



Automatic Face Recognition Based Attendance System

**MASTER OF TECHNOLOGY
IN
COMPUTER SCIENCE AND ENGINEERING**

SUBMITTED BY

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Abstract

A person's face represents his or her uniqueness or individuality. In this project, the face of a person is employed for the goal of automatically calculating attendance in real-time. Every college, university, and school relies heavily on student attendance. The student's name or roll number is called, and the attendance is recorded. The amount of time it takes to accomplish this is a major worry. For example, let's say a class lasts 60 minutes or an hour, and recording attendance takes 5 to 10 minutes per class. This is a waste of time for any tutor. An image-processing-based automatic technique is employed in this research in order to avoid these losses. Facial detection and face recognition are employed in this research. Facial detection is used to find a face's location, while facial recognition is used to note the attendance of the understudy. The database of all the pupils in the class is saved, and attendance is registered when the student's face matches one of the faces in the database.

Keywords: AFR, Automatic Attendance System, Face Recognition, Face Recognition Based Attendance System.

Chapter 1

INTRODUCTION

It is the main goal of the ongoing project for students to combine faces based on facial recognition

n. To improve performance, test and training images in this plan are limited to front, upright, single face images. Test images and training images should be taken with the same device to avoid any change in quality. In addition, students must be registered in the database in order to be informed. On-site registration is possible via a user-friendly interface.

Image processing for face recognition in real-

world applications is a challenge because of the effects of lighting and occlusion on real images. A framework for face detection and recognition in image analysis. Face detection software is used to detect human faces in images. In computer vision, recognition algorithms are used to classify images having known structural attributes. It's well-known that these photographs share similar qualities such as the same resolution as well as the same face feature components and eye alignment. Further parts refer to these photos as "standard image". Detection algorithms recognise faces in standard photos and extract images of the eyes, brows and lips from the faces using recognition software. Thereby increasing complexity over a single detection or recognition algorithm Face recognition systems begin with a camera image. Face detection is the next stage once the image has been collected. Three-

step face recognition uses detection results to recognize faces in real time. Determining the identity of the person as a result of self-

identification is the final stage. Figure 1 shows the different face recognition levels. As the first stage of face recognition application, frame grabbers are used to take images from the camera and count the information (environment). The digital data of the image is fed to a face detection algorithm that extracts all the faces in the image.

Many methods are given in the literature to recognize faces in images. Knowledge-

based knowledge and practical ideas are two methods for easy access. Knowing how a face is made is the basis for knowledge-based techniques. In order to find faces, people use strategies that are focused on appearance.

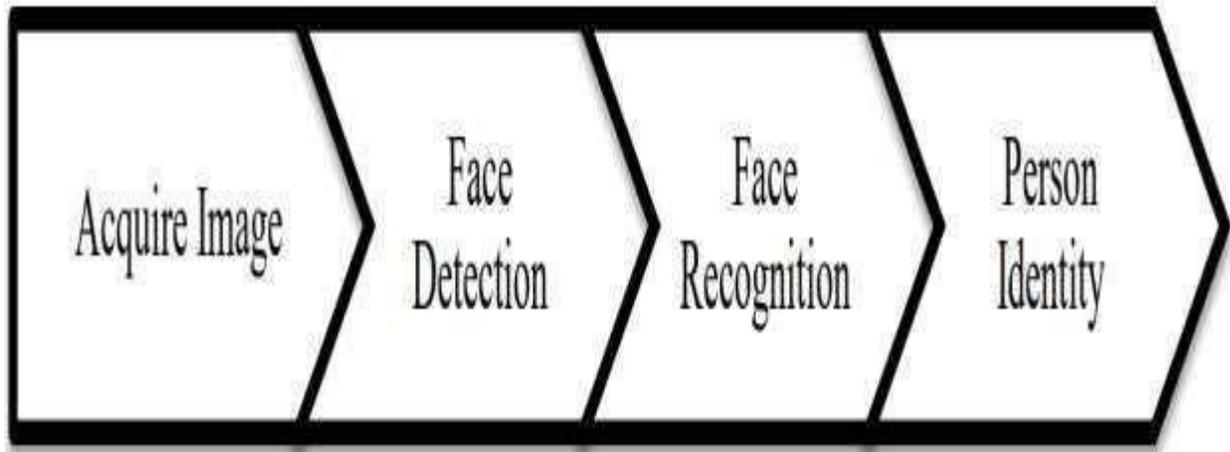


Figure: 1 Steps of Face Recognition System Applications

During face detection, face recognition is required to identify the person in the face image. Most of the techniques are described in the documentation using the face shape library. After finding the face, the image model must be prepared in several ways. While creating a photographic model, the human face can be presented to the face recognition algorithm in the process. According to the data, 2D and 3D-based methods can be divided.

The two-

dimensional method uses 2D images as input and uses some learning/training method to classify people. 3D methods for face recognition use three-dimensional face information. For example, point proximity, average half-surface, and 3D geometry metrics are all used for recognition. A detailed description of the method will be given in the next section.

1.1 Face Recognition Approaches

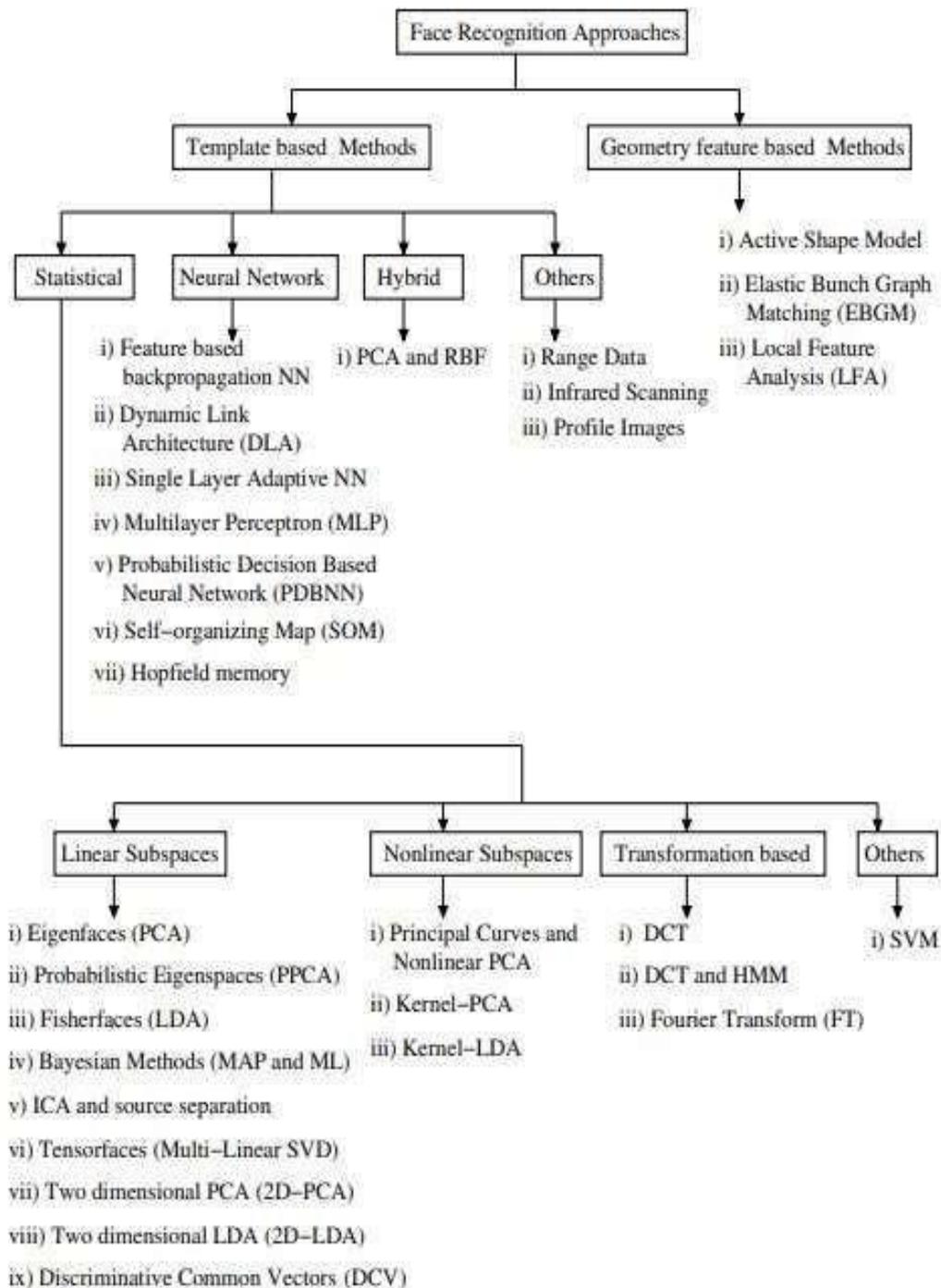


Figure: Summary of approaches to face recognition

1.2 Existing systems

Face-recognition technology has adopted a variety of ways in recent years, although the traditional method is the most widely used.

According to experts, celebrity face recognition is divided into analysis, discrimination analysis, continuous change and object analysis. When it comes to facial recognition software, it's the most important thing. Many researchers in the field of face recognition use the eigenface method. Eigenfaces are the most important part of this system. It does this by distributing many different ideas.

The PCA (Principal Component Analysis) algorithm can be used to extract the raw form of image data. PCA can reconstruct the original structure of the image using eigenfaces. Gesichtserkennung relies on eigenfaces as important objects. Eigenfaces often represent important aspects of a face that may not be present in the original image.

Artificial Neural Networks and Neural Networks are two examples of general applications. There is an ongoing process for Viola Jones' work as well. Negative filtering allows us to better understand how different colors are used for fake face detection. Almost all of these existing systems are older and lack clear instructions and explanations.

1.3 Advantages and Disadvantages

The procedure of integrating facial recognition into a computer system is smooth and simple. Facial recognition has a number of drawbacks, including image quality, size, angle of view, and processing time. First and foremost, the quality of the image has a direct impact on the algorithm's ability to recognise faces. Compared to a digital camera, the scanning of a video has a worse visual quality than a digital camera. As a result, the entire facial recognition process was affected by image quality. To store and process facial recognition data, there are a number of challenges. As a result of this, the face identification procedure will have a difficult time detecting a suitable face when using recognition software. As a result of the person's movements, the facial recognition system was unable to correctly identify him. Updated software, which is quite expensive, is necessary for more accuracy. The detection process can be hampered by blurry photos. The camera's angle has an impact on facial recognition technologies as well.

