

KLE Society's
KLE Technological University



**A course Project Report
On**

ATTENDANCE SYSTEM(VIDEO)
submitted in partial fulfillment of the requirement for the degree of

**Bachelor of Engineering
In
Computer Science and Engineering**

Submitted By

SWAPNIL KORE	01FE18BCS098
L ANUSHA	01FE18BCS103
LOKESH GOYAL	01FE18BCS105
MADHURA SHANBHAG	01FE18BCS113

Under the guidance of
Mr. Uday Kulkarni
Mr. Sunil Gurlahosur

SCHOOL OF COMPUTER SCIENCE & ENGINEERING

HUBLI-580 031 (India).
Academic year 2020-21
KLE Society's
KLE Technological University

2020 - 2021



SCHOOL OF COMPUTER SCIENCE & ENGINEERING

CERTIFICATE

This is to certify that the course Project entitled **Attendance System (Video)** is a bonafide work carried out by the student team Mr. Swapnil Kore-01FE18BCS098, Ms. L Anusha-01FE18BCS103, Mr. Lokesh Goyal-01FE18BCS105, Ms. Madhura Shanbhag - 01FE18BCS108, in partial fulfillment of completion of Fifth semester B. E. in Computer Science and Engineering during the year 2020 – 2021. The project report has been approved as it satisfies the academic requirement with respect to the project work prescribed for the above said programme.

**Guides
SoCSE**

Mr. Uday Kulkarni

**Mr. Sunil Gurlahosur
Meena S. M**

Head,

Dr.

ACKNOWLEDGEMENTS

The completion of this project gives us much pleasure.

We express our sincere thanks to Vice Chancellor Dr. Ashok. S. Shettar.

We pay deep sense of gratitude to Dr. Meena S. M. (HOD) of School of Computer Science & Engineering for encouraging us and for her inspiration.

Without the active guidance, help, cooperation, encouragement we would not have made head way in the minor project, we would like to express our sincere gratitude to our project guides Mr. Uday Kulkarni and Mr. Sunil Gurlahosur for their guidance and constant supervision as well as for providing information regarding the project.

We also thank all our faculty members for advising us and introducing us the methodology of work in the course which has helped us in applying the same in the project. Also the links mentioned in the references helped us in understanding the implemented techniques and their advantages and disadvantages which has been further used to build an efficient consensus algorithm.

We would also like to thank our esteemed KLE Technological University for providing us such an opportunity for gaining knowledge and learning new things. We would like to thank our supporting staff for providing us basic needs to complete our project.

ABSTRACT

Attendance marking plays a crucial role in every workplace. The conventional method of attendance system includes marking attendance using pen and paper. This method has certain disadvantages like it is time consuming and also there are chances of proxy attendances. To overcome this, we are proposing a more secure and fast system that uses the face recognition approach to mark attendance of students. This approach not only improves accuracy but also makes the process faster.

This includes both face detection and face recognition algorithms to mark the attendance of students. This works on the principle of capturing student's face in the image individually.

TABLE OF CONTENTS

Sl.no	Topics	Page no.
1	Problem Statement	6
2	Objectives	6
3	Information about Dataset	6
4	Approach	7
5	Implementation	7
6	Results	11
7	Conclusion	12
8	References	13

PROBLEM STATEMENT

Marking the attendance of students using face detection and face recognition and developing a system that resolves the problems in the process of maintaining attendance records manually using papers. This is based on face recognition to maintain

the attendance record of students, where one uses video consisting of set of students while testing.

OVERVIEW OF THE PROJECT

Attendance system can be seen as one of the most important system in any organization. Traditional system of marking attendance consumes a lot of time and at the same time, it causes problems like proxy attendance. If we want to refer the record after some days, it takes time to scan through each day's attendance. The attendance system with video is designed so that one can quickly take attendance and is less prone to errors. Attendance system video is the system based on face detection and face recognition algorithms, through which we can detect faces of students based on the unique features identified in the face and hence mark the attendance.

