

ATTENDANCE SYSTEM USING FACE- RECOGNITION

**A project report submitted to the Department of Computer
Science and Engineering for partial fulfilments of the
requirements for the award of the degree**

of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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VISAKHAPATNAM

MAY 2021

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

GITAM INSTITUTE OF TECHNOLOGY

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DECLARATION

We hereby declare that the project review entitled “**ATTENDANCE SYSTEM USING FACE RECOGNITION**” is an original work done in the Department of Computer Science and Engineering, GITAM Institute of Technology, GITAM (Deemed to be University) submitted in partial fulfilment of the requirements for the award of the degree of B.Tech in Computer Science and Engineering. The work has not been submitted to any other college or university for the award of any degree or diploma.

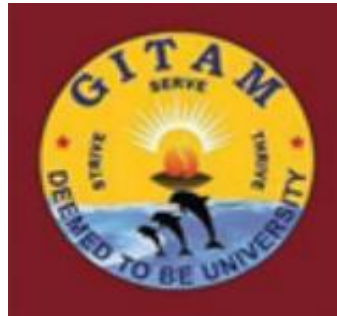
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This is to certify that the project report entitled "Attendance system using Face recognition" is a bonafide record of work carried out by **Pasupuleti Bhargavi (121710313042), Kota Lekhya (121710313030), Kosti Gowri Sai Madhurya (121710313029), Bhanu Prakash Racha (121710313061)** submitted in partial fulfilment of the requirement for the award of the degree of Bachelors of Technology in Computer Science and Engineering.

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ABSTRACT

The integrated camera of the student or the employee will start recording the video and this recorded video will then capture the images. These images are further used for detecting the face of the student or the employee. These detected faces are further encoded with the images of all the students of a class or total number of employees of the company along with the name of the particular person , that are already given to the database .the image which is detected and encoded will be compared with all these images of the student or the employee .firstly it will compare with the image that is in the top of the list to be compared if it does not get matched with the first then it will go for the second image this loop will be continued until it finds the perfect image that matches the captured image with the specified percentage of similarity .once the image is found it will stop the looping and mark the attendance in an excel sheet that is attached to it with the name of the person that is there in the image to which the captured image has got matched with and also it will specify the time of the student or the employee at which the image has been captured. Which will enable us to know the student or the employee who attended the section without disturbing it.

TABLE OF CONTENTS

DECLARATION

ACKNOWLEDGEMENT

ABSTRACT

S.No.	Topic	Page No.
1.	INTRODUCTION	1-2
	1.1 Motivation	2
	1.2 Problem statement	2
	1.3 Scope	2
	1.4 Hardware requirements	2
	1.5 Software requirements	2
	1.6 Summary	3
	1.7 Limitations	3
2.	LITERATURE SURVEY	4-13
	2.1 Objective	13
	2.2 Outcomes	13
	2.3 System methods	14
3.	BLOCK DIAGRAM	15
4.	IMPLEMENTATION	16-20
	4.1 Physical components	20
	4.2 Overview of the technology	20-21
5.	UML DIAGRAMS	22-24
6.	PREREQUISITES	25
	6.1 Python	25

6.2 Jupyter notebook	25
6.3 Face recognition	25
6.4 Open CV	26
6.5 Numpy	27
6.6 OS	28
6.7 Dlib	28
6.8 Testing	29-32
7. RESULTS	33
8. CONCLUSION	33
9. FUTURE SCOPE	33
10. REFERENCES	34

LIST OF FIGURES

S.No.	Figure Name	Page No.
1.	Fig 3.1 Block diagram	15
2.	Fig 4.1 Test image 1(False case)	16
3.	Fig 4.2 Test image 2(False case)	17
4.	Fig 4.3 Test image 1(True case)	18
5.	Fig 4.4 Test image 2(True case)	18
6.	Fig 4.5 Image detecting to take attendance Through camera	19
7.	Fig 4.6 Excel sheet for attendance	20
8.	Fig 4.7 Tabular representation of the attendance	20
9.	Fig 5.1.1 Use case diagram	22
10.	Fig 5.1.2 Class diagram	23
11.	Fig 5.1.3 Activity diagram	24
12.	Fig 6.4.1 Code to download open CV	26
13.	Fig 6.4.2 After successfully downloaded	27
14.	Fig 6.5.1 Code to download Numpy	27
15.	Fig 6.5.2 After successfully downloading numpy	27
16.	Fig 6.6.1 Code to download OS	28
17.	Fig 6.6.2 After successfully downloading OS	28
18.	Fig 6.7.1 Code to download Dlib	29
19.	Fig 7.1.1 Graphical representation of the attendance of different classes.	33

1. INTRODUCTION

The Attendance system allows the students to mark their attendance automatically using face-recognition. In this project a cam will activate and it will recognise the face and the details (name and time of login will be given) will be added to the excel sheet.

Here an integrated camera within the system captures the image of the candidate and this captured image is compared with the database that is provided by with specified candidates images .then when it matches with the data stored it provides attendance along with the name of the particular candidate also displays the time at which the image of the candidate has been captured .similarly ,every candidates image will be captured and finally the output is given to an excel sheet where it will display the name of the candidate who is present along with time .in this project we have used jupyter notebook, face recognition ,dlib for libraries, numpy and opencv2.also this project helps us to overcome problems that were been faced by using traditional attendance system where there you need to maintain a register and callout the names of the candidates and mark there presence, which takes lots of time to complete and also will disturb the class atmosphere. So, this project helps us to overcome these kind of problems. Here an integrated camera within the system captures the image of the candidate and this captured image is compared with the database that is provided by with specified candidates images .then when it matches with the data stored it provides attendance along with the name of the particular candidate also displays the time at which the image of the candidate has been captured. Similarly, every candidates image will be captured and finally the output is given to an excel sheet where it will display the name of the candidate who is present along with time .in this project we have used jupyter notebook, face recognition ,dlib for libraries, numpy and opencv2.also this project helps us to overcome problems that were been faced by using traditional

attendance system where there you need to maintain a register and callout the names of the candidates and mark there presence, which takes lots of time to complete and also will disturb the class atmosphere. So this project helps us to overcome these kinds of problems.

1.1 Motivation

We decided to do this project since according to the traditional methods of taking attendance there can be chances of proxy and can become tiresome for the teachers. But with this project we can overcome the problem where it automatically takes the attendance of the particular student including the time of joining.

1.2 Problem definition

While taking attendance there might be chance of missing students or there might be a chance of proxy. While here in the project we can overcome this as the attendance will be taken automatically with time of login to check the timing.

1.3 Scope

The scope of this project is that due to the current situation everything has become online and the work and classes are taking place through the online methods therefore this method of taking attendance will be very useful.

1.4 Hardware requirements

The hardware requirements will be the inbuilt camera available in the laptop or pc and a memory of 2mb for the code is enough.

1.5 Software requirements

The software requirements of the project are the libraries:

- Open cv

- Numpy
- Face recognition
- OS

And apart from the libraries we also require the jupyter notebook with dlib environment where the libraries can be effectively used.

1.6 Summary

This project will be very useful in the future and also this current period with a little more of application added on it will become very useful.

1.7 Limitations

The limitations in the project are that we do not have an option to record which can be a very good future scope for anyone who wants to make this project much more efficient as have a video record of every student there will be no chance of having a proxy. Only the respected student will be given attendance.