1.4 Problem Statement

There are a few issues with the student enrollment process. The face-

based attendance system eliminates traditional phone calls, ID card checks and other student attendance records for convenience. Not only do they disrupt the teaching process, they can also distract students during exams. Attendance papers are distributed to the class in addition to attendance. Attendance forms can be overwhelming in a classroom, especially if there are many students. Therefore, it has been proposed to use the face recognition student attendance system to change the student list, which is not easy, time consuming and causes learning effects on students. Students who go to the machine based on facial recognition can also overcome the cheating problem, and teachers do not need to count students over and over to make sure they are alive.

1.5 History of Facial Recognition

These are Woody Bledsoe, Helen Chan Wolf, and Charles Bisson, who developed facial recognition in the early 1900s. In 1964 and 1965, they began using computers to recognize faces. They focus on the eyes, nose and mouth of the face. To compensate for the position difference, they used a computer to mathematically rotate the body. To recognize a person, the distance between facial markings is determined and compared with the image.

Facial recognition was in its infancy at the time. Using linear algebra for facial recognition, Sirovich and Kirby made it commercially viable biometric. Their method, called eigenface, requires less than 100 values to correctly encode the image of a face. The discovery of facial recognition in images by Turk and Pentland in 1991 paved the way for facial recognition to become a reality. Face recognition technology has evolved thanks to this breakthrough in face recognition.

In the 1990s, DARPA and NIST began implementing the FERET program for commercial facial recognition. There are 2413 criminal records representing 856 people in the database. These studies were developed in the early 2000s to provide an unbiased assessment of the government's facial recognition system and technology. These analyzes provide law enforcement and government agencies with the information they need to best use facial recognition technology. Face Recognition algorithms were evaluated as part of the 2006 Face Recognition Grand Contest.

He used high-

resolution images, 3D face scans and iris images as part of his test. In terms of accuracy, the new algorithm scored 10 times better than the 2002 method and more than 100 times better than the 1995 method.

1.6 Importance of Facial Recognition System

Face recognition systems have many applications. Applications include security and surveillance technologies, as

well as authentication or authentication technologies. What we don't realize is that we are constantly dealing with facial recognition technology. Facial recognition is used by many businesses for authentication, authentication and security purposes. This process can be used in many ways.

This is why many countries such as the USA, UK and Australia are now using facial recognition in many public places. Retail giant Alibaba is focusing on developing facial recognition payment technology for future use. Employees use technology for entry and exit. Authorities use facial recognition technology to identify criminals and locate missing persons. In the future, we will see that face recognition algorithms and technology are used more and more in our lives.

1.7 Challenges of Facial Recognition System

Facial Recognition Technology can change the way businesses and governments interact with people. However, this technique can cause serious problems when used incorrectly. The potential for misuse of personal and sensitive information is substantial. Businesses and organizations must ensure that there is adequate checks and balances and appropriate security before using these tools. The database stores the unique biometric information of each person examined by the technology. It all depends on who controls the data and what security measures are in place to keep them safe.

These systems are far from ideal. Algorithms are trained using data from humans. Insufficient data and too much data used to inform algorithms can lead algorithms to misidentify people. The gender or identity of many dark-skinned people was determined by the system. This is because there is no data that represents the views of the general public.

Technological advances have led to new forms of terrorism. By entering the database, criminals can access facial recognition data and track people's movements, locations and messages. If criminals gain access to facial recognition, they can cause serious damage. A person's identity can be stolen, making them a criminal.

1.8 Python

Python has several advantages, including high-

level programming language content. Guido van Rossum developed Python 0.9.0 in 1991. It was conceived as the successor to the ABC programming language developed in the 1970s.

Announced on October 16, 2000, Python 2.0's many new features included written comprehensions and garbage collection. Python 3.0 was released on December 3, 2008. As a popular programming language, Python is versatile.

For example, often online and software development, math and data analysis and writing, etc. Python is a widely used programming language with Windows, Linux, Mac, and Raspberry Pi. Because of its simple syntax, Python is more popular than other programming languages. They can produce code that is easier to understand and in less lines due to its syntax. In an interpreter system, it executes. Because of this, a piece of code can be run immediately after it has been written.

1.8.1 Why Python?

- “Python can work on most platforms. (Mac, Windows, Raspberry Pi, Linux etc.)”
- “Python has a language that is more similar to English.”
- “In python, similar instances of the case use fewer lines of code than compared to other languages.”
- “Python code can be executed as soon as it is written as it uses an interpreter. Therefore prototyping can be quick.”
- “Python can be treated in a functional, procedural or object-oriented way.”

1.8.2 OpenCV

OpenCV is a free and open source machine learning and computer vision library. Free to use, OpenCV is a cross-platform library. A new version of the software was released in 1999. OpenCV was created by Intel to build CPU software. It is used to create C++.

There are Java and Python bindings. Linux, Windows, OS X and other operating systems are supported. In particular, it focuses on video capture and image processing as well as analysis of captured images. The software has a face detection and object detection function. You can read/write images, shoot and save videos and even convert them using OpenCV.

It can recognize features such as faces, cars and photos. This library is used by many well-known companies such as Yahoo, Google, Microsoft, Intel.

1.9 Recent Approaches to Face Recognition

Researchers have been working on face recognition for the last 30 years. Image processing, pattern recognition, computer vision and neural networks are all part of this research. Scientists from many fields of psychophysical sciences and computer sciences have investigated it. When it comes to facial recognition, psychologists and neuroscientists focus on the human perception side of the problem, while computer scientists focus on the computational side of it. Facial

recognition is often used in biometrics, access control, law enforcement, and security and surveillance, just to name a few applications. Facial recognition is a complex problem that can be summarised as follows: Using a stored database of faces, identify one or more people in a situation based on still photos or video. Primarily, it's a classification issue. The facial recognition system works by using images of known people to train the system and classify new images into a group.

This issue seems to be easily fixed by humans because the main issue will be low memory; when the problem of the robot face recognition system is:

1. “Facial expression change”
2. “Illumination change”
3. “Aging”
4. “Pose change”
5. “Scaling factor (i.e. size of the image)”
6. “Frontal vs. profile”
7. “Presence and absence of spectacles, beard, mustache etc.”
8. “Occlusion due to scarf, mask or obstacles in front.”

Automated complex process detecting face in an unstructured environment, extracting features from facial features, and identifying faces. All the subproblems of a comprehensive face recognition system must be solved, each of which is a different research problem. This study primarily focuses on face lifting and face recognition. Face recognition algorithms can be categorized into two groups: image-based and geometric image-based. When utilizing a model for face recognition, the face identity is estimated by assessing the correlation between the face and one or more reference models. Brunelli and Poggio emphasized that the most effective approach for comparison in facial recognition is preferred to ensure accuracy and reliability.

According to their research, the first technique was 90 percent accurate, while the second was 100 percent accurate, using a database of 97 people. The creation of a sufficient set of face templates has been done using

There are hybrid methods using statistical tools, pattern recognition and neural network systems such as support vector machine (SVM), principal component analysis (PCA), linear discriminant analysis (LDA), kernel methods and neural networks. neural network are two examples of hybrid techniques. Aside from range and infrared scanning, people have employed profile photos for face recognition. When it comes to templates, they can be thought of as features, but they tend to capture the global traits of a face. It can be tough to deal with facial occlusion when using these techniques.

1.10 Template based Methods

Face recognition using global representations is conceptually similar to template matching. A pattern classifier is used to classify a picture of a face that has been viewed as a whole. A statistical approach is one way to extract features from a holistic system.

Statistical Approaches

As high-dimensional pixel arrays, images of faces are often part of a manifold of fundamentally low dimension. Facial recognition systems that take use of this fact and have become increasingly popular. The next sections cover the methods PARAMeterizing, analysing. However, subspaces, exist nonlinear subspaces (such as kernel-PCA and Kernel-LDA).

1.10.1 Geometry Feature based Methods

Methods based on geometry feature, eye distance, ratio of eye distance to nose, etc. It uses face measurements like topology map.

1.11 Neural Network

A neural network is a computational model based on the structure and function of a neural network, often referred to as an Artificial neuron network (ANN). In computer science terms, it is like the brain that receives, processes and transmits information.

Generally, there are 3 different layers in a neural network :-

1. “Input Layer (All the inputs are fed in the model through this layer)”
2. “Hidden Layers (There can be more than one hidden layers which are used for processing the inputs received from the input layers)”
3. “Output Layer (The data after processing is made available at the output layer)”

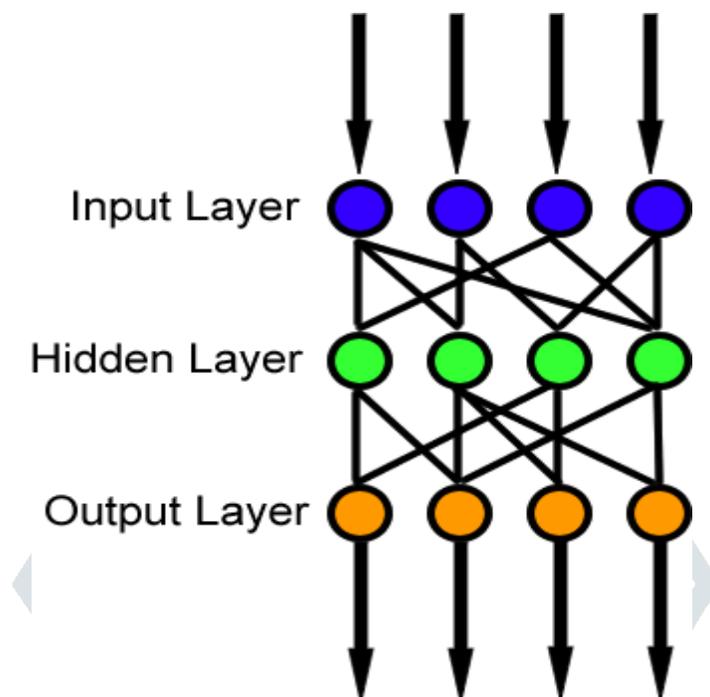


Figure: Different Layers

1.11.1 Input Layer

When a neural network receives a pattern from the external environment, it communicates with the input layer. Its only task is to process all inputs. To learn more about the hidden layers, go [here](#). If we are training a neural network for a specific circumstance, the input layer should reflect that condition. A neural network's output should be influenced by each input neuron's representation of an independent variable.

