# ATTENDENCE AND MASK ANALYSIS SYSTEM

**MAJOR PROJECT REPORT**

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

**BACHELOR OF TECHNOLOGY**
(COMPUTER SCIENCE AND ENGINEERING)


Submitted By:

Prabhat Kumar (1805539
Akhilesh Kumar (1805485)
Sangharsh Kumar (1905840)

Submitted To:

Dr. Hardeep Singh Kang

**Department of Computer Science and Engineering**
**Guru Nanak Dev Engineering College**
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## Abstract

This report is focused on the problem that come at each and every institute, The manual system needs more time and effort to mark attendance and if students are coming in online mode than it is more cumbersome. So automated system of attendance marking will help. so we were come with this project , Here what we did , we first of all collect the 3-4 pics with different view of student with mask or without mask and stored in our system at the time of registration and after that when student sitting in the class the high resolution camera takes the picture or video of students sitting in class and the system analyse that faces and at the same time system detect the multiple faces and mark attendance with or without mask on the basis of matched found . Here we use the multi-face detection technique which makes the system very efficient and easy method for taking attendance. It also assists teacher in their daily administration, reporting and following up tasks.

It assists the college in the following option – Attendance tracking system with mask or without mask, Result analysis system and it also track the student that they attend which which class and finally build up the Report file on the weekly basis or monthly basis on our requirement. And it also report the student parents about this that their children attending class or not .

## ACKNOWLEDGEMENT

We are highly grateful to **Dr. Sehijpal Singh,** Principal, Guru Nanak Dev Engineering College (GNDEC), Ludhiana, for providing this opportunity to carry out the major project work at making "ATTENDENCE AND MASK ANALYSIS SYSTEM USING DEEP LEARNING" using unity.

The constant guidance and encouragement received from **Dr. Parminder Singh** H.O.D. CSE department, GNDEC Ludhiana has been of great help in carrying out the project work and is acknowledged with reverential thanks.

We would like to express a deep sense of gratitude and thanks profusely to **Dr. Hardeep Singh kang**, without his wise counsel and able guidance, it would have been impossible to complete the project in this manner.

We express gratitude to other faculty member of computer science and engineering department of GNDEC for their intellectual support throughout the course of this work

Finally, we are indebted to all whosoever have contributed in this report work.

**Prabhat Kumar**

**Akhilesh Kumar**

**Sangharsh Kumar**

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# Chapter 1 INTRODUCTION

## 1.1 Introduction to Project

As the famous proverb says, Face is the index of the mind. A face-to-face interaction between human beings is considered most important and natural way to communicate. Recognition of faces and processing the data is a challenging task with very large database using low-cost desktop embedded system. With the prevalence of surveillance cameras in the Class room of schools, and colleges, we can easily detect the faces of students and mark their attendance with or without mask.

Here, we use the multi- face detection technique which help the system to detect all the faces that are present in the image and video and easily identify the particular students.

We are using computer vision technique which is a field that deals with how computer scan gain high-level understanding from digital images or videos so we can actually use this technique for the input and processing of frames for our projects.

And for detecting the faces with mask or without mask in class room we use OpenCV library for it. Where OpenCV (Open-Source Computer Vision Library) is an open-source computer vision and machine learning software library that mainly aimed at real time computer vision and has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state- of-the-art
computer vision and machine learning algorithms.

## 1.2 Objectives:

- To mark student's attendance by taking picture of multiple faces.
- . To generate report of students to check whether students using facemask or not.
- It also generates the excel sheet at the end of month which helps in analyzing the student's attendance.

# Chapter 2. Requirement Analysis And System Specification:

## 2.1 Feasibility Study

This automatic attendance marking system integrates video surveillance and face recognition algorithms into the process of attendance management. The system is implemented using a non-intrusive web camera installed at the class room, if there is any movement, camera placed at class room gets activated and image is captured. The captured image undergoes face detection and faces recognition, and extracts all faces from the acquired images. After faces have been extracted, they are compared with an existing database of student images and upon successful recognition a student attendance list is generated and saved on a database.