OBJECTIVES

- 1) To develop a system can that can detect student's face in a video
- 2) To store the attendance in csv file

MOTIVATION

- 1) This challenge encourages us to build how you can build your own facial recognition system in Python using opencv library.
- 2) This challenge helps us enhance our knowledge of computer vision and the main motivation behind this is to save time and maintain accuracy in the attendance system

INFORMATION ABOUT THE DATASET

The dataset consists of 2889 images (3.5GB) in different angles.

A sample dataset is shown here.



APPROACH

This consists of series of several problems like,

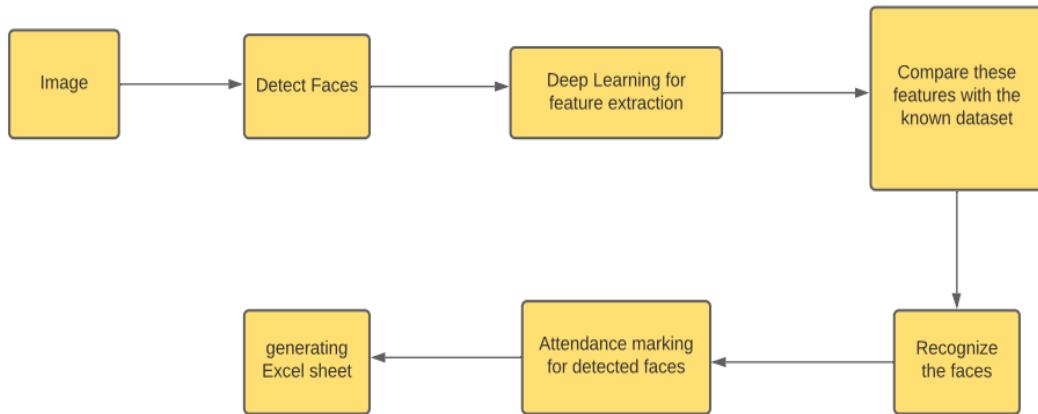
1. Finding all the faces in the picture.

2. Focusing on each face and making sure that even if a face is found in different direction, it should still be the same person.
3. Selecting unique features of the face for identification.
4. Comparing the unique features of the given face with all the faces to determine the person's name.

Given an input dataset, we need to use a suitable algorithm for face detection and face recognition and finally draw a bounding box to the facial region and display the correct name and time. Store the attendance records finally in excel sheet for reference.

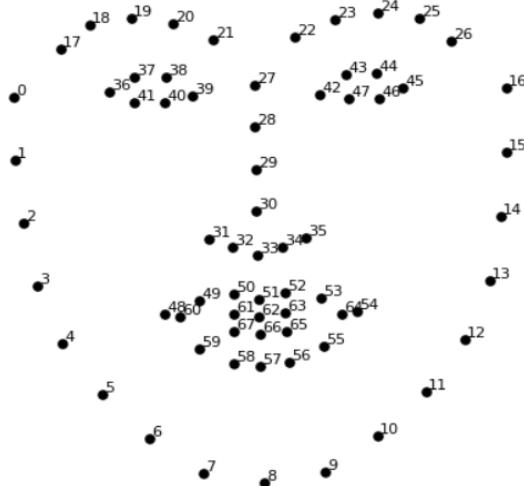
IMPLEMENTATION

1) ARCHITECTURE



2) METHODOLOGY

- **Image acquisition:** The obtained images of students are given as an input to the system.
- **Creating dataset:** Before the recognition, the dataset is created to train the system, wherein we store all the images in one folder for the ease of use. For better accuracy, more than 60 images of each student is taken.
- 128-d facial features are computed using deep learning and stored in a proper format.
- **Face Detection and Extraction:** Face detection algorithm applies to identify the human faces in that image, We can detect faces in images and the location using HOG method.
- **Face positioning:**