1.11.2 Hidden Layer

Moving between input and output processes, the hidden system is a collection of neurons performing a function. To do this, it uses inputs from the previous layer. In other words, it is the layer's responsibility to extract the desired features in the hidden has been subject numerous studies, but none of them have been able to produce a reliable conclusion. Also, a Neural Network can have numerous hidden layers. So, you're probably wondering how many hidden layers you'll need for which type of issue.

For example, if the data is distributed, there is no need for confidential processing, because the a

activation function will be used in the input operation, which will solve the problem. We can, however, utilise intricacy precision required when dealing with complex decisions. However, that does not indicate that the neural network will be highly accurate if we continue to add layers! As we add layers, the accuracy gets more or less consistent. It's also a good idea to figure out how many neurons are in each network. A complex data set will require fewer. Overfitting can occur if there are too many neurons in the network. Until date, several methods have been used to calculate, but none of these methods has provided a precise formula.

1.11.3 Output Layer

Using Output process of neural network, data is collected and transmitted in the way that it was meant to do so. You may trace the pattern of the output layer back to the input layer. Prior deciding on how many neuronal units should be included in the output layer, it is important to evaluate what kind of neural network you want to build.

1.12 Thesis Outline

In chapter 1 we discuss about introduction part of our proposed system.

Chapter 2 discuss about previous work by other authors related to our proposed work. Chapter 3 Provide deals with deep details about face recognition.

Chapter 4 discuss about methodology part of our proposed work. Chapter 5 show about result part of the proposed work.

Chapter 6 discuss about conclusion and future scope

Chapter 2

Literature Review

Akash Singh et al. full (2021) Auto face recognition support, simple, accurate and efficient. The system works automatically when the information of each student is created by the administrator

. Some appearance recognition algorithms should be used to improve performance and recognition accuracy. The face reflects the personality of the person.

Therefore, the authors developed a student support system based on facial recognition. This system is very useful for security and surveillance in daily use. Airport security systems use facial recognition of suspects, and the CBI and FBI also use facial recognition for forensic investigations. Video framing in our project is also done by using an easy-to-use interface to access the camera. To detect and segment faces of video frames, use HOG (Histogram orientated gradients).

The Debadrita Ghosh (2021) system provides automatic support. Using these techniques has been proven to save time and increase safety. You can also identify people you don't know. One way to improve recognition is to

think about the future. The current system only provides 30-degree facial recognition, which needs further development.

Insufficient lighting in the classroom affects the image, and insufficient lighting reduces physical activity. Among all biometric technologies, one of the most important advantages of face recognition is that it is easier and more accurate to use than other methods. With the advancement of technology and scientific knowledge, today's world has changed a lot in almost every subject. Technology, machine learning, algorithms, etc., in almost every corner of the world, plays a very important role. In this respect, we have done this research, which includes face recognition, face detection and extraction of the features. This research is based on face recognition assistance in real time, as it can be useful for many institutions and other departments. It is not necessary to involve real supervisors. The system is fully based on improved internet connections and better illumination. An additional feature that includes student information for e-mailing to the tutor has been added. Python 3.7.6 and OpenCV 3.4 complete your task. And the browser of

Anaconda (Anaconda3). Various light intensities and conditions were tested for the proposed arrangement.

Dr. Asif Ali et al. The all (2021) Authoring method allows individuals to be identified by comparing images from images in a folder. Thanks to this model, students' faces are recognized in real time and their attendance status is determined without human intervention. We can improve the performance of the model by renting cloud storage content.

Traditional methods involve teacher registration, which can lead to human error and a lot of oversight. The biggest problem with this system is long-term use. To revolutionize it, authors have considered the use of modern digital instruments (e.g. facial recognition). Authors project ensures that manual work is more accurate and meaningless.

A revolutionary change has been made to solve the problems of the traditional system.

Ankur Singh Bist et al. all (2020) Signy Advanced Technologies has succeeded in the intelligence business, AttendX's AI creates student attendance data which is believed to prevent attendance fraud. In the AttendX 1.28 test, which lasted 13 days between 5-

18 August 2020, 49 people, 17 men and 32 women, participated in the test.

Of the 1,000 selected participants, 1,764 participated. The success rate of 882 masks can reach 56%. Out of 882 attempts without mask, the success rate was 79%. Men were right in 78% of 612 trials and 77% of 1152 trials. A total of 1764 tests were performed, 1202 times, and the accuracy was 68%.

Finally, wearing a mask is more important than wearing a mask. There are still large differences between men and women. There is a clear difference between wearing and not wearing a mask, and there is no difference between men and women. Test the target to make sure the error is high enough.. There are no barriers to the process of learning, so teachers and students can learn easily. In the future, system data need to be improved by gathering more samples of anti-spoofing tests in different light conditions from human faces.

The research findings will provide an alternative to the educational activities and technology that must be

developed to meet the growing era of intelligence-based artificial intelligence technology.

Samiksha Malhotra et al. full (2020) The system works like artificial intelligence, eliminating human error and reducing labor. It works better as it is fully automatic. The system will aim to eliminate traditional card, RFID or fingerprint based biometric systems. Many smart machines have been developed using different methods, and it can be determined that hair-like features are most suitable for the mentioned method, since it takes less time to model when compared to other methods. This will take more time. The most common work in machine learning (ML) and deep learning is face detection and recognition (DL). These features are popular in areas such as security cameras and cell phone anti-theft devices (biometric locks).

This form shows attendance at the university according to the above activities, feedback of the time and auto-signature of participating students. CCTV cameras in the classroom. The system saves time, enhances the efficiency of work and then dials attendance manually. The system features an integrated hair cascade, an open curve and a facial recognition book. This is discussed in the document proposed. Authors compared these two models and concluded that the function of hair cascade is more effective than the built-in college attendance facial recognition library.

Soumitra Chowdhury et al. Automatic grading and storage for all (2020) Classes. The system includes access to student information, educational materials, facial recognition and automated help. The CNN model used in this study can detect and recognize a person by their face even if they are not looking directly at the camera. The system is approximately 92% accurate in detecting and identifying students.

You can save teachers' time and effort by making phone calls and engaging students immediately

. To be the best, the system must provide the same image and satisfaction to everyone during training. The camera should also be placed so that it can be seen clearly by all students. This document introduces auto-engagement for students based on face recognition, including data entry, document creation, face recognition, and attendance. This article discusses the use of Convolutional Neural Networks.

Different people in the video stream can be detected and recognized and daily visits automatically recorded. Average accuracy of approximately 92% is achieved with the proposed system. This system enables easy everyday attendance to be recorded and the risk of human error avoided.

Aparna KS et al. all (2020) When placing webcams in the classroom, the proposed system relies on authentication to identify images of students based on faces and attendance. The system is 84 percent accurate in detecting pictures of students. The authors are aware of the face in the future external environment. This facial recognition is available on mobile devices. Taking classes in real time is a time-consuming process. Teachers face many problems when monitoring attendance. Service procedures are time consuming; Participation only takes about 10 minutes. A system of automatic aid based on face recognition in real time is discussed in this article. Visual acknowledgement is broader than biometric methods and is a very good method. The system of face recognition is developed based upon various concepts for machine learning. To extract facial features, we use HOG feature extraction technology. In class videos, authors plan to recognize multiple faces.

Payal Chaudhary et al. all (2020) Face Recognition Management System aims to solve the existing problems in the current system. The security of databases and datasets is important to prevent anonymity. Manual support can be eliminated and time saved. Since it has no effect on the body, it also eliminates the risk of infection.

Due to Covid-

19, all establishments must follow the government's social distancing guidelines. When such a device is installed in the school, we can ensure that the diversity of the school is observed. Attendance management can score and analyze daily tasks while reducing the impact of guidelines.

Users don't have to queue, because they can simultaneously record the attendance of several people by recognizing the faces of a few. Authors have suggested this system to prevent contact infections and preserve social distance on the basis of the current COVID-19 situation. This project uses the OpenCV library to build an attendance management system based on facial recognition and store polling results in a MySQL database.

explains how the work uses technology and methods. Finally, the findings and solutions are presented and discussed. Haar-Cascades works well for face detection.

High-

speed live videos without visual effects were appreciated even if the subjects wore glasses or had a beard or other facial features. Combining LBPH and Haar-

Cascades can be considered a good result of facial recognition. An example would be a system that can identify known revolvers in a shop or store to alert the owner to be interested or automatically start a class. It is written, memorized and analyzed by students using different algorithms and methods. The computer can identify students and mark their attendance using our attendance system.

Different algorithms and techniques are used to improve face recognition performance. Open CV is the concept we use. The author also uses a Raspberry Pi and a camera module to capture images and store them in a file. Therefore, support is carried out automatically.

Assoc.

RS Sabeenian et al. all (2020) This project was made to participate more intelligently. A deep learning algorithm is the Mobile Face network.

The correct face tagging rate in a given dataset is 85%, and the correct face tagging rate in a given dataset can go up to 90%. This helps administrators reduce school attendance and replace the RFID card system with a corresponding ID for each student. Thus, the possibility of losing the card will not affect the student's attendance and irregular absences will be minimized. Therefore, if the model is implemented in real life, the organization will help to maintain cooperation and protect outsiders from the organization. The proposed solution involves the creation of a functional model of a system that supports classroom motivation by recognizing students' faces

from classroom photos. The problem of intermediaries and students, although not present, can be solved easily with the development of this framework. Research has been carried out and a system of facial recognition and recognition has been developed in recent years. Some are used on social media platforms, banking applications, public administrations, etc. As the facial recognition of mobile devices plays a vital role, it plays a part in particular operations. This is based on our use in the intelligent support system, which takes less time than manual help.

