

FACE IDENTIFICATION FOR ATTENDANCE USING MACHINE LEARNING

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Abstract - We Can Identify a Person uniquely by Looking at their Face or by listening to their Voice. So we are able to use Face for Biometric System. The daily routine task in any School, College or Institute is marking attendance. In old attendance system teacher calls every student roll no wise and marks attendance in a book or paper which we are seeing from our school days. These techniques are time consuming. In this Model, the Open Computer Vision based face Identification approach has been used. This model has Webcam that captures student images(input images), an algorithm for detecting faces from an input images, encoding and identifying the faces, marking the attendance in a spreadsheet(CSV file). After marking Attendance, System will play music clip with no of presenties. The features are extracted using LBP algorithm which is implemented by Open CV library. To make User Interface for this Model we use Tkinter Library in Python.

Key Words: LBPH, Open CV, Webcam, Face identification, Attendance, CSV File, Tkinter.

1.INTRODUCTION

Marking Attendance is every day's task in school, colleges, institutions or any other organizations to observe the performance of the students or employees. All of these colleges or schools uses mostly traditional way of marking attendance i.e. by using normal paper based system and some organizations are using fingerprint based attendance system. There are so many disadvantages than the advantages in these old techniques some of these disadvantages are time consuming, difficult to analyse the student details in paper based system, many errors would be there because of human fault. Fingerprint based systems are also have many disadvantages as it is difficult to scan fingers perfectly for every time and it will not for physically disabled persons (mainly fingers). To overcome these problems we need best solution that solution is 'Machine Learning Based Face.

2.SYSTEM ANALYSIS

2.1.EXISTING SYSTEMS

Based on fingerprint: Using a Fingerprint attendance system, either the fingerprint device needs to be built with the student's fingerprint earlier, or the students need to record the fingerprint. Then the configured device to ensure their attendance for every day.

ADVANTAGES:

- Fingerprint-based recognition system is difficult to crack.

DISADVANTAGES:

- Handicapped or Physically disabled people may experience issues.
- Difficult to recognize wet fingers.
- Spread of Covid19.
- This model is Time Consuming.

2.2. PROPOSED SYSTEM

- The task of the proposed system is to capture the face of each student along with their Roll number, Name and to store it in the database for their attendance.
- There is no need for the teacher to manually take attendance in the class.
- system takes photos and through further processing steps the face is being recognized and the attendance database is updated in Spreadsheet.

ADVANTAGES:

- Attendance for all the students is marked at a time.
- This model has user interface.
- Attendance data will be stored in excel sheet with exact date and time.

LIMITATIONS:

- This system can't be recognized in poor light conditions.

2.3.SYSTEM SPECIFICATIONS

HARDWARE SYSTEM CONFIGURATION

- Processor - x86 running at 1GHz or better
- RAM - 4GB(min)
- Hard Disk - 50GB
- Fingerprint Scanner - Yes

SOFTWARE SYSTEM CONFIGURATION

- Operating System - Windows 7/8/10

- Programming Language - Java
- Database - Hard Disk/SSD

3.SYSTEM ARCHITECTURE

We can see the system architecture diagram below which has a Graphical User Interface that can be managed by the faculty. To make this model work, first of all, every student needs to register by providing their image samples, ID, and Name. This can be done when we press the "Provide Image Samples" Button It will open a camera and captures the sample images of the student then it will be stored in a database which you can see clearly in the Architecture Diagram.