## 2.2Software Requirements:

OpenCV (Open-Source Computer Vision Library) is an open-source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in commercial products.
In this context we will use it as an interface between Deep Learning trained model and the video recorded by the camera using OpenCV.
NumPy: NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

These are the software needed for this software to run...

a. Python 3.6 or higher
b. Visual Studio code 16 2019 (C/C++ compiler)
c. Cmake 3.x or higher
d. OpenCV v3 or higher
e. matplotlib latest
f. OpenCV-python latest
g. NumPy any version

# Chapter 3. Principles and Methodology of Image Recognition System.

## 3.1 Enrolment of Students Faces:

First step in every biometric system is the enrolment of a person using general data like their name and their unique biometric features as templates.

Image is captured from the camera and then student face is detected. After the face is detected, that face is cropped and then it is enhanced using histogram equalization and noise filtering so that exact features can be extracted. These unique features are then stored in the face database with certain id of that person

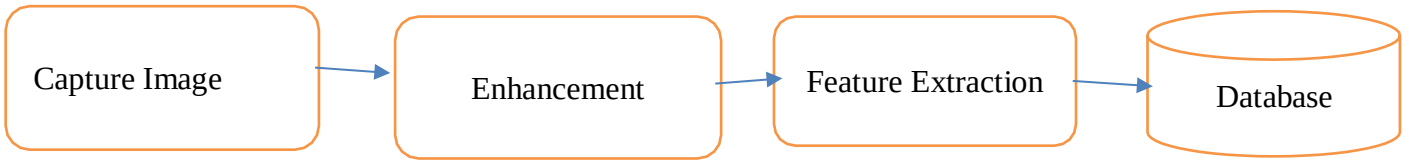


Fig: - 3.1 (Enrolment of Students Faces)

## 3.2 Capturing the Image of Students:

Camera attached in front of classroom that is continuously capturing images of students, detect the faces in images and compare the detected faces with the database and mark the attendance. In order to avoid the false detection, we are using the skin classification technique. Using this technique enhance the efficiency and accuracy of the detection process. In this process first the skin is classified and then only skin pixels remains and all other pixels in the image are set to black, this greatly enhance the accuracy of face detection process. How capture works

In the first step image is captured from the camera. There are illumination effects in the captured image because of different lighting conditions and some noise which is to be removed before going to the next steps. Histogram Normalization is used for contrast enhancement in the spatial domain. Median filter is used for removal of noise in the image. There are other techniques like FFT and low pass filter for noise removal and smoothing of the images but Median filter gives good results.

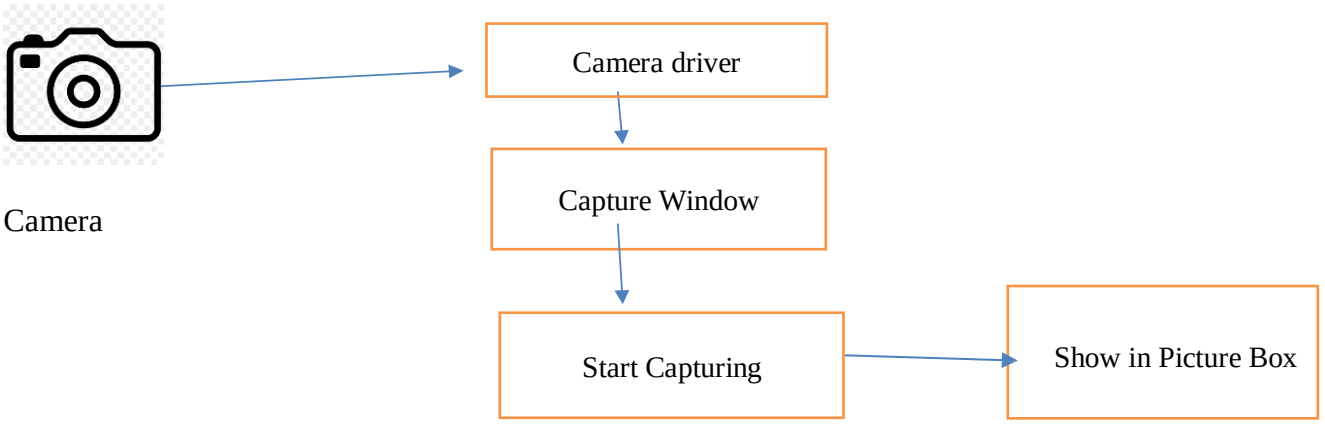


Fig: -3.2 (Capturing the Image of Students)