Khem Putheal et. all (2019) Automatic scoring of attendance can prevent missed examinations and improve time consuming problems. Many automated attendance management systems are used to manage student attendance in large classrooms with biometric technology. However, even in terms of processing time, facial recognition systems do better than biometric systems.

The method proposed improves luminosity face image eye- and nose-. score calculation time is 12 min, and images of 200 facial components can be recognized. Comparisons between the attendance scoring and the work involved in the second part show that the system proposed is very precisely and time-consuming. The proposed system, used s, which provide the attendance management system with a detailed application. Streaming services are however also able to continuously identify themselves, which provides the least attendance table errors.

The proposed system must, however, continue to be improved. In future works, more precision will be established by artificial neural networks. [11]

Fayaz Ahmad Fayaz et. all (2019) Authors have developed a system to check the identity of the applicants on site and to test their candidates with minimal human interactions. Authors are happy to implement this system. Since this model does not employ a depth sensor, infrared beam, or other facial sensor, it uses only standard picture formats, such as .jpg, .png, etc. APIE problem is A- is the angle of the photo submitted by a candidate in his registration form. P- represents posture, light and mood of the person when photographing. P-represents the position. The model also reveals that these factors have a significant exactness rate of 87 percent, including specifications, bars, beards, maquillages etc. and noted or tested those factors. In addition, 99,38% of images tagged on the Wild landmarks are accurate in the algorithm model. A further number of libraries are available for searching for landscape faces. Effective facial acknowledgement, such as the resolution and processor speed. Thus, these factors are monitored and evaluated in the testing process to achieve optimal model performance. [12]

Tata Sutabri et. all (2019) Authors system to help students recognize the face is proposed. The system successfully acknowledges student faces in the classroom by using a compelling neural network for facial insertion, Dlib's CNN or deep metric training, and K-NN for the classification of faces. The data is provided by identified students. This system allows for automatic completion of the student attendance process and should replace the existing manual participation process. To accelerate facial recognition, the plan will use cloud-based facial recognition for future work. To compare the performance and provide better performance (speed and precision) than the already used method, a more complex method of face recognition is envisaged (in this case, a convolutional neural network). [13]

Dr. Mohd. Abdul Muqet (2019) While the accuracy of facial identification is low in comparison with other

biometric programmes, our automatic dialling system has a precision rate of 92%, as 11 of 12 faces are recognised effectively and physical assistance is avoided in a wasted time. The system also supports biometric schemes with multiple models. Improvement in image quality and speed for real-time performance has always been the aim. The system can be used for various applications in which facial recognition is used to confirm. Manual is considered for the current support system. Professors and students require a lot of time. The ability of a proxy remains in the class through manual participation. We chose Raspberry Pi and webcam to make it suitable for different platforms. Use webcam to capture student's face image. Using the OpenCV IDE platform of Qt creator, various extraction steps are implemented. In this work we are using facial recognition to recognize the face of every student when entering the classroom or when he or she approaches a webcam. [14]

Nafis Mustakim et. all (2019)

The system is based on the Raspberry Pi, which is the brain of the system. Python is used in this system due to its ease of use as an open source library. The open source library is OpenCV which is mostly used for runtime in computer vision. The silent image is stored in a 2D array in Python. NumPy is a multi-source library from Python for faster graphics processing. SQLite is a popular data base management system. The information on the person to be tested contains in this data base. The system is extremely useful and efficient because the identification of people does not have any background effect. In different lighting conditions, it can function satisfactorily. Minor face changes, such as maquillage, glasses, etc., have almost no effect on recognition. Four frames per second can be processed quickly by the system. It can therefore be built into any system to improve automation, efficiency and ease of use. [15]

Rajat Kumar Chauhan et. all (2018) The facts indicated that the intelligent attendance system is an effective attendance system in the classroom. The system is non-invasive and reduces the potential for misrepresentation and support. There have been many intelligent methods proposed, but the method based on facial recognition has been found to be the best method of intelligent assistance system. A reliable system must be developed to verify attendance. We implemented the same procedure in the classroom successfully. Authors system configuration is very simple and easy to use. To perform face recognition it needs a simple camera module and a computer.

The Raspberry Pi supporting the Internet can also implement our system. First, facial detection is based on the algorithm of the histogram oriented gradients (HOG). Second, the facial alignment is done using the algorithm to estimate the facial characteristics. 3. The accuracy rate in the LFW data set is 99,63 percent using the Facenet algorithm-based face coding technique. The 128 unique values are encoded on each side. Finally, the 128 dimensional values are used by the SVM classification for each face. Our system generates a dated attendance report and sends it to the faculty and staff automatically. [16]

Kaneez Laila Bhatti et. all (2018)

In the current artificial intelligence system, intelligent collaborative management is designed to solve existing problems. The author uses the concept of facial recognition to mark students' participation and complete the

process. The system works satisfactorily in many duties and authorities. In the future, this system should be improved, because remote students do not sometimes recognize these systems and we face certain processing constraints. With a high performance system, better system performance can be achieved. The following system maintains facial recognition records for students. Due to the subject saved by administrator, the daily attendance rate for students is recorded. The system automatically starts taking pictures and then uses the facial sensing and recognition technology for the given image when the time comes for the subject. The students identified will be identified as assistants and will update their time and subject identification. attend. We use the system with profound learning technology, use directional histograms to detect image faces and use profound learning methods for calculating and comparing students' facial characteristics to identify them. In real time, our system can recognize several faces. [17]

Md. Sajid Akbar et. all (2018) At the beginning of this Article, our aim and objective is to design and implement the aid system based on facial identification and RFID verification, because both parts have worked as expected and have been successful. There is no doubt that our model can be used to exceed the efficiency and convenience of manual aid systems. Our model is easier to use and the most precise and organized data is provided. Authors can use our system in every security installation with a small modification. For academic institutions to disseminate and ensure quality learning for all students, proper attendance management is essential. This paper proposes an automated attendance system model that reduces manual data entry work and therefore eliminates the risk of fraud. This model is designed to identify and count students authorized to enter or leave the classroom, combined with facial recognition and radio frequency identification (RFID). Every registered student has an intelligent attendance system that saves a lot of tedious traditional tasks. In addition, the intelligent system stores each student's data [18]

Yuslinda Wati et. all (2018) Instead of a locked system requiring the use of fixed hardware and software, the attendance system employs the Internet of Things. The Internet of Things will be developed and more information will be provided than we imagine by using existing information. This information should only be analyzed and is more helpful than log files. These information can be employed to provide better services, to analyze the quality of lectures to be improved and to motivate more students to take part in classes and courses. The system

successfully recorded the current and absent students list using the proposed system. Appropriate databases for institutions will be the focus of further work. Instead of the Raspberry Pi camera.

The cloud service provides useful attendance information, for example, the summary attendance performance, and displays the information in graphs and tables.. The GUI will provide a user- friendly way to analyse the data and time. System of support. Python, for establishing The findings demonstrate assistance constructed by connecting the facial recognition system to the server. [19]

Sakshi Patel et. all (2018) The OpenCV algorithm modules on the Python Platform are part of the project. The project also enables others to see new improvisations as a result of upcoming hardware and technological changes. The model accuracy is 99.38 percent and provides a single face recognition tool, much better than the general algorithm, because it needs only a grayscale- free image processing. In order to calculate the distance

between pixels and points in the image, hair, LBPH and own face require thousands of samples. The integrated Raspberry Pi email function is used to take advantage of the Internet of Things. This is aided by the SMT protocol. The project's future scope can improve the model's speed and precision. [20]

Tejas Saraf et. all (2018) Authors has been a proposed email alerting system. The system verifies and registers facial images on the basis of facial recognition techniques for control of door access control. The relevant staff will notify detection staff successfully through email alerts and other detailed details. Face recognition is one of a number of people recognition technologies. For this purpose, there are several methods. The use of PCA or Eigenface is some of the most common. While other new technologies are easier to understand, use and implement, they are also performing very well. One of these is the Haar Cascades algorithm. Like we have demonstrated, Haar Cascades performs extremely well and is very precise. Verification of identity in the information system era is one of the main problems. technology monitors and human-computer interactions as an important branch of biometric verification. The project proposes an automatic access system control method using the Python programming technology of facial recognition and the OpenCV cascade method. It is the use of a Haar functional classification system for object detection. This is an independent dongle with an electronic development board and USB modem for wireless Internet access that is operated by the Raspberry Pi battery. An automatic notification has been implemented. This is a more efficient and reliable solution, and the system consumes less data and energy compared to other existingsystems. [21]

Priya Pasumarti et. all (2018) Authors realize that there are different, tedious and ineffective methods, such as biometrics, RFID, etc. The breach of the old framework is therefore a better and stronger arrangement for all who are interested in time and security. We have therefore completed the creation of a robust and effective framework for image processing algorithms to detect faces in the classroom and accurately perceive attendance faces. Participation in the class is an important task. A lot of production times are often wasted by class when done manually. The current solution is to have the machine join using face recognition. The face is the most important part of every person. This project demonstrates how to detect and recognize human faces i n real time using Raspberry Pi. This project describes a workflow for open source graphics using the OpenCV framework. Our method has five modules, face detection, face advancement, face t raining, and database engagement. Create a face database to recognize students' faces. The system was first trained on students' face s, called a student database. The system uses a user interface to improve user experience, trainingand testing, image collection, and student assistance through the system. [twenty two]

Marko Arsenovic et. all (2017) The face is every person's main distinctive feature. This projectdescribes ways to detect and recognize faces

Use Raspberry Pi in real time. This project describes a workflow for open source graphics using t he OpenCV framework. Our method has five modules: face recognition, face advancement, face training, and information service. Create a face database to recognize students' faces. The systemwas first trained on students' faces, called a student database.