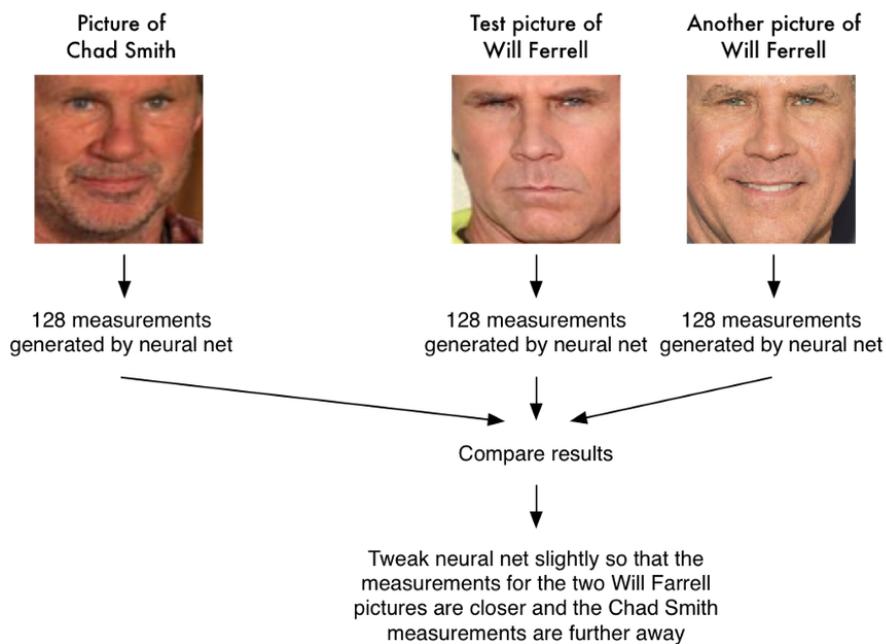
To detect landmarks of faces and to position the image.

- **Face Encoding:** Extract the unique facial feature for each image. Basically whenever we get the position of the face, the 128 key facial point are extracted and these 128-d facial points are stored in data file.
- **Face matching:** This is used to compute the Euclidean distance between face in image and all faces in the dataset.

3) ALGORITHMS USED

HOG(Histogram Oriented Gradient) for face detection:

A single 'triplet' training step:

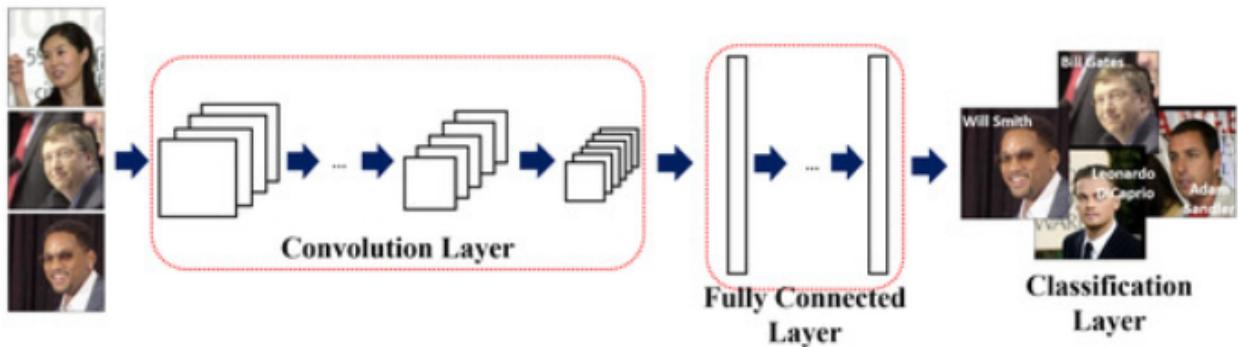


Many factors determine the method of face recognition such as pattern, size, posture, occlusion, and lighting. To find faces in an image, we'll start by making our image black and white because we don't need color data to find faces. Then we'll look at every single pixel in our image one at a time. For every single pixel, we want to look at the pixels that directly surrounding it. Our goal is to figure out how dark the current pixel is compared to the pixels directly surrounding it. Then we want to draw an arrow showing in which direction the image is getting darker. If you repeat that process for every single pixel in the image, you end up with every pixel being replaced by an arrow. These arrows are called gradients and they show the flow from light to dark across the entire image. If we analyze pixels directly, really dark images and really light images of the same person will have totally different pixel values. But by only considering the direction that brightness changes, both really dark images and really bright images will end up with the same exact representation.

