct the face and students cannot verify or pose to edit the data when there is error in class. With this reason, this research aims to develop the facing attendant system to be more effective and the mechanic of the system which students can easily verify. The experiment of this research is to find the way to recognize the face by using the technique of Android Face Recognition with Deep Learning which can correctly recognize up to 97%. The database is connected to Attendance Management System web server by using cloud storage. The result on screen in real time on the application so that students can verify and check data.

**16.] Title: A Survey on Face Recognition based Students Attendance System**

**Author:** Binyam Tesfahun Liyew , Prasun Hazari

**Abstract:**

Face recognition is the detection and identification of humans by the unique characteristics of their Faces. Face recognition technology is the least intrusive and fastest bio-metric technology. It works with the most obvious individual identifier the human face. This research aims at providing a system to automatically record the students’ attendance during lecture hours or exam in a hall or room using facial recognition technology instead of the traditional manual methods. The objective of this research is to thoroughly study the field of pattern recognition (facial recognition), which is very important and is used in various applications like identification and detection. And finally, apply this technology to support the student's attendance system. These will help the attendance system to record more efficiently. The proposed system will update the attendance once the students face is match with the template database.

**17.] Title: A Review Paper on Attendance Marking System based on Face Recognition**

**Authors:** Khem Puthea, Rudy Hartanto and Risanuri Hidayat

**Abstract:**

Attendance marking system has been become a challenging, intriguing and accurately in the real-time system. It is tough to mark the attendance of a student in the large classroom, and there are many students attend the class. Many attendance management systems have been implemented in the current research. However, the attendance management system by using facial recognition still has issues which allow the research to improve the current research to make the attendance management system working well. The paper will do a literature review on the previous worked from different researcher has done on their research paper. This paper does not only provide the literature review on the earlier work or related work, but it also provide the deep analysis of Principal Component Analysis, discussion, suggestion for future work.

**18.] Title: SURVEY ON ATTENDANCE MANAGEMENT SYSTEM USING FACE RECOGNITION**

**Authors:** Chaitra T.K, M.C.Chandrashekhar, Dr. M.Z. Kurian

**Abstract:** As one of the most successful applications of image analysis and understanding, face recognition has recently received important attention, mainly during the past several years. The development of automatic attendance management system is very important research topic in computer vision. Therefore, it is very necessary to discuss the effective system which records attendance of student automatically. This paper provides an up-to-date critical survey on different feature extraction and classification techniques for face recognition. In the process of system development literature reviews conducted to understand the theory, methods and technologies associated with the attendance management systems that have been developed. In addition, relevant topics such as psychophysical studies, system evaluation, and issues of lighting and pose distinction are covered.

**19.] Title:** **Face Recognition based Attendance System: Review**

**Authors:** Neha Savakhande, Vinay Sripathi, Kiran Pote, Parth Shinde, Prof. Jayant Mahajan

**Abstract:** The planet just where we live in, have taken many measures to improve the technology. Wherein the image processing is a cornucopia of innovations which bolsters the digital and smart systems. When talking about the models such as identification (ID) of the faces or generation of attendance, these are few of many practical applications which are concerned to image processing. This Paper features and deliberates about the enhancements in previous and present systems of “Face recognition-based attendance model” chronologically. The solo purpose of this research is to critically analyze as well as evaluate the old and most recent model of “Marking of attendance”. The conditions and criteria involved for the selection of papers for review are the models which can automatically detect the pupils in an image captured by camera and mark the attendance by recognizing the respective students. The process of attendance is generally known to be taken by manual methods which is recumbent to security and maintenance of the attendance log. Plethora of multiple “Face recognition-based attendance systems” have been already implemented and there are abundant of issues still in existence. Thus, after studying different attempts made in researches and a lot of pondering, this paper reviews the previous works on attendance system based on facial recognition. It not only provides the literature survey but also supports discussion and suggestions for future work.

**20.] Title:** A Study on Automated Attendance System using Facial Recognition

**Authors:** Ms. Munmun Bhagat, Chaitanya Kirkase, Yash Hawaldar, Aishwarya Paigude, Shivani Nimbalkar

**Abstract:**

Attendance marking system has been become a challenging task in the real-time system. It is tough to mark the attendance of the candidate in the huge classroom/hall, and there are many students attend the class. Many attendance management systems have been implemented in the current research. However, the attendance management system by using facial recognition still has issues which allow the research to improve the current research to make the attendance management system working well. The paper has conducted a literature survey on the previous work by different researcher has done on their research paper.

**21.] Title: A Review Paper on Attendance Marking System based On Face Recognition.**

**Authors:** Khemm Puthea

**Abstract:**

Providing accurate attendance marking system in real-time is challenging. It is tough to mark the attendance of a student in the large classroom when there are many students attending the class. Many attendance management systems have been implemented in the recent research. However, the attendance management system based on facial recognition still has issues. Thus many research have been conducted to improve system. This paper reviewed the previous works on attendance management system based on facial recognition. This article does not only provide the literature review on the earlier work or related work, but it also provides the deep analysis of Principal Component Analysis, discussion, suggestions for future work.

**22.] Title:** **FACE RECOGNITION BASED AUTOMATED STUDENT ATTENDANCE SYSTEM**

**Authors:** CHIN HOWARD

**Abstract:**

Face is the representation of one’s identity. Hence, we have proposed an automated student attendance system based on face recognition. Face recognition system is very useful in life applications especially in security control systems. The airport protection system uses face recognition to identify suspects and FBI (Federal Bureau of Investigation) uses face recognition for criminal investigations. In our proposed approach, firstly, video framing is performed by activating the camera through a userfriendly interface. The face ROI is detected and segmented from the video frame by using Viola-Jones algorithm. In the pre-processing stage, scaling of the size of images is performed if necessary in order to prevent loss of information. The median filtering is applied to remove noise followed by conversion of colour images to grayscale images. After that, contrast-limited adaptive histogram equalization (CLAHE) is implemented on images to enhance the contrast of images. In face recognition stage, enhanced local binary pattern (LBP) and principal component analysis (PCA) is applied correspondingly in order to extract the features from facial images. In our proposed approach, the enhanced local binary pattern outperform the original LBP by reducing the illumination effect and increasing the recognition rate. Next, the features extracted from the test images are compared with the features extracted from the training images. The facial images are then classified and recognized based on the best result obtained from the combination of algorithm, enhanced LBP and PCA. Finally, the attendance of the recognized student will be marked and saved in the excel file. The student who is not registered will also be able to register on the spot and notification will be given if students sign in more than once. The average accuracy of recognition is 100 % for good quality images, 94.12 % of low-quality images and 95.76 % for Yale face database when two images per person are trained.

**23.] Title: AN AUTOMATED STUDENT ATTENDANCE REGISTERING SYSTEM USING FACE RECOGNITION**

**Authors:** HIMANSHU MALLIK

**Abstract:**

Uniqueness or individuality of an individual is his face. In this project face of an individual is used for the purpose of attendance making automatically. Attendance of the student is very important for every college, universities and school. Conventional methodology for taking attendance is by calling the name or roll number of the student and the attendance is recorded. Time consumption for this purpose is an important point of concern. Assume that the duration for one subject is around 60 minutes or 1 hour & to record attendance takes 5 to 10 minutes. For every tutor this is consumption of time. To stay away from these losses, an automatic process is used in this project which is based on image processing. In this project face detection and face recognition is used. Face detection is used to locate the position of face region and face recognition is used for marking the understudy’s attendance. The database of all the students in the class is stored and when the face of the individual student matches with one of the faces stored in the database then the attendance is recorded.