The system uses an easy-to-use user interface to facilitate the user experience, training, and test the system, collect pictures and help students. This paper proposes a new system of deep learning facial recognition. The whole process of developing a model for face recognition is detailed. The model consists of several basic steps that have been developed using the latest technology today: CNN facial sensing cascade and CNN facial embedding technology. This research aims mainly at applying these advanced profound methods of learning to facial

recognition. As the best results are achieved by CNN on larger data sets, which are not in a manufacturing environment, the main challenge is to apply those processes to smaller data sets. For facial recognition tasks, a new method for improving images is proposed. [23]

Chapter 3

FACE RECOGNIZATION

3.1 DIFFERENT APPROACHES OF FACE RECOGNITION: When it comes to face recognition, many algorithms have been created throughout the years.

Geometric: In other words, spatial configuration of facial traits known as geomets. Initial facial features like as eyes, noses and mouths are found, followed by a categorization of facets according to geometrical distances and angles between them.

Photometric stereo: Using a large number of photographs, reconstruct the item's shape under settings

3.2 Understanding how Face Recognition works

• To understand how face recognition works, let's first understand what an eigenvector is. Every machine learning algorithm takes data as input and learns from it. Algorithms scan the data looking for patterns. When trying to recognize faces in images, we will look for different criteria:

- The Height/width of the face.
- Height and width may not be reliable since the image could be rescaled to a smaller face. However, it is the ratio that remains constant even after rescaling - the ratio of face height to face width does not change
- Face painting.
- Lips, nose, etc. the width of other parts of the face, such as As we can see, several of the faces have varying measurements. Faces of the same size that are similar. In order to do this, a particular face must be converted into a series of numbers. It is referred to as a functional vector. The feature vector includes different integers in a specific order.

3.3 FACE DETECTION

As a result of face detection, picture windows are divided into two classes, one with faces (facing background) and the other without (clutter). Even while there are some similarities amongst

faces, the ages, skin tones, and facial expressions vary greatly. Dissimulation, make the work considerably more difficult. Regardless of the lighting circumstances, it would be ideal. Face

detection is a two-part process. It starts with receives any outputs if image has any faces. Another objective is to locate faces in a picture. This involves making an image of the inside and outputting any faces:

A. Pre-Processing: For example, the faces have been processed before being sent out into the network in order to reduce the variability. The only way to get a good look at the face is to clip out the front faces of the photos. A consistent algorithm for lighting is then used to alter all photos.

B. Classification: By training on these instances, neural networks may be i categorise. Our version as well as it be used to do this. A variety of network configurations are tested in order to achieve the best results possible

C. Localization: When images are found, the trained neural network searches for them and locates them in an embedded box, if they are present. Facets of the job performed: - Scale Illumination Positioning.

3.3.1 Challenges of Facial Recognition System

2 Technology has to change the way businesses and governments communicate. But if this technology isn't used correctly, it could pose major risks. In order to successfully use this technology, firms and organisations must guarantee enough, as well as suitable safety measures. In a database, the biometric data of every person scanned by this technique is stored. Depending on the owner of the measures may authorization technologies aren't flawless.

3 Algorithms are trained using human data. Missing diversity lead to an incorrect identification of the person.

4 When it comes to those with darker skin tones, the system has misidentified their gender or identity on numerous instances. As a result, a wide range of persons were not represented in the data set. Modern technology has spawned a new breed of crime. It's possible for criminals to obtain facial recognition data without their consent by hacking into the database. When criminals employ facial recognition technology, they may cause a lot of damage. Criminals may be able to steal important personal information or the identity of a victim. Many promises have been made regarding the use of face recognition technology.

This technology can be used if it is effectively deployed.

3.2 Neural Network based Approaches

Analytical neural networks are excellent tools for pattern identification problems. ANN is a well- established organisation.

The use of neural networks has solved a number of problems with faces, including gender classification, face recognition, and facial categorization, which were previously difficult to handle. Even when a picture input is extremely noisy or parts of the picture are missing, a precise recall was preserved with tiny face photographs. Following are a few NN-based approaches to facial reconnaissance

Single Layer adaptive NN: To detect faces, analyse facial expressions, and verify faces, was reported to be used. The Recognizing Device of Wilke, Aleksander, and Stonham was designed (WISARD). Translation and variance in facial expressions are among the training patterns for each categorization. This requires 200-400 presentations. One classifier has been created for each subject in the database. When the classifier that offered the best answer to the image presented was identified, classification was completed.

- **Multilayer Perceptron (MLP):** There is a significant body of research on neural networks for facial recognition that focuses on just a few classes of faces. A five-dimensional neural network was created by retrieving the autoassociation neural network from the first 50 primary components of the photographs.
- **Self-Organizing map (SOM):** A self-organizing map (SOM) and a convolutionary neural network are used in a hybrid network solution that incorporates local image sampling. The SOM quantifies picture samples in a topological space which are also close to the output space, hence reducing the dimension and invariance of slight changes in the image sample. The convolutionary neural network enables the translation, rotation, scaling and deformation with a partial invariance. The recognizer gives a measure of trust in its result.

3.2.1 Other Approaches

Along with a variety of other methods. By scanning the subject with a laser scanner, data is collected. To classify facial images, the algorithm uses three-dimensional data.

Infrared Scanning: Infrared light can also be used to identify them. As a result, some authors use thermal sensors to check the temperature of their faces. In order to do this, the front view of the image is first normalised for position and size, then temperature distribution, local average temperature, and the face shape variables are determined.

It's possible to feed a neural network using data from the observed

A result, the performance greatly the lighting conditions (light sources such as shadows, reflections, and darkness).

3.3 Geometry Feature based Methods

However, the fact utilising face differs significantly from feature-based techniques in that it uses facial feature measurements such as eye distance, the distance ratio, etc. to construct the topological graph.

- **Graph Matching based Methods:** There were sparse graphs with geometrical distances recorded as

vertices that showed the objects' positions. Using a collection of complex wavelet coefficients of Gabor to represent each node, a rectangular graph, called a jet, was created. During matching and recognition, only the coefficient size was used to match and recognise. Model gallery charts are individually connected to each image, and when identifying a face in a new image, the person recognised showed the greatest similarity.

3.4 DIGITAL IMAGE PROCESSING

1. “Improvement of pictorial information for human interpretation”
2. “Processing of scene data for autonomous machine perception”

Field of ways to extract picture information in a computer- appropriate form. Examples include automated character recognition, industrial machine vision, military recognition, automated fingerprint processing etc. for product installation and inspection.

A simple image model:

Picture $F(x,y)$ must be scanned in space and amplitude to be acceptable for computer processing. Image sampling is called spatial coordinate digitization (x, y) . Digitalization of amplitude is referred to as quantization of grey levels.

Types of image processing

- Low level processing
- Medium level processing
- High level processing

Processing at the lowest level includes actions such as reading, resizing and rotating images as well as RGB conversion to grey level and histogram equalisation. The resulting image is a raw image after little processing. This involves eliminating areas of interest from low-level image processing results. The medium-level processing includes identifying borders, i.e. borders.

Segmentation is the term used to describe this process. Adding artificial intelligence to medium- level signal processing is the goal of high-level signal processing.

3.5 Face Detection using Haar-Cascades

If you want to distinguish signals that change suddenly, you can use a hair wavelet, which creates square-shaped waves with a start and finish. In order to create a cascade, it is necessary to combine numerous wavelets, which identify edges, lines, and circles with different colours. They were used in Viola Jones in 2001 to detect faces, and since then, different designs for object detection have been presented, as shown in figure. Figure 1. Hair Cascades analyses a photo at a size smaller than the desired image. Averaging the pixel values in each part, it is placed on the image. A match occurs when the difference between two values exceeds a specified threshold. In order to detect a human face, a combination of hair-like properties is used. Front, eyes, and nose are all shown in contrast in the figure below. There aren't enough classifiers to go around.

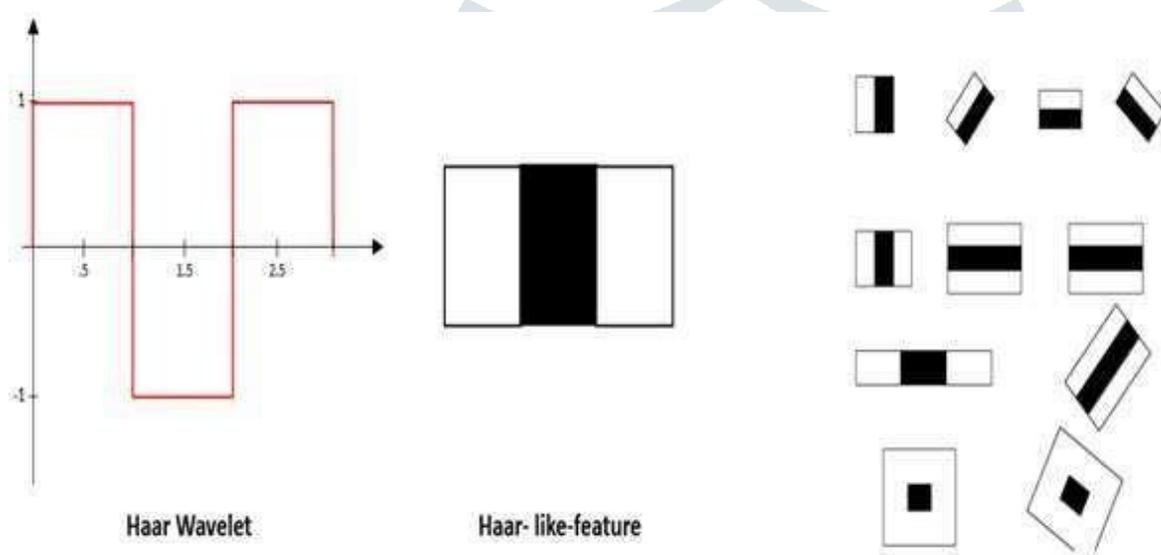


Figure : A Haar wavelet and resulting Haar-like features

3.6 Face Detection

The initial step was the design of a hair cascade face detection system, which was then followed by a second stage. However, OpenCV already has a powerful set of hair cascades that have been used in the project. Face-cascades alone were used to recognise random objects, then eye waterfalls were added to give robust facial detection. The detection system's fluid diagram is shown. Face and Eye Classifier objects are generated using the OpenCV classifier `cv2.CascadeClassifier()`, and the corresponding XML files are loaded. A camera object is created by calling `cv2.VideoCapture()`. We're using the `CascadeClassifier`. Different sizes of the `detectMultiScale()` object are compared to determine the returned location. Using the location data, the face is sliced in order to verify it. For a cropped face, the cascade of eyeballs is utilised to verify that there are two eyes. Faces can be identified in the location where they should be.