1. Encode a picture using the HOG algorithm to create a simplified version of the image. Using this simplified image, find the part of the image that most looks like a generic HOG encoding of a face.
2. Figure out the pose of the face by finding the main landmarks in the face. Once after finding those landmarks, use them to warp the image so that the eyes and mouth are centered.
3. Pass the centered face image through a neural network that knows how to measure features of the face. Save those 128 measurements.
4. Looking at all the faces that have measured in the past, we see which person has the closest measurements to our face's measurements.

CNN(Convolutional Neural Networks)

When it comes to Computer Vision, its goal is to train the machines to view and recognize the world as humans do. Convolutional Neural Network (CNNs or ConvNets), which is a special type of feed-forward network which is used mostly to analyze visual imagery. Convolutional Neural Networks are very similar to ordinary neural networks but are made up of neurons that have learnable weights and biases.

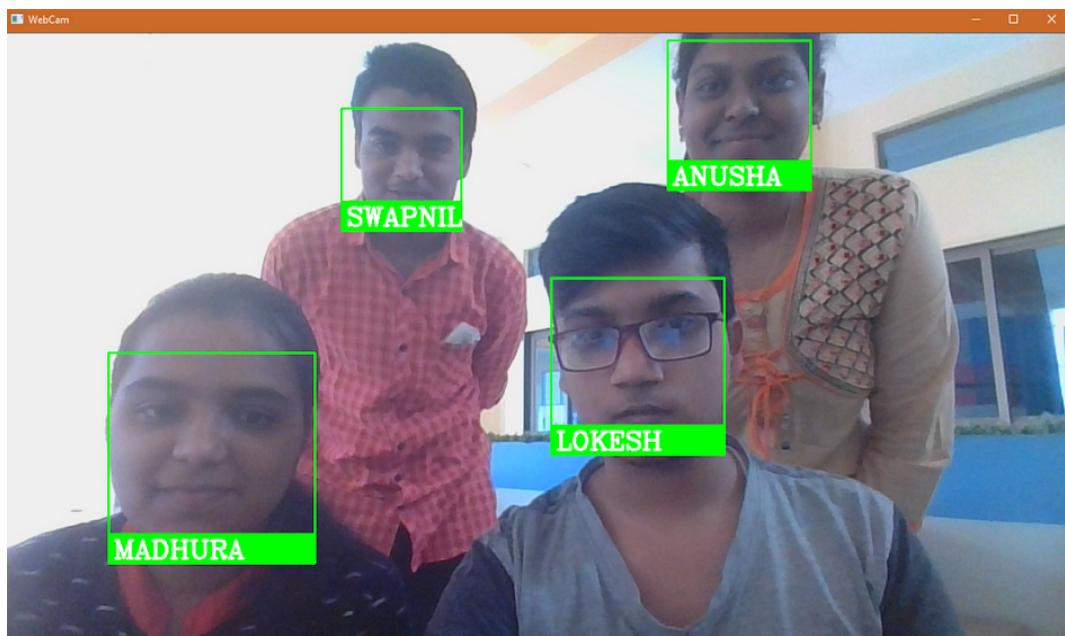


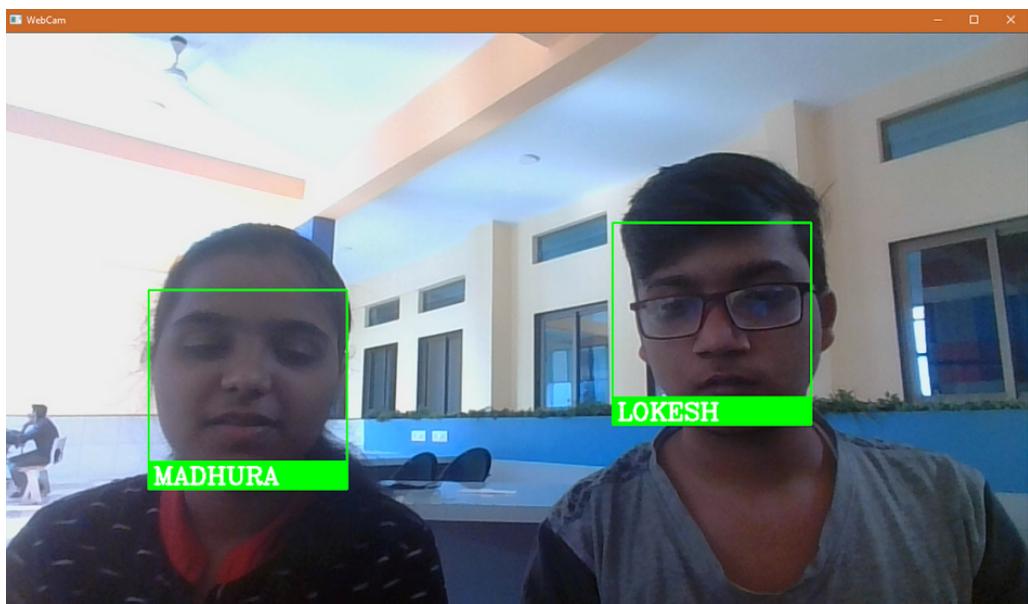