2. LITERATURE RIEW

Face detection and face recognition using open-cv. In this paper it completely discusses about the face recognition and face identification. How efficiently we can use the open-cv libraries and use them for face recognition and face identification. The history of face recognition is discussed how it started. It began on the 1977 by kanade. It discusses about the use of Haar-Cascade method for face detection. They started with face detection and then the face recognition process. In the face recognition process they started with collecting images and then classifying according to their face features and then store those in the XML files. Once the image is matched then the particular face is recognized. They collected 50 images per person for detecting the particular face in any condition or side. They made graphical representation for all the test case and it showed the more students or candidates are involved the more accuracy increased. Finally they concluded that LBPH combined with Haar-cascades can be used for face-recognition platform.

In this project they will be using two methods to detect and recognise face in a live video. Since detecting a face in live video will be challenging compared to detecting in the photo. Here they have used methods like KLT and Viola jones algorithm which uses Haar method for face recognition. This algorithm helps us to detect the face features for recognizing the faces. They have finally concluded that with these methods and algorithms help in decreasing the computation time and increase the accuracy. The KLT method is used to track or find the face in the live running video whereas the Viola jones algorithm helps us in recognising the face in the video. So by concluding we can say that by combining these two methods we can say that it helps us to recognise the face in a live video in a very smooth manner

This paper discuss about face recognition system design. How it is implemented and important and better than other biometric process like finger print and signature. In the face recognition firstly the image is taken then the face is recognised and the the image pre-processing is done. Once this pre-processing is done then it identifies and recognises and gives the name of the particular person. Here knowledge based recognition methods for detecting the face in a video or photo. Any problems that occur during face recognition can be solved using FFNN which helps to solve the patter problems.

In human body, face is the crucial part that uniquely identifies a person. Implementation of face recognition can be done by using face characteristics as biometric. Marking of attendance is the most important task in any industry. Generally In traditional way of attendance system, names are called out where you need to mark the attendance ie.; present or absent of a person. Obviously it is time consuming to take attendance in traditional way. In this project, we have proposed the Open CV based face recognition approach. An integrated camera is used in this project. An image is used as input, face detection is done by using an algorithm. Identification and encoding of the face in the input image is also done by using another algorithm. A spread sheet is used to mark attendance and then it is converted into a pdf. Faces of the authorized students are used to create training database. Those authorized faces are cropped and are stored with respective labels as data base. LBPH algorithm is used to extract the features.

Organisations, industries uses strategies such as Iris recognition, fingerprint identification, RFID etc, For personal identification to take attendance. The most natural high efficient and less time taking personal identification strategy is face recognition among above mentioned all. Face recognition has got many applications in security systems and managing attendance also. A system is implemented to take attendance of employees in industries and students in

Educational Institute by the use of face recognition and detection technology. With the help of internet connectivity a web server is uploaded with data base automatically and a time period is also given for taking attendance. No human intervention is used in this process. Open CV library with Raspberry Pi is installed and for face recognition and detection Raspberry camera module is connected. The Raspberry Pi is provided with a memory card where the data is stored which can be accessed through internet.

Every organization requires attendance. it is difficult to maintain a register and handle it. We also have some other different automated methods such as voice recognition, Biometric, RFID, eye detection and many more.an effective and smart way of attendance is given by this project. Primary identification of a human is face, this face recognition provides attendance with low cost and less time consuming. Face recognition library has been used therefor sorting the attendance. parent of respective students will be informed through mail about the absent of the student .finally the main objective of this project is use technology such as face recognition for attendance to less hardware cost for fast computing and for large data storing.

Face recognition attendance system is the purpose of students in a class, a normal attendance taking system is the fundamental process for any learning management system. Now a days attendance taking will consume more time and make necessary for a hand-operated work from the respective teacher or students. This project aim is to explain all these things in a easier manner by recognizing the faces in the perfect procedure. In this project, we show to find the attendance of the particular person and his position and his face representation in the respective class. The face detection will detect the face of a person in the class and the program evaluate the existence and the available

location of the students in the continuous review and the recorded video. Then the recorded video will test the students in the required database, then at last this will happen through camera and computer.

In the smart attendance system were having two different algorithms were as principal component analysis and the other was using artificial neural network. The main lead to solve the old attendance system to make it in a easy way. In the principal component analysis, it does uprooting and pick out the sameness in the database and earn images. In this Artificial Neural Network will be using to solve the problems of the given data and get checked and learned from the given data and looking forward to the value. In this program execution they use back propagation method and merge with mathematical function to do in the program. AS the result, it appears in the program and it will be use to acknowledge in the dissimilar domain.

They prompt a way that takes the presence of understudies for homeroom address. this method takes the presence consequently utilizing face acknowledgment. In any case, it is muddled to work round the participation exactly utilizing every consequence of face identification freely on the grounds that the face acknowledgment rate is not adequately high. during this paper, we propose AN interaction for gauge the presence without ambiguity utilizing all the when effects of face acknowledgment got by Continuous examination. Consistent investigation improves the presentation for the assessment of the presence we tend to made the speak presence framework addicted to face acknowledgment, and applied the framework to review hall address. Face acknowledgment innovation has broadly involved focus thanks to its tremendous application worth and market potential, as an example, face

acknowledgment and video perception framework. Constant face recognition not completely is one part of the programmed face acknowledgment framework nevertheless additionally is expanding a free exploration subject. Thus, there square measure components of ways to agitate settle face recognition. This paper portrays the development of AN understudy participation framework addicted to face acknowledgment and validation innovation. MATLAB diagram is utilized for execution. the present normal presence framework expects understudies to physically sign the sheet without fail

In this we have a tendency to introduce a system for student attendance in categories and any Lecture hall by mistreatment the open CV (Open supply pc Vision/open source computer vision) with some face detection and face recognition algorithms. The aim is to require the number of individuals gift within the category and take attending to each of them mistreatment face detection algorithms and face recognition algorithms to work out the particular identification of persons that of them area unit gift. This approach will use in different things like security purpose, Authentication etc. however here during this paper it's enforced to require attendance to the scholars in a very category space or in a very Seminar hall. it should be conjointly used for the hindrance of unauthorized persons in a very system and in security problems for security or in any ineligible activities.

Face detection utilizing IOT. Participation is an obligatory necessity of each association. Keeping up participation register day by day is a troublesome and tedious errand. There are many mechanized techniques for a similar accessible like Biometric, RFID, eye discovery, voice acknowledgment, and some more. This paper gives a productive and savvy technique for checking participation.

As it is realized that essential ID for any human is its face, face acknowledgment gives a precise framework which beats the ambiguities like phony participation, significant expense, and time utilization. This framework utilizes face recognizer library for facial acknowledgment and putting away participation. The non-attendant's manager or guardians are educated through email with respect to the shortfall of their workers or on the other hand wards individually. The target of this task is to enhance existing ventures with some additional element like huge information capacity and quick figuring through less equipment cost.

One of the simplest ways to tell who someone is by looking at their face. Face recognition is a type of personal identification system that uses a person's personal traits to determine their identity. The basic steps in the human face recognition technique are as follows.

Face detection, which occurs relatively quickly in humans, is divided into two parts. Unless the object is at a short distance away, the following step is the introduction, which recognizes a face as an individual. The Eigenface approach uses Principal Component Analysis (PCA) for facial features to reduce the face-dimensional space.