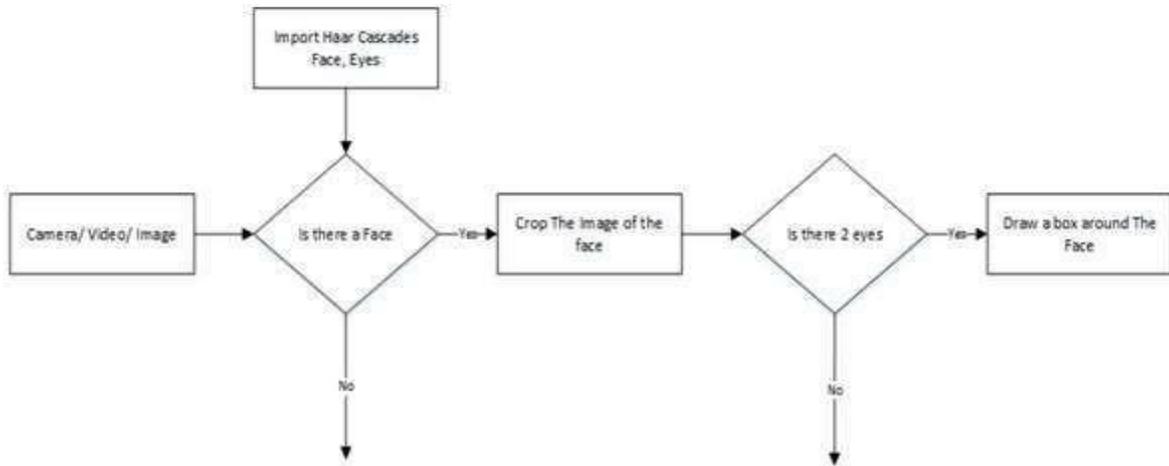
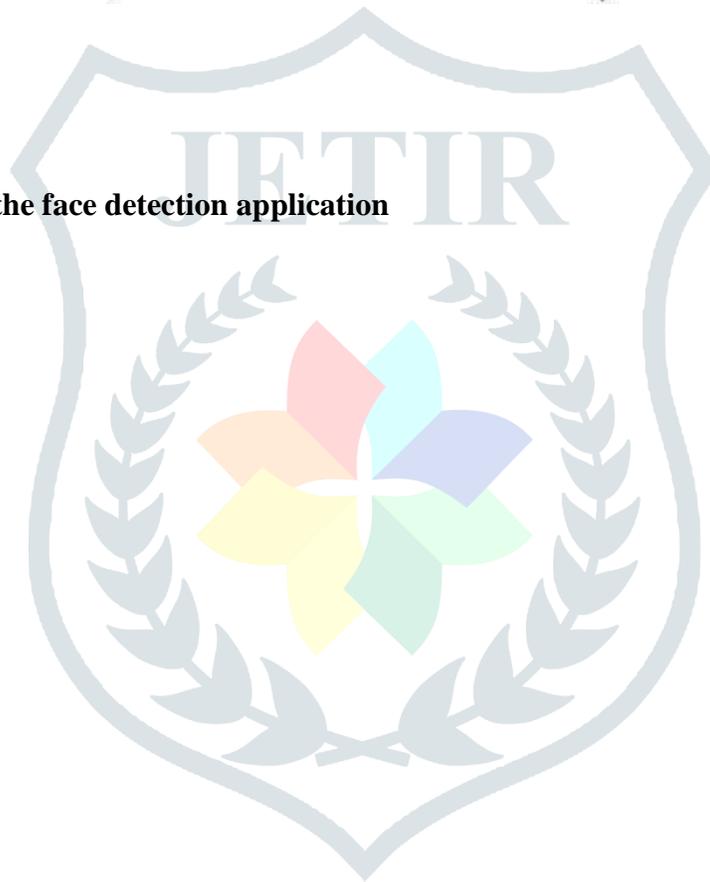


Figure: The Flow chart of the face detection application



Chapter 4

METHODOLOGY

As a school teacher and student, your participation is the most important thing. Therefore, it is important to keep attendance records. Think about the way to class. Attendance or attendance recording is not only time consuming but also energy consuming. Therefore, using time and participation can solve all the problems listed above and more. Many institutions utilise automatic attendance systems. As an example, biometrics is a technique. It takes a long time. An involuntary attendance marking system is being introduced in this project, which does not interfere with the normal teaching process in any way. Exams and other instructional activities where attendance is critical can also be monitored using this technology. There is no longer a need to identify pupils in the traditional way, such as shouting out their names and looking at their disruptive or distressing periods. In computer-human interaction, recognising a human's face is a challenge. It is a key aspect of their identity feeling in society. We are able to recognise faces even after a long period of detachment because we are able to perceive numerous appearances that have evolved over time. Despite the fact that there are significant variations in visual enhancement due to changing health, ageing, and diversions, such as facial hair, spectacles, or changes in hairstyle, this skill is quite strong.

Because they can contribute to hypothetical learning as well as practical applications, Face-recognition PCs could be used for criminal identification proof, security frameworks, image and video management, identity confirmation, and human-PC interface, for example. The fact that faces are confusing, multi-dimensional, and essential visual cues makes adding to a computational model of face recognition and acknowledgment extremely problematic.

4.1 Proposed Block Diagram

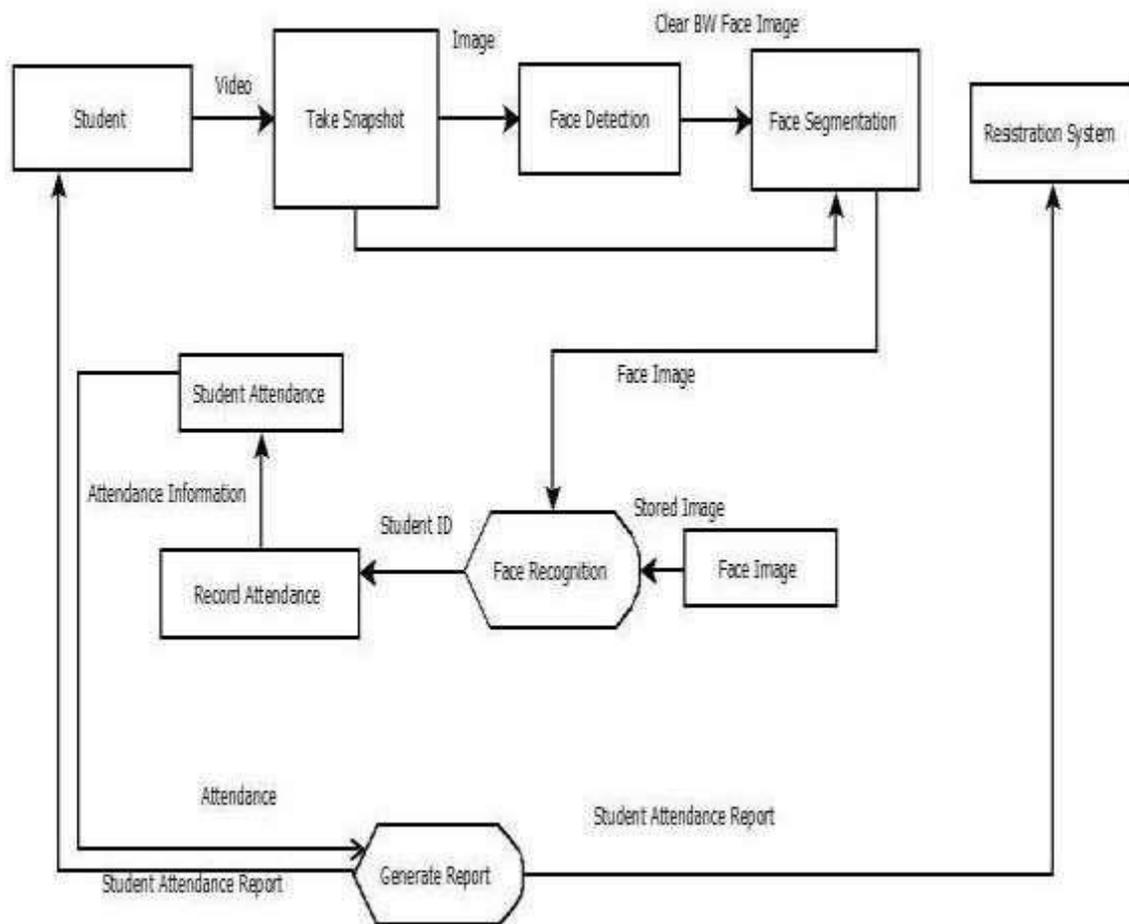


Figure: Proposed Block Diagram

4.2 Image Segmentation

An image is segmented into areas that items sections of an object, called image segmentation. All pixels in an image are assigned to one of these groups. A good segmentation is typically one in which:

- “Pixels in the same category have similar grayscale of multivariate values and form a connected region.”
- “Neighbouring pixels which are in different categories have dissimilar values.”

4.2.1 Types Of Image Segmentation

Even with image segmentation, there are some aspects that you should pay attention to. The first is semantic partitioning, followed by example partitioning. The next is panoptic segmentation. Let's take a look at each.