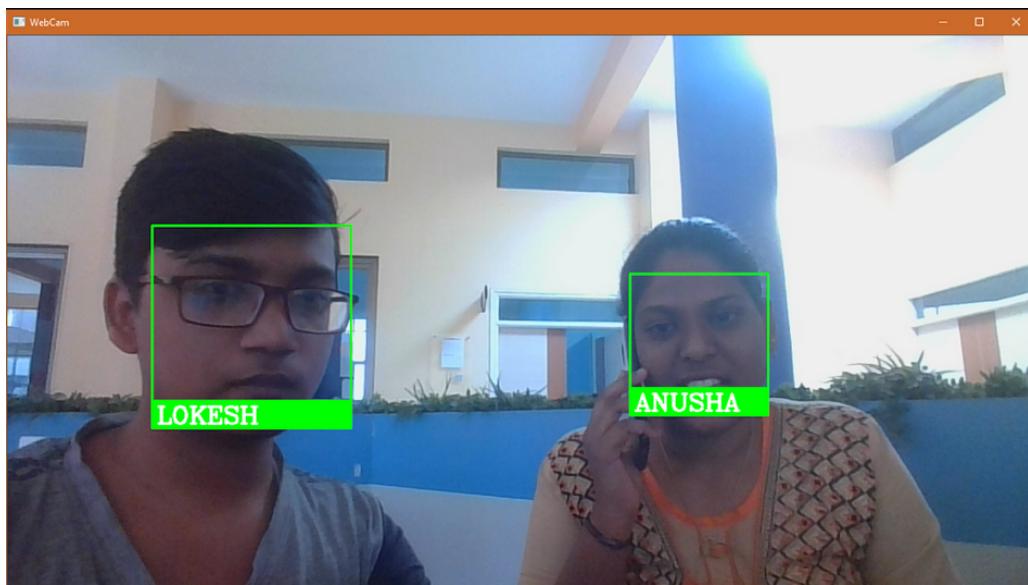
In our application, we are using the following libraries :

1. OpenCV, which supports a lot of algorithms related to Computer Vision and Machine Learning and not to mention it's built in Deep Neural Network which we will be using in our application.
2. Numpy, which is a package used for scientific computing with python.

3. OS, which provides a portable way of using operating system dependent functionality

RESULTS





CONCLUSION

Face recognition is an essential feature of Image processing owing to its excellence in many areas. The advanced face recognition technology helps in improving the performance in attendance of daily activities and analysis with reduced human intervention.

REFERENCES

- <https://towardsdatascience.com/face-recognition-how-lbph-works-90ec258c3d6b>
- https://www.youtube.com/watch?v=sz25xxF_AVE
- <https://medium.com/@ageitgey/machine-learning-is-fun-part-4-modern-face-recognition-with-deep-learning-c3cffc121d78>
- <https://www.ijert.org/smart-attendance-system-using-opencv-based-on-facial-recognition>
- <https://www.mygreatlearning.com/blog/face-recognition/>