## 3.3 Face Localization and Face Detection:

Face localization aims to determine the image position of a single face. This is a simplified detection problem with the assumption than an input image consists only one face [6] . The procedure below explains the proposed face localization technique.

3.2.1) Image Conversion The input image is first converted into the gray-scale image. The gray-scale image is then converted into its binary form.

3.2.2) Dilation The dilation process removes the noise encountered in the binary image. Hence, the dilation operation is performed on the binary image obtained. The gray-scale image is then converted into its binary form. Then, the dilated image is mapped on to the gray scale image.

3.2.3) Image Cropping The mapped image is converted into binary image and the required face region is cropped from the binary image and is saved to the database. The execution sequence of image cropping is as follows: -

The Feature Extraction is carried out by taking the features such as eyes, mouth, nose, ears etc. In this paper, the two features, eyes and mouth are taken into consideration


Fig: - 3.3(a) (Feature Extraction is carried by all the view points on face)

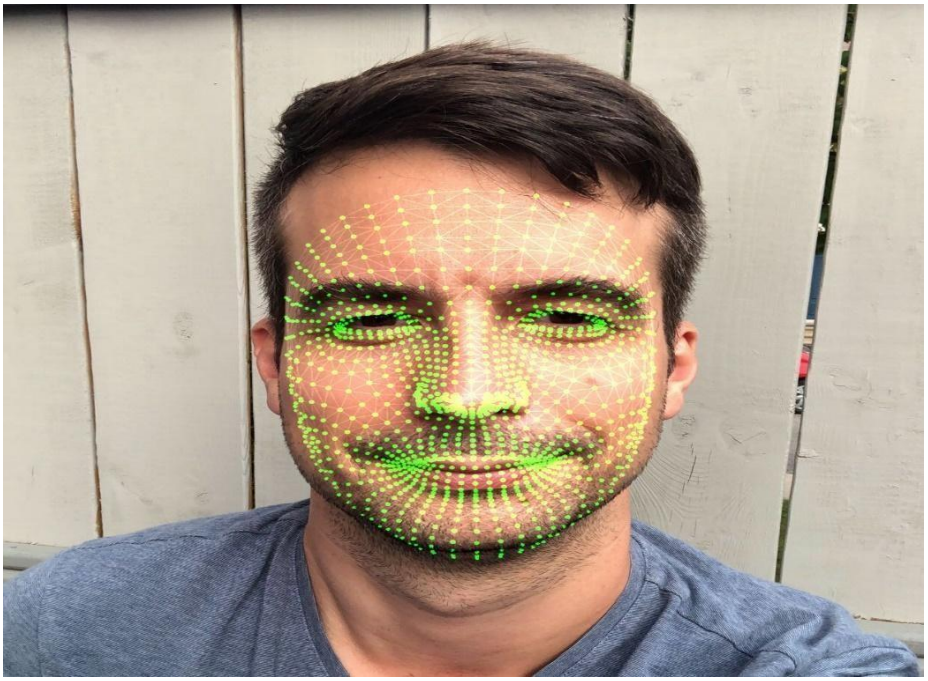

Fig: - 3.3(b)(Feature Extraction is carried by all the view points on face)