Face detection is the subject of this electronic paper. Face detection is one of the most researched areas in computer science. The purpose of this project is to create a realistic image from a random image.

The goal of this study is to see if there are any faces in the data. The picture of the eyes and the detection of the upper body while this is true,

Although it looks to be a simple task for humans, it is extremely difficult. A difficult problem for computers The distinction there have been hundreds of

studies on face identification approaches, however if one were to name a single face identification method that has had the most influence in recent decades, it would most likely be Viola and Jones face detection, which is capable of detecting processing photos at a high rate and achieving a high detection rate a rate In this lesson, we will learn and comprehend the Viola algorithm Jones.

This project was completed using OpenCV, a superb "Open Source Computer Vision Library." We'll be focused on Raspberry Pi (thus, Raspbian as OS) and Python in this lesson, although I tested the code on my Mac and it works great. OpenCV was built with a significant focus on real-time applications and computational performance in mind. As a result, it's ideal for real-time facial recognition using a camera.

The Open CV "Open Source Computer Vision Library" was used to complete this project. We'll be focused on Raspberry Pi (thus, Raspbian as OS) and Python in this tutorial, but I tested the code on my Mac and it works perfectly as well. Open CV was created with an emphasis on real-time applications and computing efficiency. As a result, it's ideal for real-time facial recognition using a camera. To accomplish a Face Recognition project, we must work on three distinct phases.

This study outlines research efforts aimed at building algorithms for a robust face recognition system that will address many of the shortcomings of existing two-dimensional facial recognition systems. This paper specifically addresses the issue of Detecting faces in colour photographs under a variety of lighting situations and with a variety of complicated objects

You must be able to recognize faces as well as their backgrounds. Faces with different poses, lighting, and expressions.

Face detection and face recognition are the two key sections of the paper.

A skin-tone colour model has been used to construct a near real-time face detection system. As well as facial traits We've created four separate solutions for facial recognition:

I accumulating evidence for 2D face recognition, (ii) demographic inconsistency(iii) 3D model enhanced 2D face recognition with small amount of training samples, and (iv) 3D face recognition using 2D facial pictures

In the past, face recognition, image processing, and machine learning, among other topics, have been among the most interesting and essential study disciplines. A slew of publications have been published in an attempt to overcome differences in parameters (such as illumination, expression, scale, position, etc.) and improve recognition rates, but there is currently no reliable method for dealing with uncontrolled realistic scenarios.may entail a variety of things at the same time. We'll go over general concepts and structures of recognition, critical issues and factors of human faces, and critical methodologies and algorithms in this report. Rather than video-based face recognition, this report focuses solely on color-image-based (2D) face identification (3D). two-decade period The requirement for automatic recognition and surveillance systems is one of the causes.from the demand for automatic recognition and surveillance systems, to the interest in human visual systems for face recognition, to the creation of human-computer interfaces and access control. These studies draw on expertise and experts from a variety of fields, including neuroscience, psychology, computer vision, and pattern recognition. Color-based skin segmentation and face detection were used in the method.These studies draw on expertise and experts from a variety of fields,

including neuroscience, psychology, computer vision, and pattern recognition. Color-based skin segmentation and picture filtering were used in the face detection technique. The centroid of the identified region was used to identify the location of the face. A software version of the method is developed and tested independently on stiles matlab diagrams

Human face identification and acknowledgment assume significant parts in numerous applications like video reconnaissance and face picture information base administration. In our undertaking, we have contemplated chipped away at both face acknowledgment and recognition methods and created calculations for them. In face acknowledgment, the calculation utilized is PCA (head part examination), MPCA(Multilinear Principal Component Investigation), and LDA(Linear Discriminant Analysis) in which we perceive an obscure test picture by contrasting it and the realized preparing pictures put away in the data set just as give data with respect to the individual perceived. These methods function admirably under vigorous conditions like complex foundation, diverse face positions. These calculations give various paces of precision under various conditions as tentatively noticed. In face discovery, we have fostered a calculation that can recognize human countenances from a picture. We have taken skin tone as a device for identification. This method functions admirably for Indian faces which have a particular composition shifting under a specific reach. We have taken genuine models and recreated the calculations in MATLAB effectively

Participation for the understudies is a significant task in class when done physically it by and large squanders a ton of the beneficial season of the class this proposed answer for the current issue is through the mechanization of the participation framework utilizing face acknowledgment the face is the essential id for any human this venture portrays the strategy for distinguishing and

perceiving the face continuously utilizing raspberry pi this undertaking depicts a productive calculation utilizing an open-source picture handling system known as opencv our methodology has five modules face location face pre-processing face training face acknowledgment and attendance database the face information base is gathered to perceive the essences of the understudies the framework is at first prepared with the under studys faces which are all in all known as the understudy information base the framework utilizes easy to understand a us to augment the client experience while both preparing and testing which are gathering understudy pictures also gauging participation with the framework this undertaking can be utilized for some different applications where face acknowledgment can be utilized for validation raspberry pi utilization helps in limiting the expense of the item and the convenience as it can be associated with any gadget to gauge participation this project utilizes the changed calculation of haars cascades proposed by viola-jones for face identification and utilizations lbp histograms for face acknowledgment and utilizations SQLite a light form of sql in raspberry pi alongside MySQL to refresh the information base the framework will naturally refresh the under study essence in the class to the under study information base and sends messages to gatekeepers of non-attendants and furthermore to the head of the office.

2.1 Objective

To use face recognition during the beginning of the class and no student will be missed and it is a easier way to take the attendance directly than taking the attendance manually.

2.2 Outcomes

In this project the outcomes are that there will be face recognition in the live video and then the particular person will be identified and that particular person

name will be recorded into the excel sheet with the time of joining which will help in knowing the punctuality of the student during joining the class

2.3 System methods

Software requirements:

- Jupyter notebook
- Face-recognition
- dlib
- numpy
- Opencv2

3. BLOCK DIAGRAM

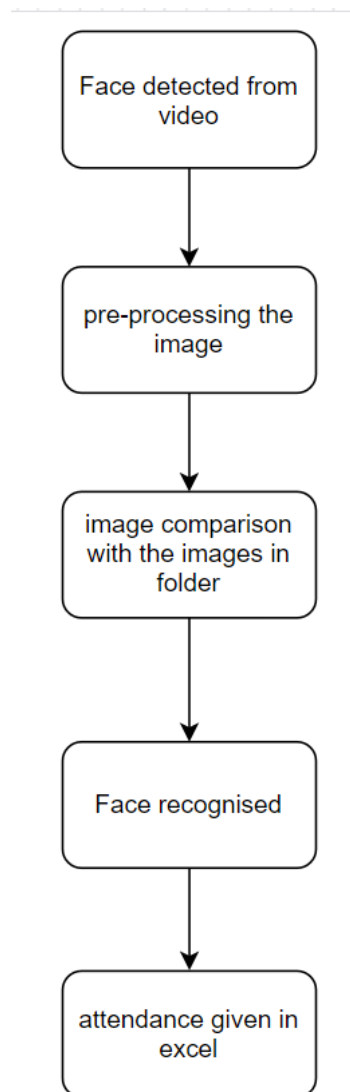


Fig 3.1:Block diagram

Block diagram helps us to understand the project much easily it explains the steps of how the implementation of the project works in an diagram form.