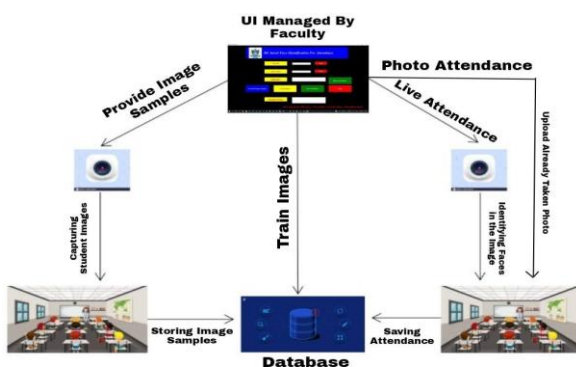


Fig 1 : System Architecture Diagram

After storing student image samples notification is displayed in Graphical User Interface saying "Images are Saved". After seeing this message we need to click on the "Train Image" button, It will train the sample images and will display "Images are Trained" once the images are really trained. After training images for all the student's faculty can make attendance by simply pressing the "Live Attendance" button. This will open a camera as we can see in the architecture diagram also. The camera will capture a video until the faculty press the 'Q' key on the keyboard. It will identify the students in different frames of the video. If student data is found in the database it will show his or her ID and name or else it will simply show unknown. If faces are known then they will get attendance. The attendance data will be stored in the CSV file with exam date and time(the time when faculty presses the 'Q' key). Faculty can make attendance by using another way by pressing the "Photo Attendance" Button where faculty needs to upload the photo of the students in a classroom. It will detect the faces & if they are known faces then they will get attendance. And then attendance data will be stored in the database which you can see in the architecture.

3.1. UML DIAGRAM

DEPLOYMENT DIAGRAM

The Deployment diagram is a run-time processing node. Each node is interlinked with another node. Student and faculty node is linked with the system to take, train, and to track the images. This system will collect the data from the database. Database will match to the existing data.

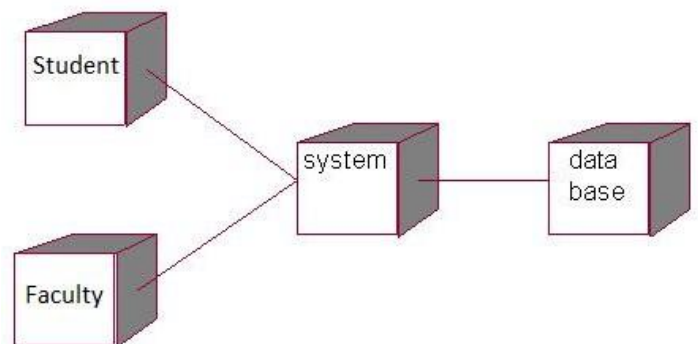


Fig 2 : Deployment Diagram

4.SYSTEM IMPLEMENTATION

4.1.TECHNOLOGIES USED

4.1.1.FACE DETECTION

The main aim of this step is to find whether the human faces are there in a given input picture, and what is the position or situation of these faces. These faces are detected by using Haar cascade frontal face module.

4.1.2.FACE IDENTIFICATION

Face Identification includes face detection also. For automatic Identification, we need all student face databases. Many pictures are taken of each student and their data like ID or roll no and name are stored in the database. So based on their data it will identify a student.

4.2.ALGORITHM

There are many algorithms used for face detection and recognition. Out of them, LBPH is the best algorithm.

LBPH is a popular technique used for image or face representation and classification. It has so many applications like facial expression recognition, face detection, face identification, Remote sensing, object detection systems, etc... This algorithm uses 3 X 3 Window from the image and we will extract an LBP code. This algorithm needs grayscale

pictures for managing the training part. LBPH algorithm in comparison to different algorithms is not a holistic approach.

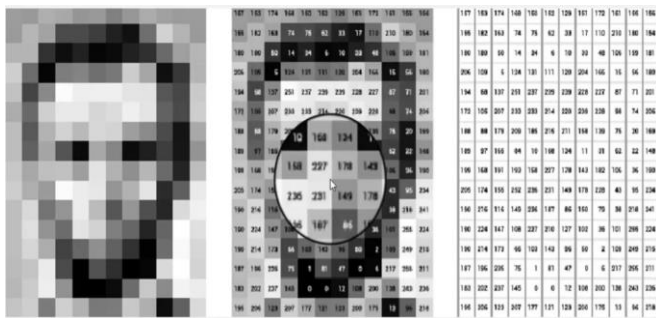


Fig 3 : Working of LBPH Algorithm

4.3.SOFTWARE REQUIREMENTS

Tkinter, OpenCV, Pandas, Visual Studio One, WPS Spreadsheets.