# Chapter 4. Datasets (used for model Training):

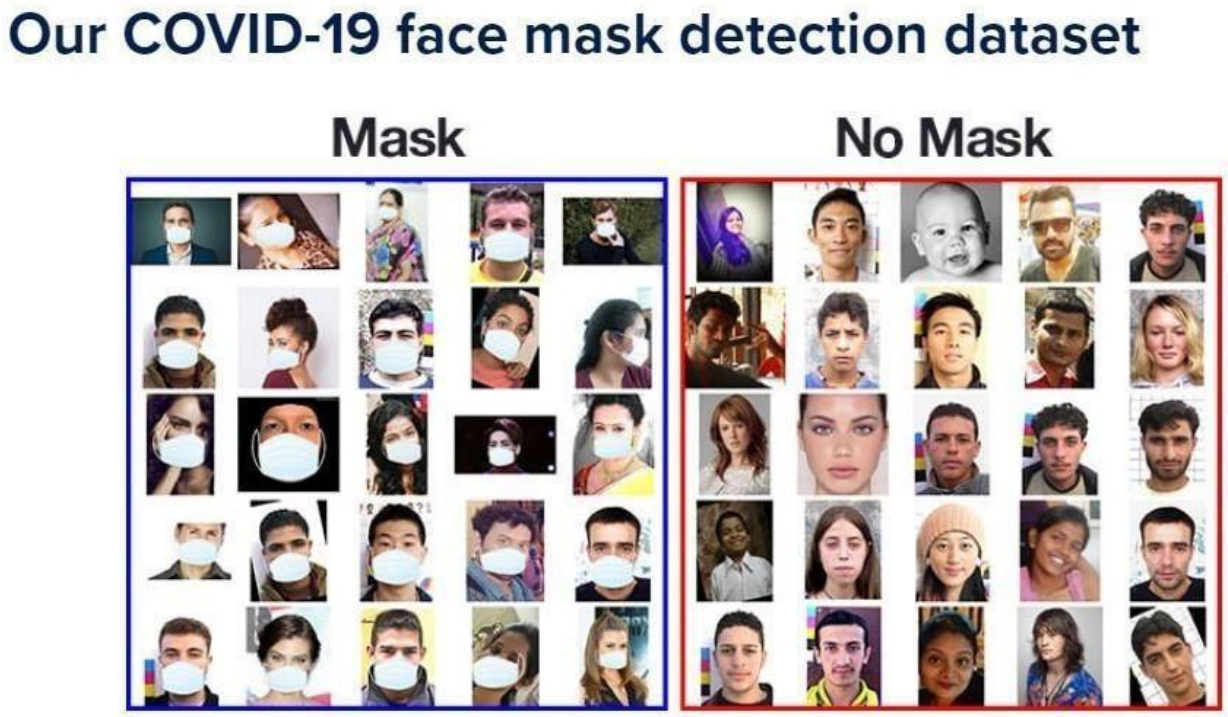


Fig: - 4.1 (Datasets for training model)

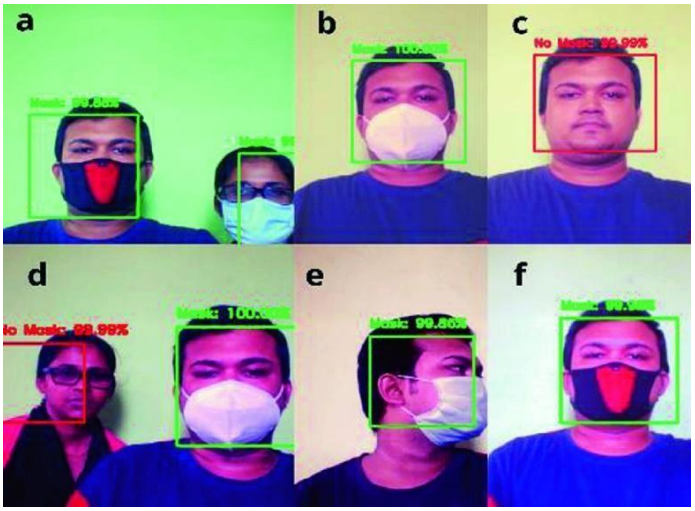


Fig: - 4.2 (Datasets for model training)