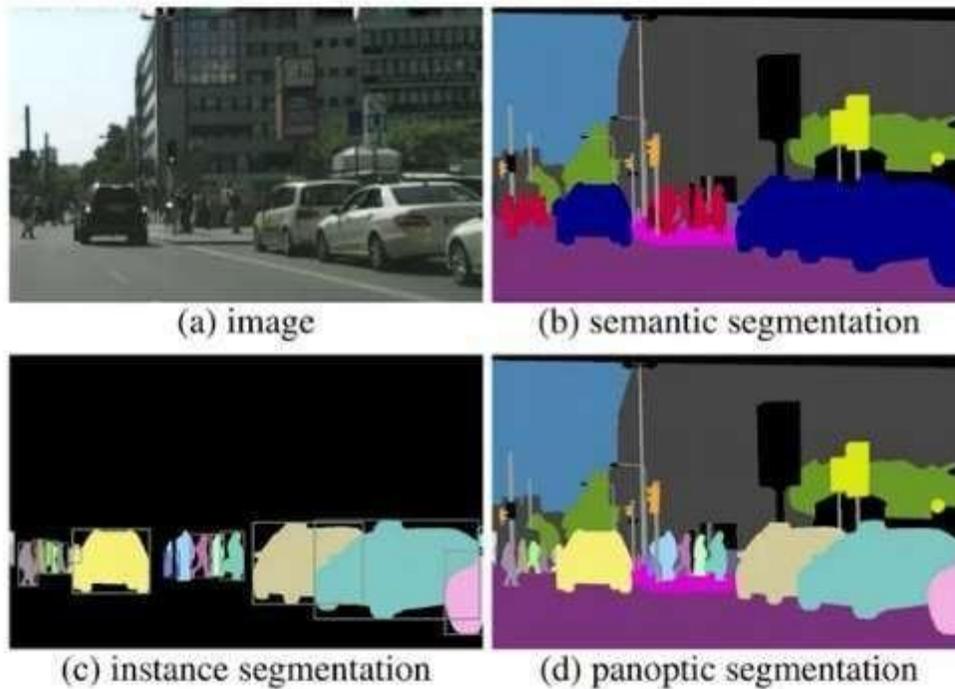


Figure: Types of Segmentation

Semantic segmentation

Semantic Segmentation describes the process of associating each pixel with a label class.

Simply put, we only care about the rough representation of all the objects in the picture here. Here you can see all cars in blue, pedestrians in red and roads in red.

so there is no difference between cars, which means all cars are blue. This is the easiest way to describe an image segmentation problem.

Instance partitioning Unlike

semantic segmentation, in image segmentation we consider each instance of an object in the image independently. So this means that we will focus on the main product first and then analyze each sample individually.

You can see that all objects in pictures of cars and people are clear and in different colors. This is an example of segmentation..

Panoptic partitioning segmentation

When we combine semantic partitioning with example partitioning,

we get panoptic partitioning. This is a new area of research where we need to associate each pixel in an image

with a semantic label and determine the state of a class..

4.3 Algorithm Flow chart:

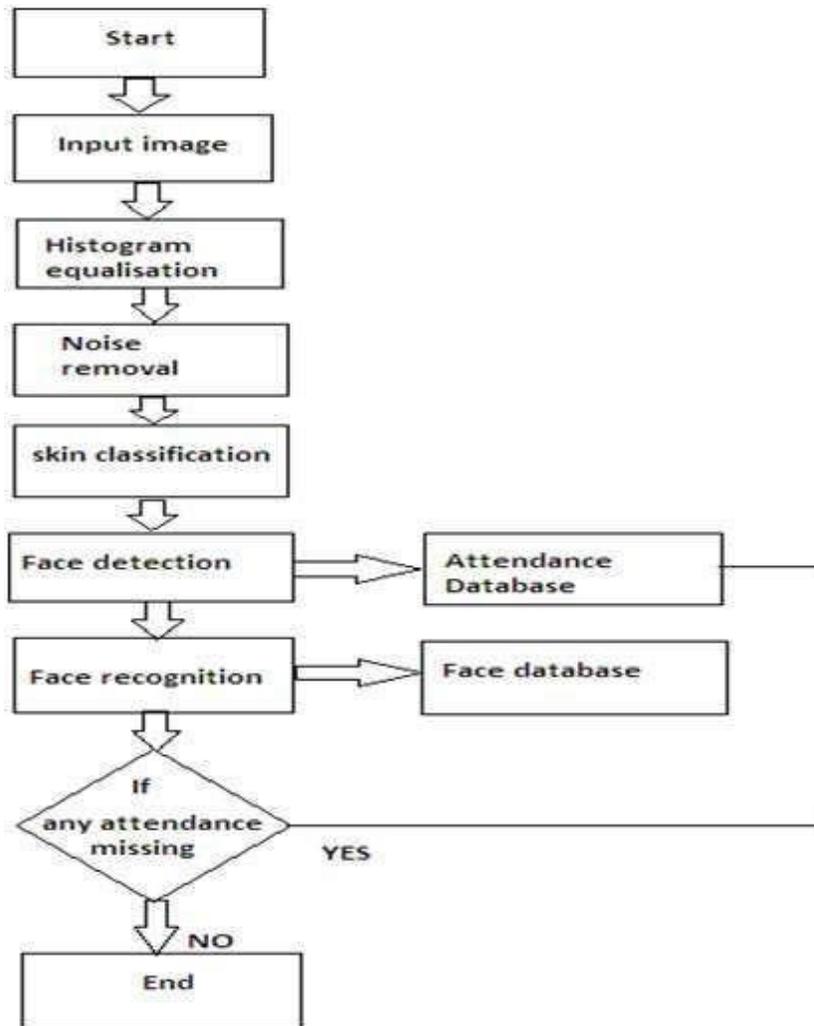


Figure: Flow Chart

Face detection is the process of determining the position of a person's face. If you want to be more specific, you can explain it as finding the area of the face in the image. In order to eliminate the facial features of the human face, it is necessary to examine the face...

It is easy to find faces in photos of one person, but more difficult to find faces in photos of multiple people. face recognition is the first important step in face recognition applications. When a face is detected, the face recognition system can start working normally. Face detection, environment, lighting, lighting, etc. It is a complex process that must take into account many factors such as There are many ways to measure a face.

These include color-based, feature-based (such as mouth, nose, and eyes), and neural network-based methods. In many ways, skin procedures are the easiest. Face detection method based on skin color is the method suggested and used in this article. The process is so powerful because many faces can be identified by a large group of people in a single shot. Human skin can be detected using the RGB color model using the YCbCr model.

4.4 Segmentation based on color

Definition: The segmentation people based on their skin colour is becoming increasingly popular today. It's being examined because of its dynamic research in content-based illustration. In the instance of, segmentation utilised boundary in an image. On finding the face region, we can apply various processing such as image modification and various coding. The initial stage to recognise a face and its expression is facial detection. Melanin content, skin pigmentation, and other biological components determine an individual's skin colour. In the overall colour space, the skin colour belongs to a specific range. The skin should not be abnormal. Because the search technique relies on face colour association, it can only be used for images that include at least the correct colour components. There are a number of segmentation algorithms, but the one utilised is the simplest.

4.5 Module Used in Proposed Work

4.5.1 Face detection

In order to detect a person's face, you need to know where their face is located.

If you want to be more specific, you can explain it as finding the area of

the face in the image. To eliminate facial features, people's faces need to be detected... It is easy to see a face in a picture of one person, but it is more complicated to find a face in a picture of many.

Face recognition is the first important step in face recognition applications. When a face is detected, the face recognition system can start working normally. Face detection, environment, lighting

, lighting, etc. It is a complex process that must take into account many factors such as Many methods have been developed over time to recognize faces. Some are based on skin color, others are based on traits or characteristics (such as mouth, nose, and eyes), and others are based on neural networks.

Among the above methods, the skin method is the easiest. In this study, a face detection method based on skin color is proposed and applied. A large number of faces can be discovered at once from a large number of persons in an image.

4.5.2 Face recognition

In computer-human interaction, recognising a human's face is a difficult task. We are able to recognise faces even after a long period of detachment. As a result of changing health, ageing, and diversions, such as facial hair and eyeglasses or a change in haircut this skill is quite strong. Because they can contribute to hypothetical learning as well as functional applications, attractive. Face-recognition PCs could range of tasks, including criminal identification proof, security frameworks, image and video management, identity confirmation, and human-PC interface, among others. Unfortunately, adding to a computational face recognition and acknowledgment model is problematic, given that faces are confusing, multifaceted visual stimuli of great importance.

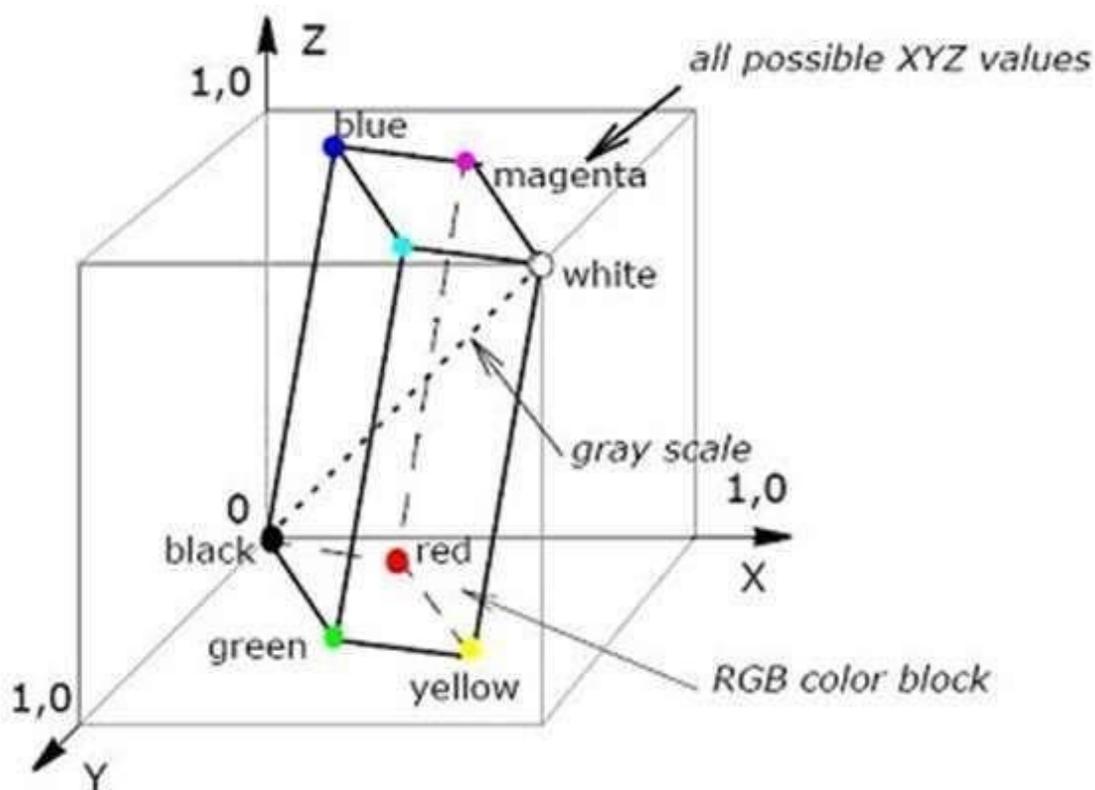
4.5.3 Attendance Registering

For students in colleges or high schools, class attendance is crucial. There must be an accurate and rapid way for a business to keep track of each employee's performance. Attendance tells us whether a person is physically there or not. Students' names or roll numbers are called to register attendance in the usual way, which might take a long time or be a complete waste of time during class time.

