IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 7.39 ⁜ Vol. 11, Issue 8, August 2022

DOI: 10.17148/IJARCCE.2022.11804

A Machine Learning Inspired Attendance Management System through Face Recognition

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Abstract: Traditional attendance systems using pen and paper are time consuming, so in modern world new attendance systems are introduced which are fast and also accurate. One of such attendance systems is using Face Recognition. Currently there are two types of Face Recognition viz Using manual method and Automatic method. We have created manual method for increasing accuracy. In this Attendance System the student will be registered first then he can use the system to mark his attendance. The whole system has been created using python only using Premade module OPEN CV which is a very powerful image processing module based on machine learning algorithm.

Keywords: Machine Learning, Face Recognition, Attendance System.

I. INTRODUCTION

In this project we have implemented the automated attendance system using 'NumPy' and 'PYTHON'. We have projected our ideas to implement an "Automated Attendance System Based on Face Recognition". The application includes face identification, which saves time as well as being purely software based it can be flagged as eco-friendly as it reduces the use of paper. This system also eliminates the chances of fake attendance because of the face being used as a biometric for authentication. Hence, this system can be implemented in a field where attendance plays an important role. The proposed system is designed in NumPy platform supported with a script of PYTHON as well as OPEN CV database. The algorithm used in the system is based on image comparison on the basis of the encoded values of the face from the image from database with the image recorded by the system in run time. The system has output in the form of excel sheet

The Face Recognition System utilize facial recognition to mark the attendance of a student. It takes image and extract 128 different special characteristic which will be save in form of matrix form in .yml file format. Using OPEN CV module which is based on machine learning algorithm we match 2-D image to saved matrix format. This project aims to automate the traditional attendance system where the attendance is marked manually. It also enables an organization to maintain its records like in-time, out time, break time and attendance digitally. Digitalization of the system would also help in better visualization of the data using graphs to display the no. of employees present today, total work hours of each employee and their break time. Its added features serve as an efficient upgrade and replacement over the traditional attendance system. Fig 1 shows the representation that how unique character extracted from images.

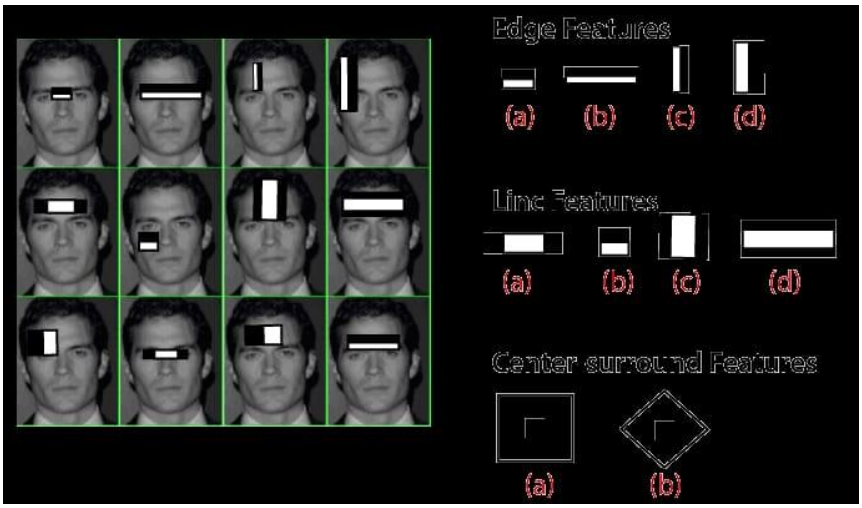

Fig 1: Representation how unique character extracted from image

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As the above picture illustrate, OPEN CV which use Dlib's HOG facial detection base on machine learning try to find unique character from image and convert this into matrix form (128 different characters) and store in csv file. We use NumPy for fast creating and accessing matrix.