# Chapter 5. DFD's (Data Flow Diagram):

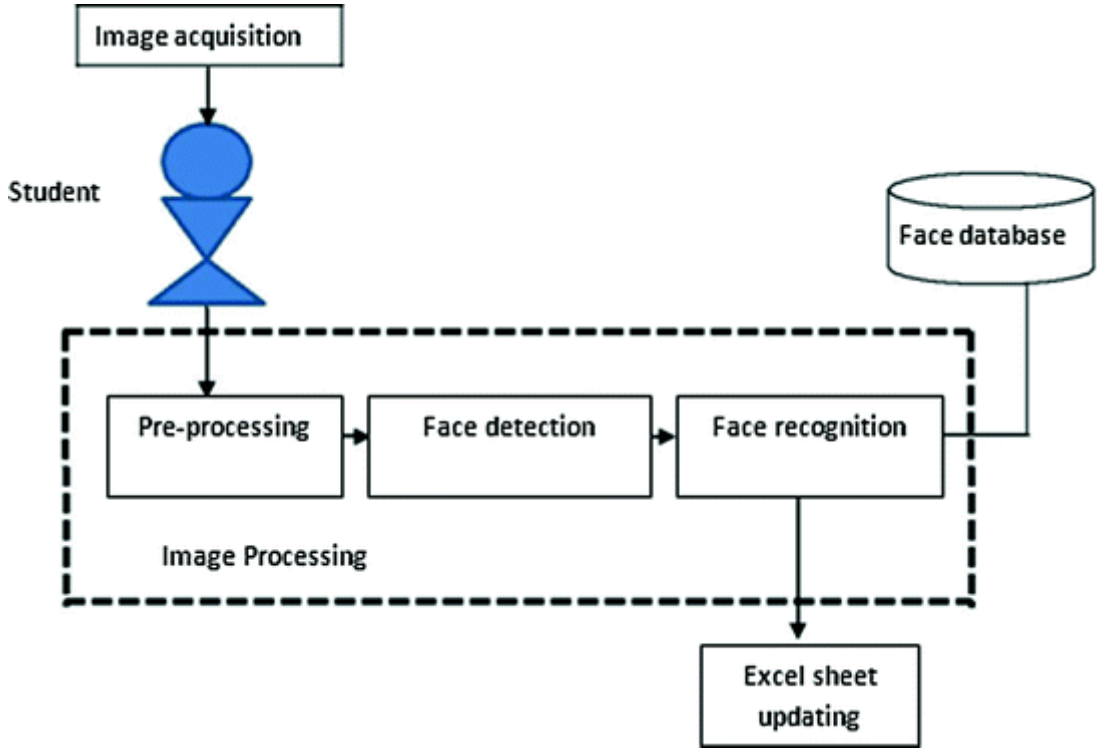


Fig: - 5.1 (Data Flow Diagram)