4. IMPLEMENTATION

- First we will train all the faces of the students using the face-recognition and opencv2 models.
- Once all the faces are trained they will be tested if the faces are recognized with their name.
- After that we start the attendance system where the webcam pops up to take the picture and recognise it.
- Once the face has been recognised then the names with the login time will be stored in the excel sheet.

In the first step we compare two images in the folder for testing the accuracy of detecting and recognising.

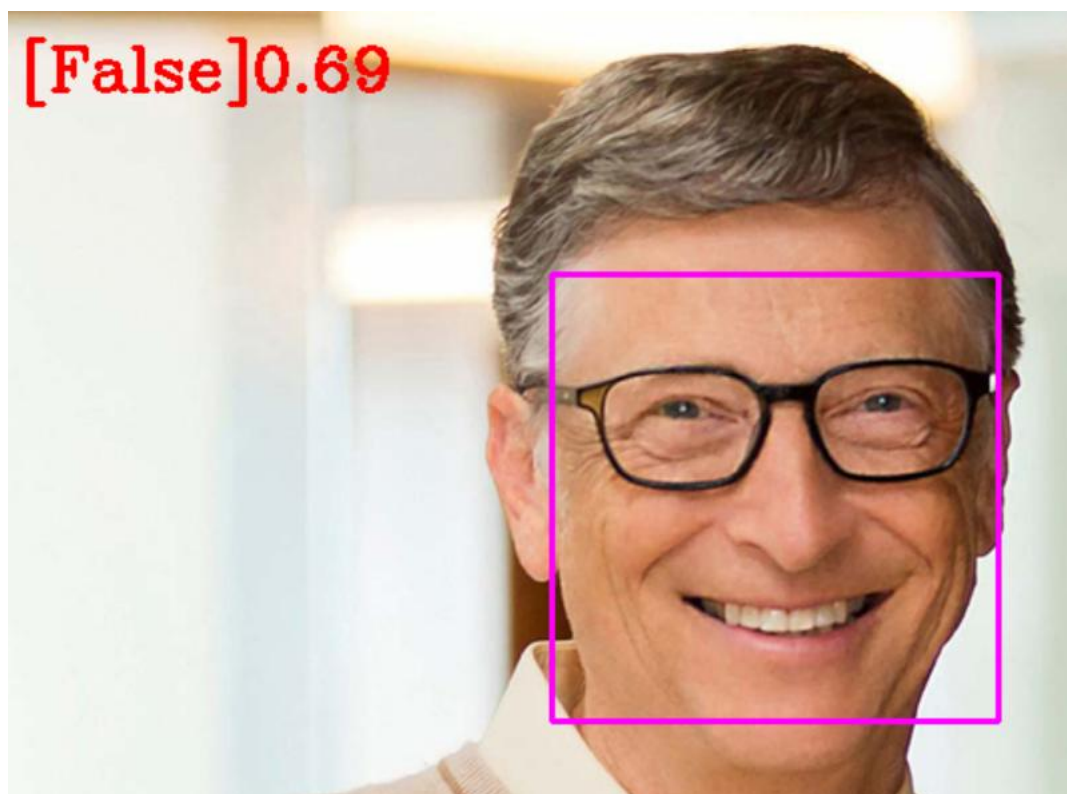


Fig 4.1:Test image 1

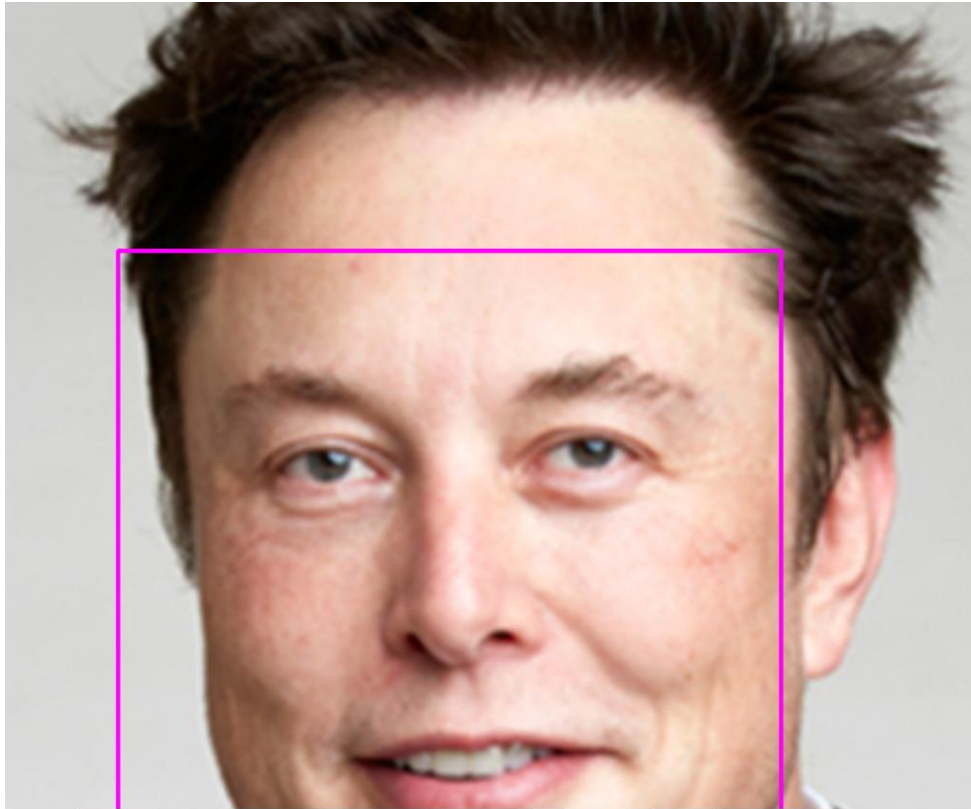


Fig 4.2:Test image 2

Here we are testing the accuracy so we are comparing the fig 4.1 and fig 4.2 from the test folder to get the accuracy of the detecting and recognition of the face.

Here since the two images are of different people we have got a false with the distance of [0.69]

The distance [0.69] here determines the distance between two images. When the image comparison takes place it calculates the distance between those two images and if the distance is more then the report is given as False which means that those two images are not same.