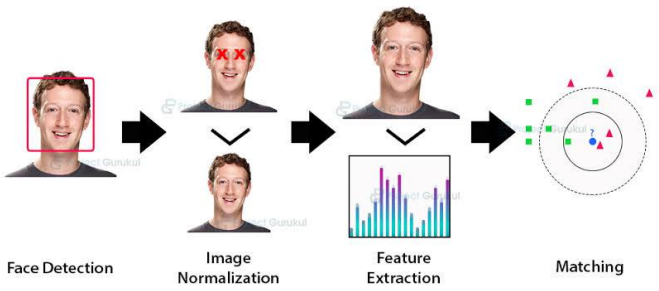

Fig 2: Show how images are matches with existing data

In above picture it is shown how the image is match with existing data. First it takes picture of the student and then Normalize it after that unique character extracted form images and converted into matrix and then matches with existing data.

II. METHODOLOGY

For taking attendance you have to first input your information and picture so that it can match your image at the time of attendance.

The student or employ can perform following functions:

- Register new student.
- Add photo
- Train images
- Mark attendance
- View attendance report.

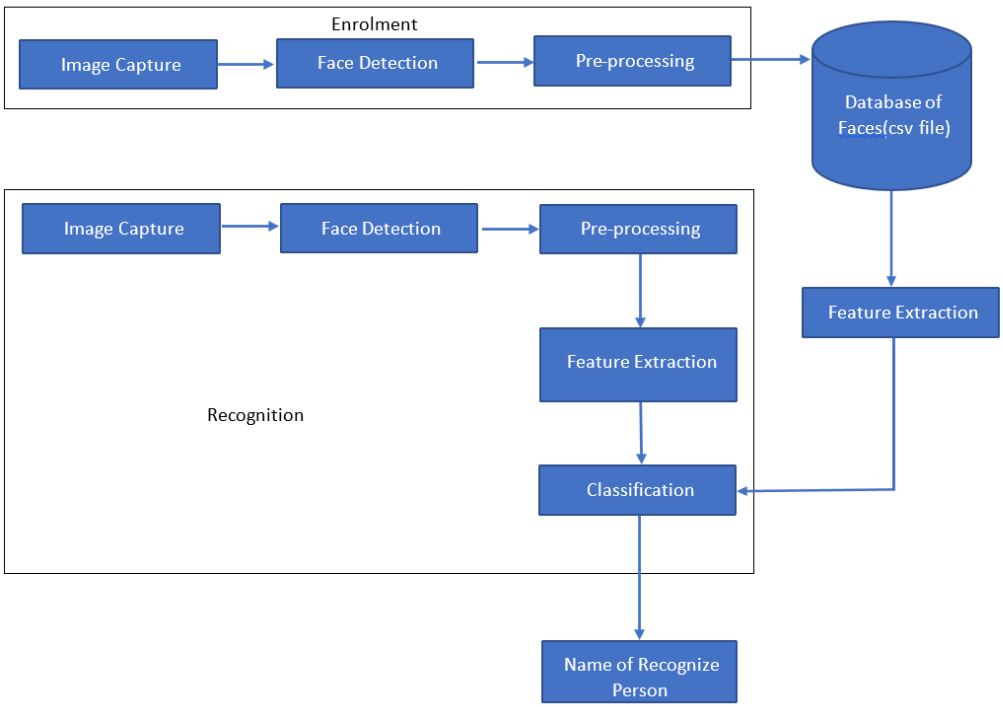

Fig. 3 : Flowchart of working of attendance system