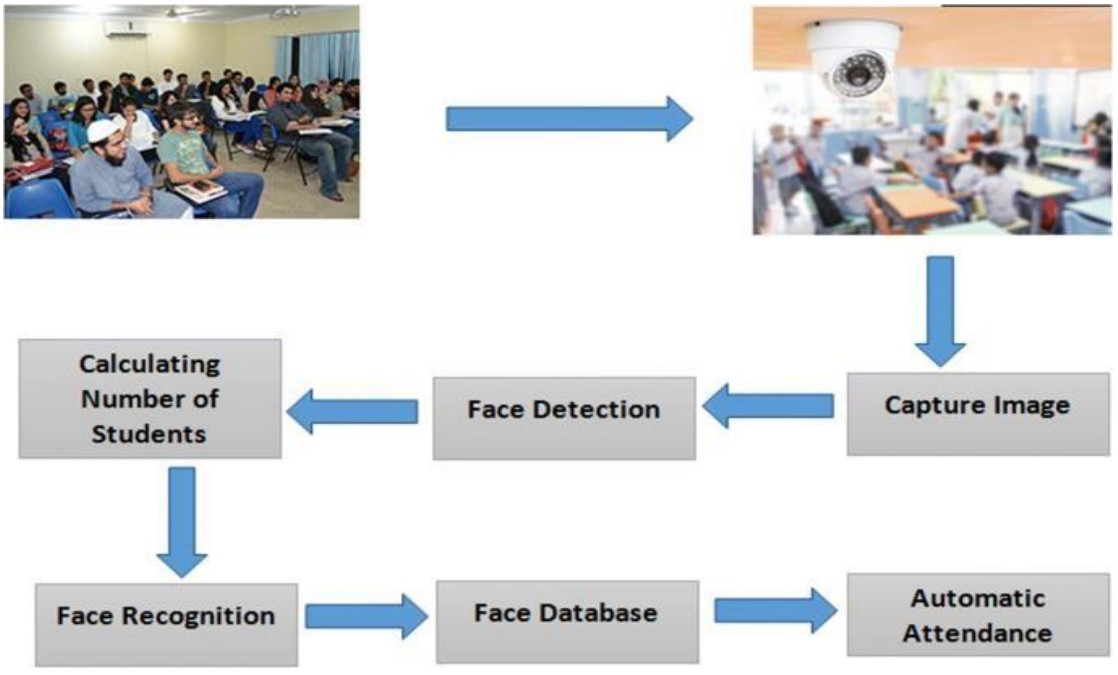


Fig: - 5.2 (Data Flow Diagram)

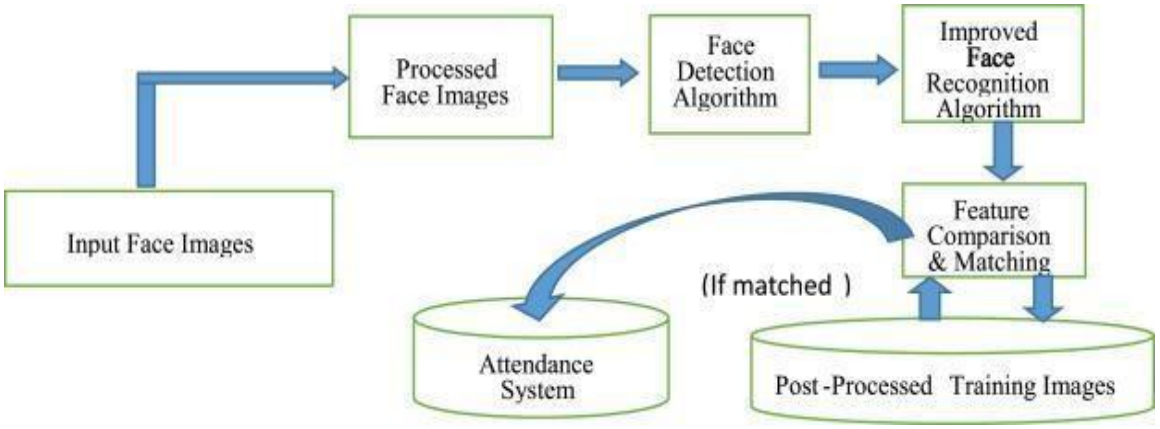


Fig: - 5.3 (Data Flow Diagram)

# Chapter 6. Results and Discussions:


Fig: - 6.1 (The snapshot of output with no mask)


Fig: - 6.2 (The snapshot of output with mask)