Fig 4.3 :Test image 1

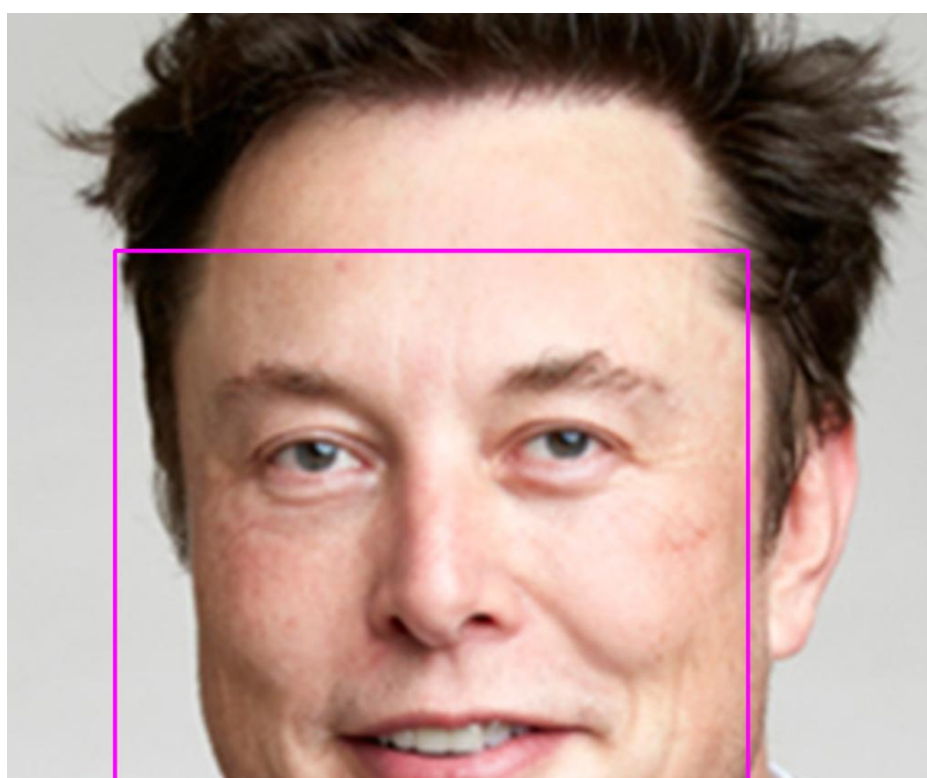


Fig 4.4:Test image 2

Here the images Fig 4.3 and Fig 4.4 are identical as their distance is less and it shows true

When an image detection shows [True] it means that the two images are identical.

This is the first step of the face recognition where faces are detected and made them compare with other images in the folder.

Once the images are detected and recognised then we write a code for the attendance system where after recognising being able to take the name and time into the excel sheet.

Here the person is detected and the name is shown

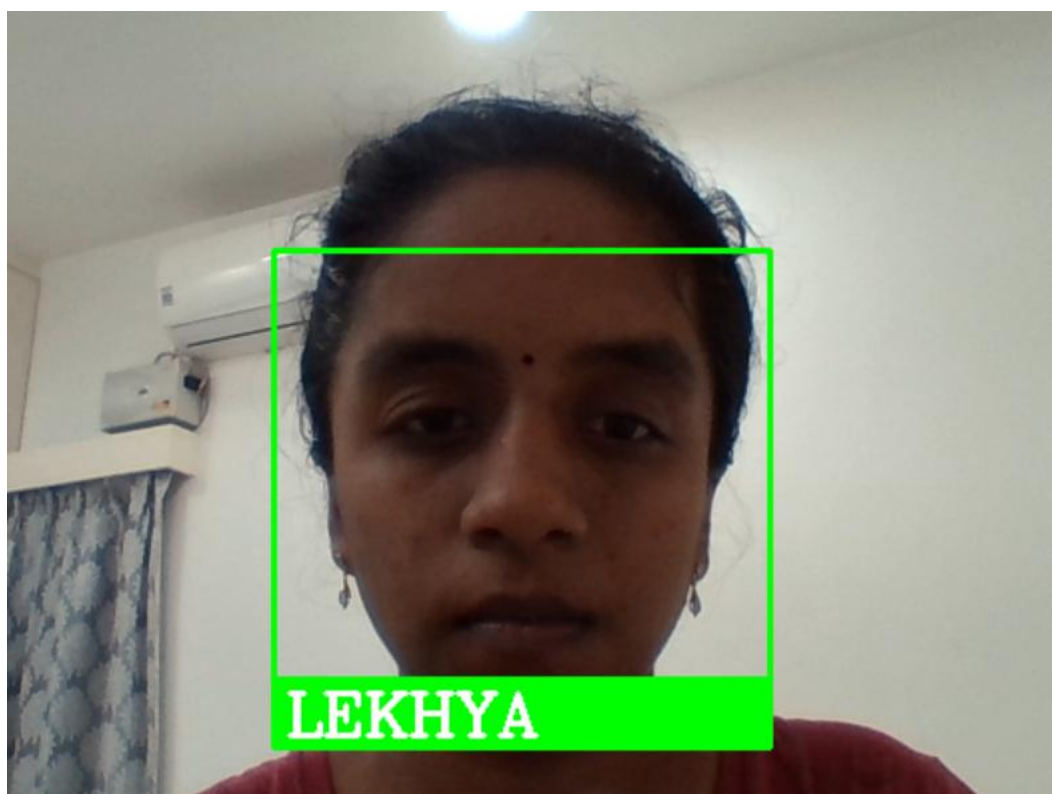
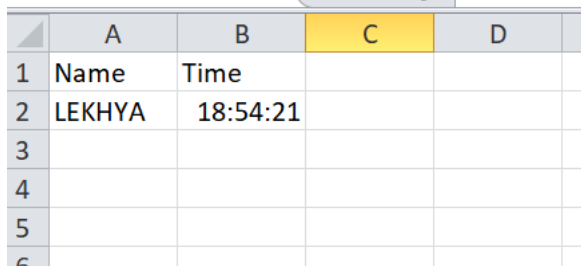


Fig 4.5: Image detecting to take attendance through camera

Once the face is detected and recognised then the name is stored in the excel sheet with time (hr:min:sec)



	A	B	C	D
1	Name	Time		
2	LEKHYA	18:54:21		
3				
4				
5				
6				

Fig 4.6: Excel sheet for Attendance

NAME	TIME
BHANU PRAKASH	10:45:14
LEKHYA	10:45:25
MADHURYA	10:45:30
BHARGAVI	10:45:55

Fig 4.7: Tabular representation of the attendance

4.1 Physical components

The physical components required for this project is camera that is inbuilt in the computer or laptop.

4.2 Overview of the technology

Face recognition is one of the most used in every field. For example in the automated cars like tesla it has face recognition where if the driver sleeps while driving the car then the car will go in auto pilot mode for the safety of the passengers. It happens like this because when the passengers get drowsy then

the blinks increase and becomes constant which is recognised as the person being drowsy.

Same way if we want to buy a pair of glasses we really don't have to go to the store and check every pair personally we can just go to their website and there the face-recognition applies and the person's eyes are detected and we can try the pair of glasses virtually.

And most commonly we know that face recognition is in every smart phone and laptop which is used instead of password to open the phone. Face recognition is one of the best and most useful technology that has been made.

5. UML DIAGRAMS

5.1 Use case diagrams

Use case is a graphical representation of the implementation process of the project. It contains different use cases and types of users interacting with the project.