5.EXPERIMENTAL RESULTS

Open the python file where our code is present, in visual studio code. After opening it the code will look like this. To run this code we need to click on the Run Code button which is shown in the figure.

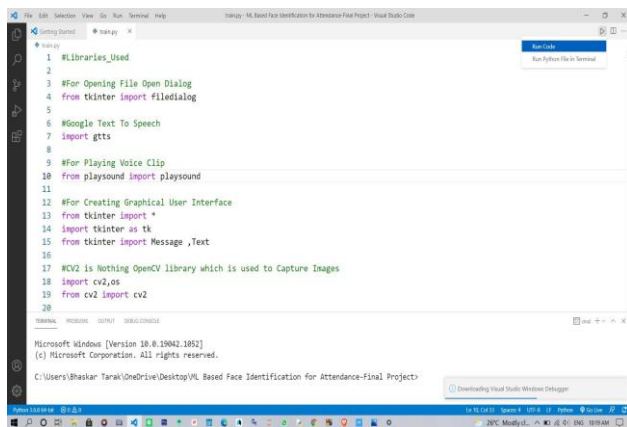


Fig 4 : Running Code

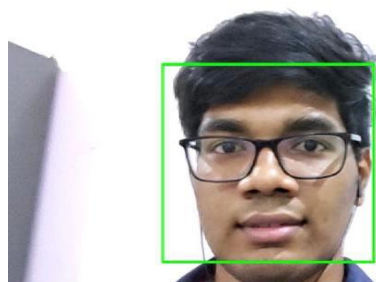


Fig 5 : Recognising the face

After Identifying the face. It will give attendance with an exact date & Time (a time when the user presses the 'Q' key) and Attendance will be registered in the Excel sheet below.

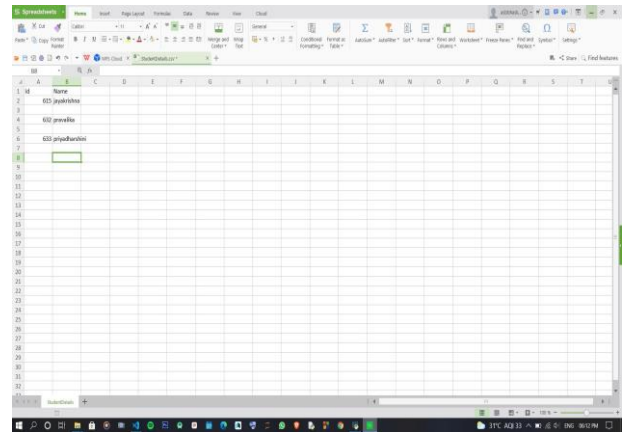


Fig 6 : Student details

6.FUTURE SCOPE

- Government authorities can use it to identify people during visa criteria, as the safety standard is high.
- Face identification requires the least amount of than any biometric authentication.
- Face detection devices are being implemented for airport protection.
- Many Companies will adopt this system, as the time taken for this process is minimal.
- Educational Institutes will adopt this system, as already a school in Sweden utilizes FRT(Face Recognition Technology) to call participation in class.

7. CONCLUSION

We have seen a traditional attendance system that has more disadvantages than advantages. The Machine learning-based face identification Attendance has also some minor disadvantages but compared to the traditional method this gives the best results and saves a lot of valuable time for faculty as well as students. It just requires 5secs to mark attendance. In the future, It will surely be implemented in most of the schools or colleges because of its advantages. We can analyze the student's attendance performance very easily. Therefore 'Machine learning-based face identification Attendance' is the best solution for the problems of traditional attendance system.

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BIOGRAPHIES

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