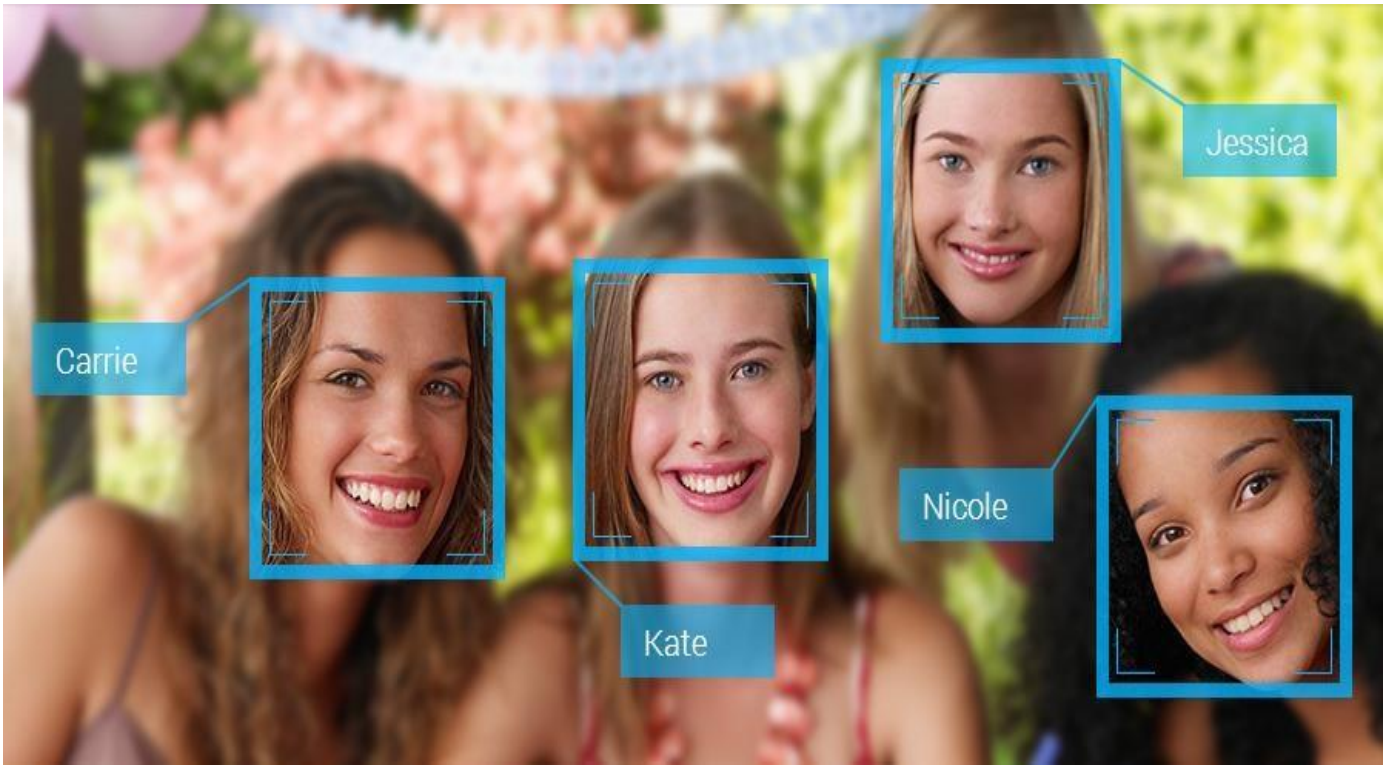


Fig: - 6.3 (The snapshot of output with no mask with name)[Representative]

# Chapter7: Conclusion and Future Scope:

## 7.1 Conclusion:

Based on the requirements of an automated attendance system this serves as a whole system for managing attendances in schools and colleges. It presents a design and framework for taking attendance and thereby making the troublesome process of taking and compiling attendance simple and efficient. So this prototype is not only cheaper, efficient, having low power design, upgraded for any other type of data acquisition system, easy to use but also not having any troublesome process of installation like in thumb biometric devices which includes wall mounting and in person attending that place one by one.

## 7.2 Future Scope:

Further improvement can be undertaken on this project for better enhancement: Multiple webcams can be integrated into the system to monitor the person who is present, thus avoiding the problem of a person scanning in for another person by single camera. The attendance system can be enhanced to thumb biometric technology which is a full proof technique that captures a person's unique biological or physical features and prevents unauthorized activities. This can be also integrated with IOT devices.

# Chapter 8. REFERENCES:


1. Python https://python.org/
2. TensorFlow https://tensorflow.org/
3. Mediapipe https://google.github.io/mediapipe/
4. OpenCv https://opencv.org/