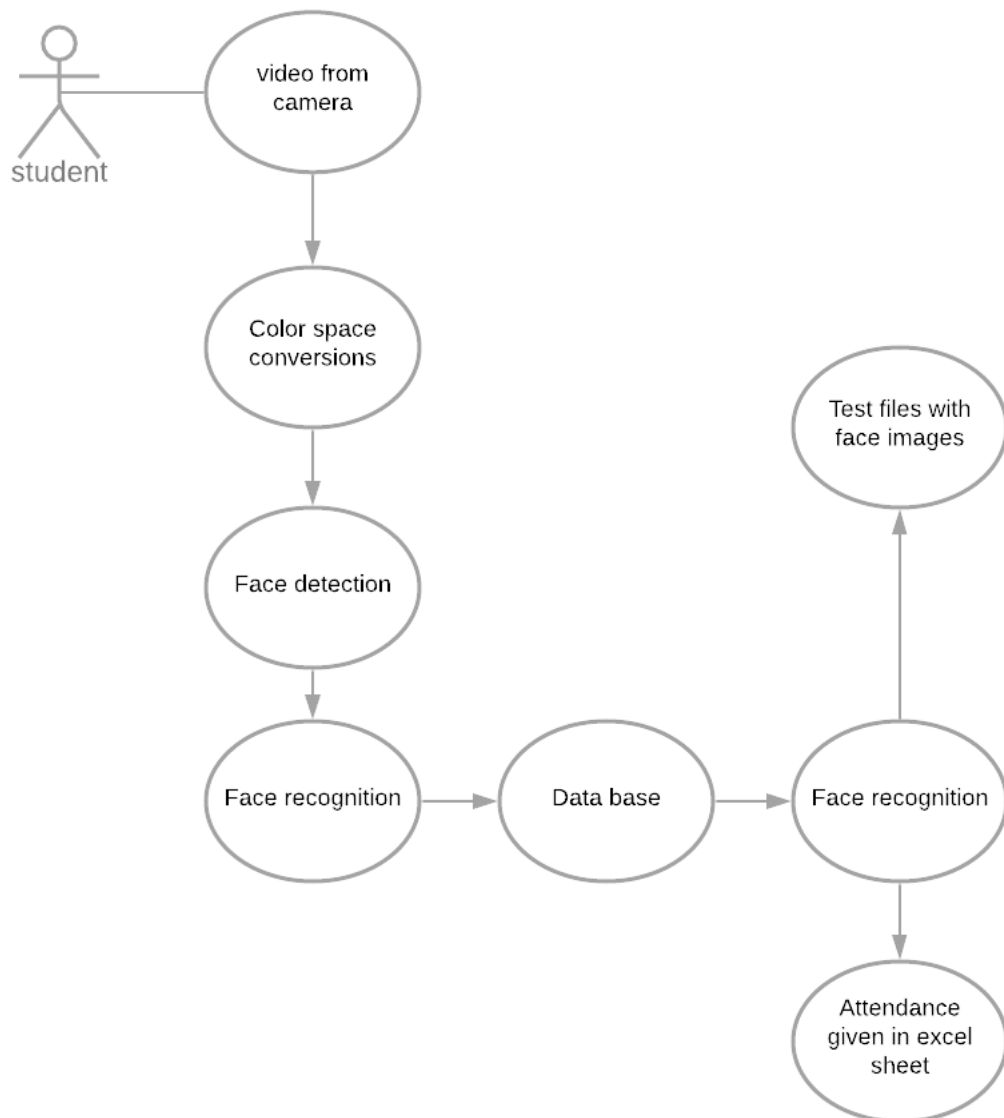


Fig 5.1.1: Use case diagram

5.2 Class Diagram

Class diagrams in UML mainly focus on object oriented modelling where it shows the operations and the relations among the attributes.

In the class diagram it shows the classes attributes functions in the project.

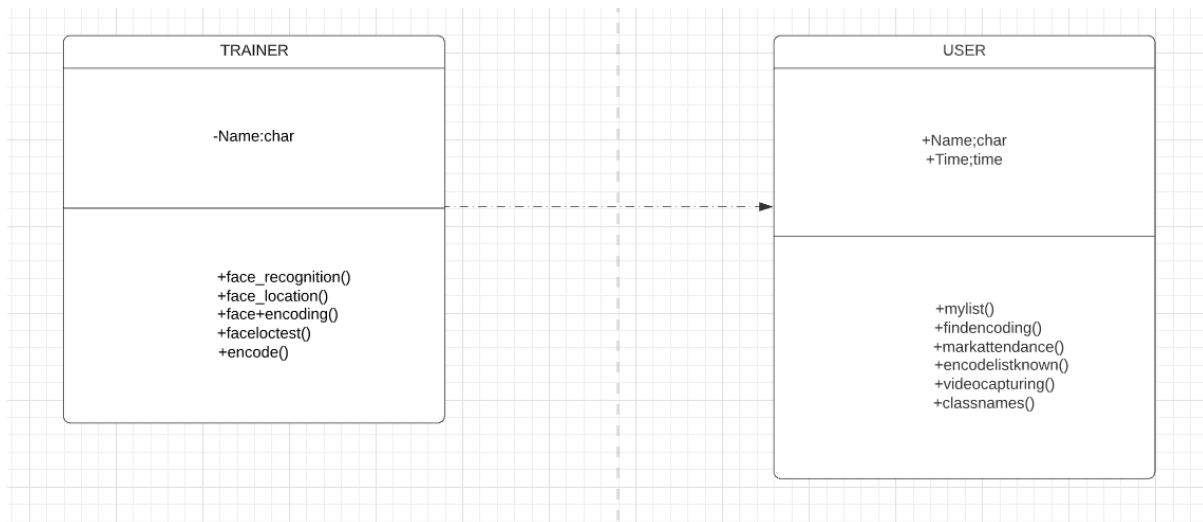


Fig 5.2.1: Class diagram

5.3 Activity diagram

Activity diagram is one of the most important UML diagram and it is an better version of a flowchart.

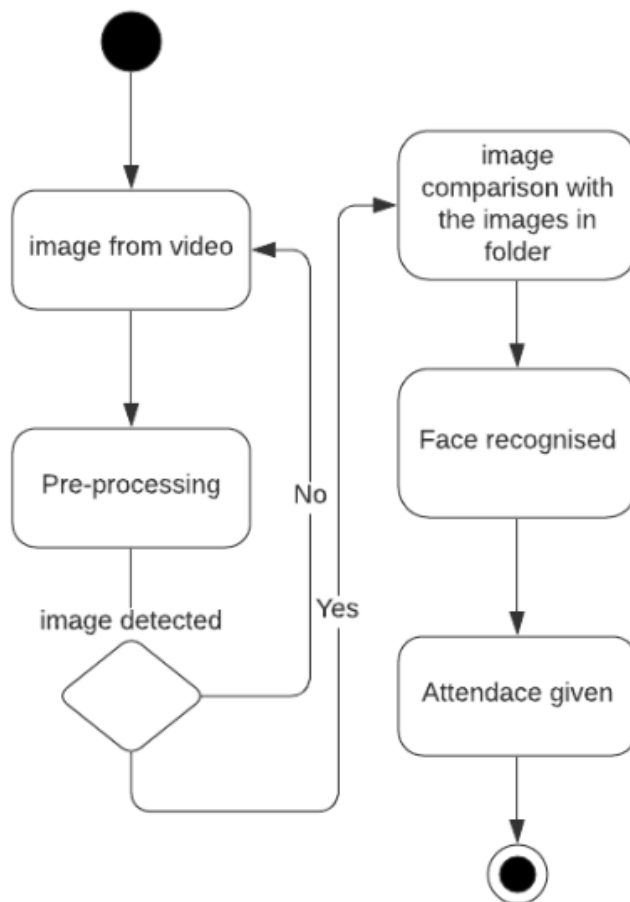


Fig 5.3.1: Activity diagram

6. PREREQUISITES

6.1 Python

Python is Associate in object-oriented, high-level programing language with integrated dynamic linguistics primarily for internet and app development it's extraordinarily engaging within the field of fast Application Development as a result of it offers dynamic writing and dynamic binding choices. Python is comparatively straightforward, thus it's simple to find out since it needs a novel syntax that focuses on readability. Developers will scan and translate Python code a lot of easier than different languages. In turn, this reduces the value of program maintenance and development as a result of it permits groups to figure collaboratively while not vital language and skill barriers.