4.6 RGB Color Space

RGB stands for red, green and blue. When these three colors are mixed in the same proportion, a new color is formed. In the diagram, the RGB color model is represented as a 3D cube with three colors on each vertex and on each axis. The origin of this cube is black. The diagonal of the 3D cube has white.

It is on the opposite corner of the gray scale, represented by a black background and a white, straight line. Red (255, 0, 0) when we examine a 24-



bit color display system with 8 color objects per channel. Red is at centre of the three- dimensional colour cube (1, 0, 0). In spite of its simplicity, this architecture isn't suitable for all types of applications. Because the three colour components are so tightly connected, some imageprocessing algorithms are difficult to implement.

Figure: dimensional RGB color space

4.7 HSV Color Model

With the RGB colour space concept. Problem with RGB that it does take into account the effect of light on the colour of skin, which leads to a lot of errors. In order to fix this difficulty, we can use the HSV model for skin colour. For example, in the following equation H stands for hue (depth), S stands for saturation (purity), and V for value (intensity of light/brightness). Figure illustrates the model. 0 to 3600 is the range of hue values for the three primary colours of red, blue, and yellow. Just by changing the tint, we can achieve our goal.

In terms of colour purity, the saturation value ranges from 0 to 100 percent By changing the saturation value, it is possible to get the pink colour from the dark red. In addition to providing a hint as to a given color's brightness, value provides insight into the hue. Numbers from 0 to 100 are included in the range. The letters 'H' and 'S' provide the necessary information regarding the skin's colour. To be considered skin, the pixel value of skin colour must meet the following criteria.

“ $0 \leq H \leq 0.25$ ” and “ $0.15 \leq S \leq 0.9$;

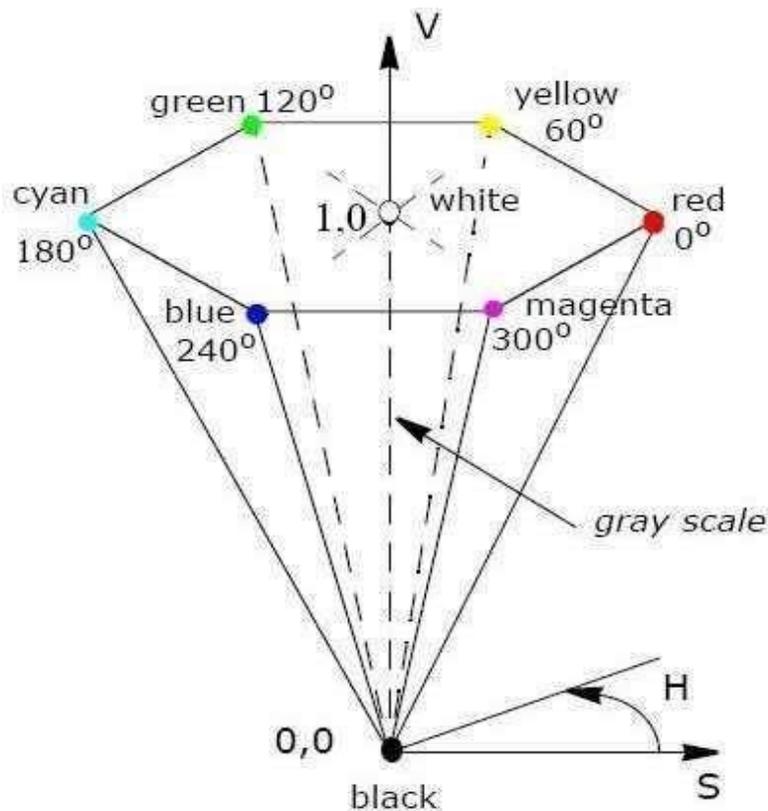


Figure: Model of HSV Color Space for Skin

4.8 YCbCr Color Model

Compared to the other two colour models, this one employs the chrominance value to extract the skin colour region from a picture. A colour space called 'YCbCr' is commonly utilised in digital picture processing. In this case, Y represents luminance, Y' represents the luma component, while Cb and Cr indicate the blue and red differences of the chroma component respectively. A true colour space is YCbCr. You can encode the RGB colour space in a different method. The YCbCr values can only be acquired if the image's original RGB information is available.

$$\begin{aligned}
 Y &= 0.299R + 0.587G + 0.114B \\
 Cb &= -0.169R - 0.332G + 0.500B \\
 Cr &= 0.500R - 0.419G - 0.081B
 \end{aligned}$$

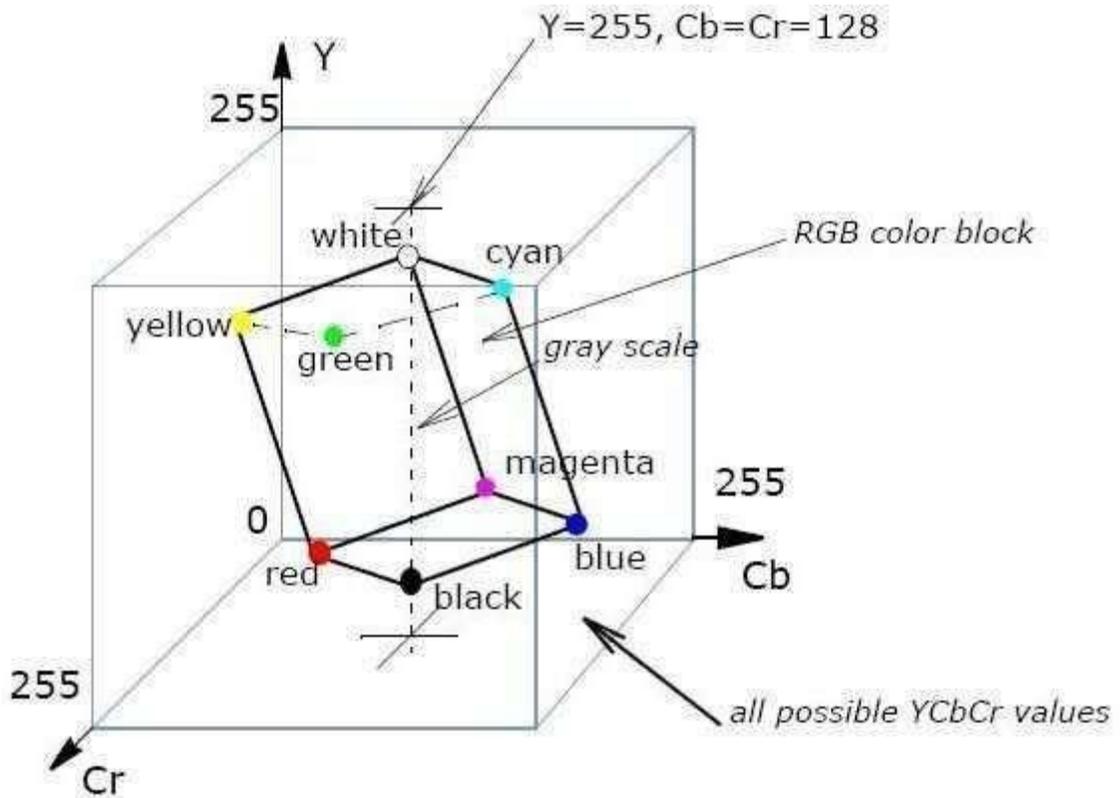


Figure: YCbCr color space for skin tone



5.1 Training Images Data



Figure: 5.1 Training Image Set (1)

Chapter 5

Result



Figure: 5.1 Training Image Set (2)



Figure: 5.1 Training Image Set (3)



Figure: 5.1 Training Image Set (4)



Figure: 5.1 Training Image Set (5)



Figure: 5.1 Training Image Set (6)

	A	B	C	D	E	F	G	H
1	Id		Name		Date		Time	
2								
3	1		Darshan Kumar Das		4/3/2021		21:17:28	
4								
5	1		Darshan Kumar Das		4/3/2021		21:17:42	
6								
7	1		Darshan Kumar Das		4/3/2021		21:22:55	
8								
9	1		Darshan Kumar Das		4/3/2021		21:28:41	
10								
11	1		Darshan Kumar Das		4/3/2021		21:46:13	
12								
13	2		Ujjali Das		4/3/2021		21:55:34	
14								
15								

Figure: Output Attendance Sheet Result

Chapter – 6

CONCLUDED FUTURE SCOPE

6.1 Conclude

The proposed project is designed to create a facial recognition system used to monitor student attendance in schools and colleges. An automated student attendance system based on facial recognition is shown below. Using the new method, people can be identified by comparing the photos entered in the photo gallery with the photos shown. An input facial picture obtained from a recording video frame can be used to recognize and localize a person's face using the proposed approach. There is a pre-processing method to improve image contrast and reduce illumination. Face recognition became more accurate when these parameters were effectively regulated. Actually, a better camera with improved lighting would be able to lessen the illumination issue and also prevent blurry photographs from being captured. The laptop's built-in camera is used as a default device in this manner.

6.2 Future Scope

Better cameras and lighting sources can be employed in the future to achieve better results. There is less reliance

on the environment, especially when it comes to the regions where test and training photographs are captured. It is also possible to construct recognizes addition to just one. In this way, the system's efficiency can be increased. Testing and training images are closely intertwined in this technique, and the picture capturing equipment has a significant impact on both. As a result, this strategy will perform better if the capture equipment is identical. There are various algorithms that can be employed instead of LBP, such as an AI system that can be utilized for face recognition.

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