6.2 Jupyter notebook

jupyter is an online intelligent advancement climate for jupyter journals code and information jupyterlab is adaptable design and orchestrates the UI to help a wide scope of work processes in information science logical figuring and ai jupyterlab is extensible and measured compose modules that add new parts and incorporate them with existing one.

The jupyter notebook is an open-source web application that permits you to make and share archives that contain live code conditions representations and story text utilizations include information cleaning and change mathematical reenactment measurable displaying information representation AI and considerably more.

6.3 Face recognition

Face recognition is a kind of PC vision innovation that can distinguish an individual's countenances inside advanced pictures. This is extremely simple for people, however, PCs need exact directions. The pictures may contain

numerous articles that aren't human faces, similar to structures, vehicles, creatures, etc.

Facial acknowledgment includes recognizing the face in the picture as having a place with individual X and not individual Y. It is regularly utilized for biometric purposes, such as opening your cell phone.

Once dlib is downloaded then we can download face recognition. Dlib supports face recognition library.

6.4 Open CV

Open CV is a Python open-source library, which is utilized for PC vision in Artificial knowledge, Machine Learning, face acknowledgment, and so forth In Open CV, the CV is a shortening type of PC vision, which is characterized as a field of study that assists PCs with understanding the substance of advanced pictures like photos and recordings.

The motivation behind PC vision is to comprehend the substance of the pictures. It separates the portrayal from the photos, which might be an item, a book depiction, and three-measurement model, etc. For instance, vehicles can be worked with PC vision, which will actually want to distinguish and various items around the street, for example, traffic signals, walkers, traffic signs, etc, and acts as needs be.

We can download open cv by getting the code to download open cv in cmd.



Fig6.4.1:Code to download opencv

```
C:\Users\SARVANI>pip install opencv-python
Requirement already satisfied: opencv-python in c:\users\sarvani\appdata\local\programs\python\python37-32\lib\site-packages (4.4.0.46)
Requirement already satisfied: numpy>=1.14.5 in c:\users\sarvani\appdata\local\programs\python\python37-32\lib\site-packages (from opencv-python) (1.19.4)
WARNING: You are using pip version 20.2.4; however, version 21.1.1 is available.
You should consider upgrading via the 'c:\users\sarvani\appdata\local\programs\python\python37-32\python.exe -m pip install --upgrade pip' command.
```

Fig 6.4.2: After successfully downloaded

6.5 Numpy

Numpy is a broadly useful cluster preparing bundle. It gives an elite multidimensional exhibit item and apparatuses for working with these clusters. It is the key bundle for logical figuring with Python. Other than its undeniable logical uses, Numpy can likewise be utilized as a proficient multi-dimensional compartment of conventional information.

To download numpy we have to go to the link: <https://pypi.org/project/numpy/>



Fig 6.5.1: Code to download numpy

Once numpy is downloaded or already downloaded we get that the requirement is satisfied.

```
C:\Users\SARVANI>pip install numpy
Requirement already satisfied: numpy in c:\users\sarvani\appdata\local\programs\python\python37-32\lib\site-packages (1.19.4)
WARNING: You are using pip version 20.2.4; however, version 21.1.1 is available.
You should consider upgrading via the 'c:\users\sarvani\appdata\local\programs\python\python37-32\python.exe -m pip install --upgrade pip' command.
```

Fig 6.5.2: After successfully downloading numpy

6.6 OS

It is used to directly take images from the folder and find the number of images import them and also encode them.

To download OS library we can go to the link: <https://pypi.org/project/os-win/>

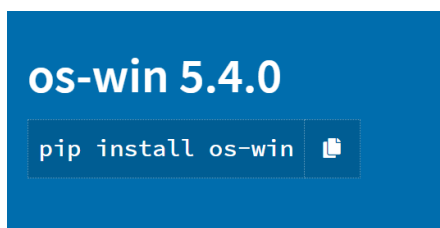


Fig 6.6.1: Code to download OS

Once we copy the link and go to the cmd and run the syntax

```
Collecting certifi>=2017.4.17
  Downloading certifi-2020.12.5-py2.py3-none-any.whl (147 kB)
    |#####| 147 kB 6.8 MB/s
Collecting urllib3<1.27,>=1.21.1
  Downloading urllib3-1.26.4-py2.py3-none-any.whl (153 kB)
    |#####| 153 kB 53 kB/s
Collecting chardet<5,>=3.0.2
  Downloading chardet-4.0.0-py2.py3-none-any.whl (178 kB)
    |#####| 178 kB 6.8 MB/s
Collecting idna<3,>=2.5
  Downloading idna-2.10-py2.py3-none-any.whl (58 kB)
    |#####| 58 kB 434 kB/s
Collecting zipp>=0.5
  Downloading zipp-3.4.1-py3-none-any.whl (5.2 kB)
Collecting typing_extensions>=3.6.4; python_version < "3.8"
  Downloading typing_extensions-3.10.0.0-py3-none-any.whl (26 kB)
Using legacy 'setup.py install' for wrapt, since package 'wheel' is not installed.
Installing collected packages: pbr, iso8601, netaddr, pyparsing, packaging, netifaces,
oslo.utils, pywin32, wmi, dnspython, greenlet, eventlet, PyMI, certifi, urllib3, char
typing_extensions, importlib-metadata, PyYAML, stevedore, oslo.config, fasteners, os
lization, oslo.context, oslo.log, os-win
Running setup.py install for wrapt ... done
```

Fig 6.6.2: After successfully downloading OS

Once successfully downloaded we get that it has been downloaded.

6.7 Dlib

Dlib is a toolbox for C++ and Python containing AI calculations and instruments for making complex programming to tackle true issues. Dlib gives calculations to AI/profound learning, multi-class arrangement and grouping

models, support vector machines, relapse models, a huge arrangement of mathematical calculations for zones like lattice controls and direct variable based math, graphical model induction calculations, and utility calculations for PC vision and picture preparing.

To download the dlib library we can go to this link and the code pops up:
<https://pypi.org/project/dlib/>

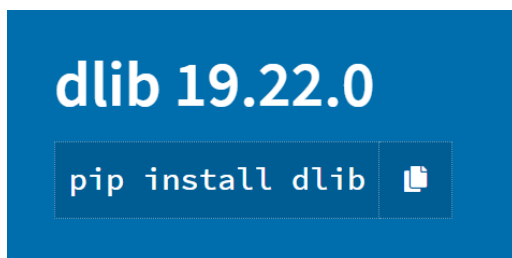


Fig 6.7.1: Code to download dlib

And then we have to copy the link and run in the command prompt (cmd).

6.8 Testing

Testing is an essential part of software quality assurance and is the final step in the specification design and coding process. The growing importance of software as a system component, as well as the related costs of software failure, are driving forces for well-planned, comprehensive testing. It is not uncommon for a software development project to spend between 30 and 40% of its total budget on development. Test case design techniques are integrated into a well-planned sequence of steps that result in the efficient construction of this programme in this system's testing strategies. It also includes a road map for the developer, the quality assurance agency, and the client, a roadmap that explains the steps to be taken as part of the testing path, when they are planned and then carried out, and how they are carried out. We must verify the software's consistency now that the coding has been completed according to the

requirements. Code testing is an important part of software quality assurance since it is the final check of the specification, design, and coding. While the aim of testing is to find errors in software, it also shows that the software functions appear to be functioning according to the specifications. Furthermore, data obtained during testing provides a fair indicator of software as well as some indicators of overall software quality. We use both White Box Testing and Black Box Testing to ensure software quality. White Box Testing is a test case design approach that derives test cases from the control structure of the procedural design. There is very little space for White Box Testing since we are using a non-procedural language. Black Box Testing is a form of software testing that concentrates on the software's functional requirements. It allows you to create input conditions that completely exercise all of a program's functional requirements. Almost all errors are detected by Black Box Testing. It detects a number of interface and database access errors, as well as performance issues. We use primarily two strategies in Black Box Testing. Equivalence Partitions: This approach divides a program's input domain into data classes from which test cases are extracted. A set of true or invalid similar values or a Boolean condition is represented by an Equivalence class. These have the following equivalence: Specific value-specific or non-specific two classes are needed for the input condition. A range or out of range two-class input condition is required.

Boundary Values Analysis: The majority of errors occur near the input domain's boundaries. A collection of test cases is practised using boundary values, i.e., around boundaries, in this technique. We removed almost all errors from the programme and tested for multiple test values for each and every input value using the two techniques described above. The outcome was satisfactory. Flow of the Tests System testing is used to find flaws that were not found in previous

studies. After multiple major failures, the entire device is checked for recovery and fallback to ensure that no data is lost. Validity and reliability of the method was subjected to an agreed evaluation. The testing theory is to find errors in the project. Many test cases have been created with this in mind. The research procedure is as follows:

code testing: Code Validation Specification testing is performed to see whether the software does as it should and behaves as expected under different conditions or combinations until it is submitted to the system for processing, and it is tested to see whether any overlaps occur during the process. This technique looks at the program's logic. Only the code's syntax is checked here. Syntax errors are corrected during code review to ensure quality.

Unit Testing: Unit testing is the first phase of testing. Different modules are evaluated here against the requirements generated during module design. Individual modules are tested using test oracles during unit testing. Unit testing is a series of experiments carried out by a single programmer before the units are integrated into a larger system. A programme unit is a tiny piece of software. To find defects, unit testing begins with the modules. These flaws are identified and fixed so that the unit suits the project perfectly.

System testing: System Evaluation Device testing and acceptance testing are the next levels of testing. This testing is conducted to see whether the system meets its specifications and to determine the system's external behaviour. There are two types of activities that go into system testing: Testing for integration Acceptance testing is a form of testing that is used to.

Integration testing : it is the next step in the testing process. Many tested modules are combined into subsystems that were tested in this way. To verify the controlflow of all modules and exhaust all possible inputs to the software, test case data is prepared. It is also checked how to handle modules when there is no data entered in the text box. This testing strategy specifies the order in

which modules must be made available, as well as the order in which they must be written, debugged, and unit tested. Many of the modules / systems that are subjected to unit testing are combined and evaluated during integration testing.

Acceptance Checking: This testing is done at the end by the customer to show that the implemented system meets the specifications. The consumer provides multiple inputs in order to obtain the desired results.

Specification Testing: When a programme is submitted for processing in the system, it is tested to see if it does as it should and behaves as it should under different conditions or combinations. It is also reviewed to see if any overlaps occur during the processing. Goals of the Test: The testing goals are as follows....

1. Testing is the method of running a programme with the aim of identifying flaws.
2. A successful test case is one that has a high chance of uncovering a mistake.
3. A effective test is one that uncovers a mistake that has yet to be found.

7. RESULTS

7.1 Graphs

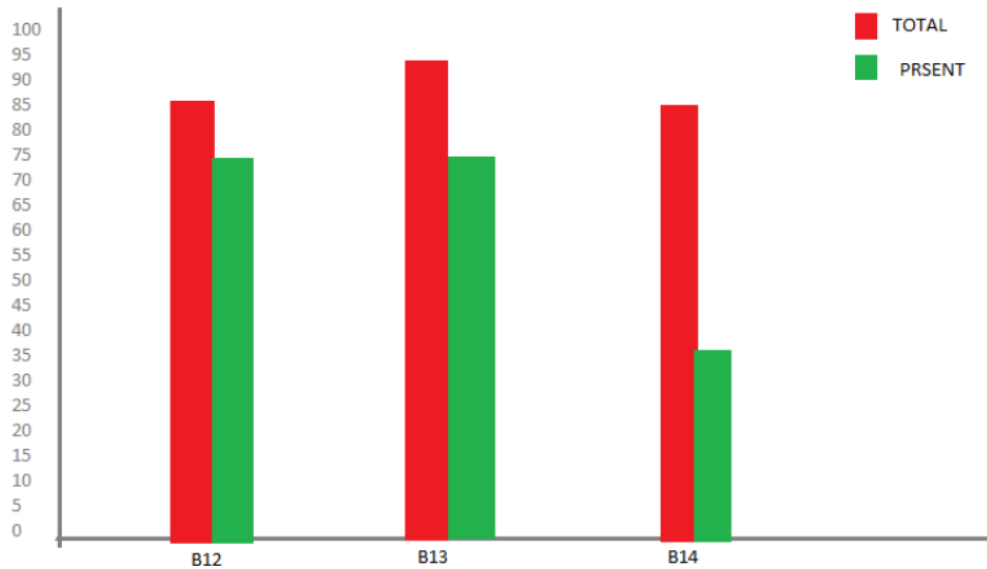


Fig 7.1.1: Graphical representation of the attendance of different classes

8. CONCLUSION

The conclusion of this project is that we wanted to make it easier for the teachers to take attendance using face-recognition. This will help in taking it faster and more accurately.

9. FUTURE SCOPE

Face recognition is one of the most used technologies and in this project we can add new application like recorder which can make it much better to prevent proxy while taking the Attendance.

We can also make it able to recognise the same student even with the face mask due to the current situation which will help it more.

10. REFERENCES

1. Lahiru Dinalankara , University of Plymouth “Face Detection & Face Recognition using open computer vision Classifies” 4th August 2017 page no:5-12
2. Rishav Chatterjee , Deloitte & Touche Llp “Face recognition system using KLT VIOLA-JONES Algorithm” April 2018 page no:7-13.
3. Cahit Gurel & Abdulkadir Erden “Design of a Face Recognition System” June 2012 page no:7-10
4. Shubhi Shriwastav & Dinesh Chandra Jain , SIRTIS , RGPV Bhopal “A Review on Face Recognition Attendance system” Volume 143-no 8,june 2016
5. Sakshi Patel ,VIT University “Face Recognition based smart attendance system using IOT” May 2018
6. Khem Puthea,Rudy Hartanto and Risanri Hidayat “A Review Paper on Attendance Marking System based on Face Recognition” Oct 2017.
7. M.Vineetha sai ,G.Varalakshmi ,G.Bala Kumar ,J.Prasad “A PROJECT REPORT ON FACE RECOGNITION SYSTEM WITH FACE DETECTION” 2013-2017.
8. Omar Abdul Rhman Salim ,Rashidad Funke Olanrewaju & Wasiu Adebayo Balogun “Class Attendance Management System Using Face Recognition” 2018
9. Sebe, N., et al. “Emotion Recognition Based on Joint Visual andAudio Cues. in 18th International Conference on Pattern Recognition “2006.
10. Ch. Vinod Kumar , Dr.K.Raja Kumar “Face Recognition Based Student Attendance System with OpenCV” Vol.08,Issue.24 Pages:4639-4643.