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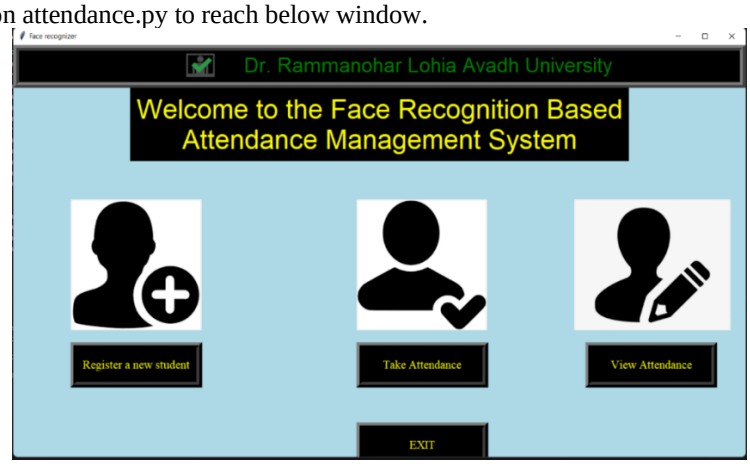
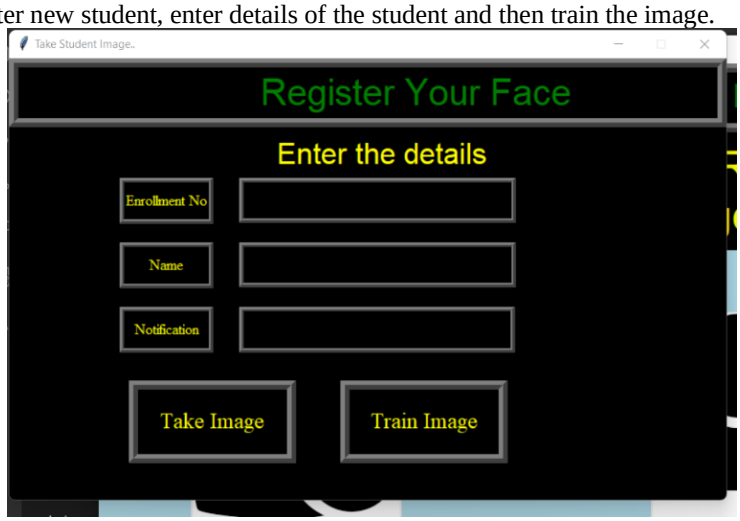
This is the logical structure which represent how the attendance.py work. This project fully based on python. Program start with attendance.py and end at exit button in between these two there are three option which are Register new student, take attendance and View attendance.

III. WORKING OF THE PROJECT

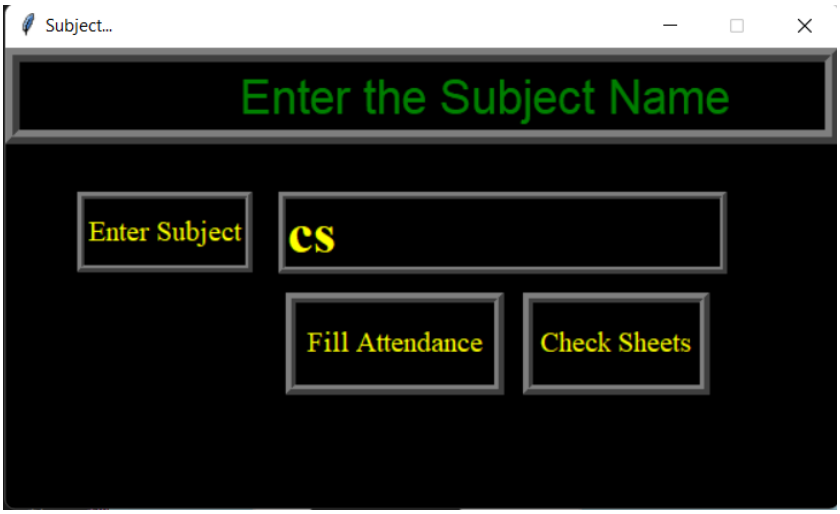
STEP 1 : Double click on attendance.py to reach below window.



STEP 2 : Click on Register new student, enter details of the student and then train the image.



STEP 3 : For marking attendance click on Take attendance and fill which subject you want the mark the attendance.



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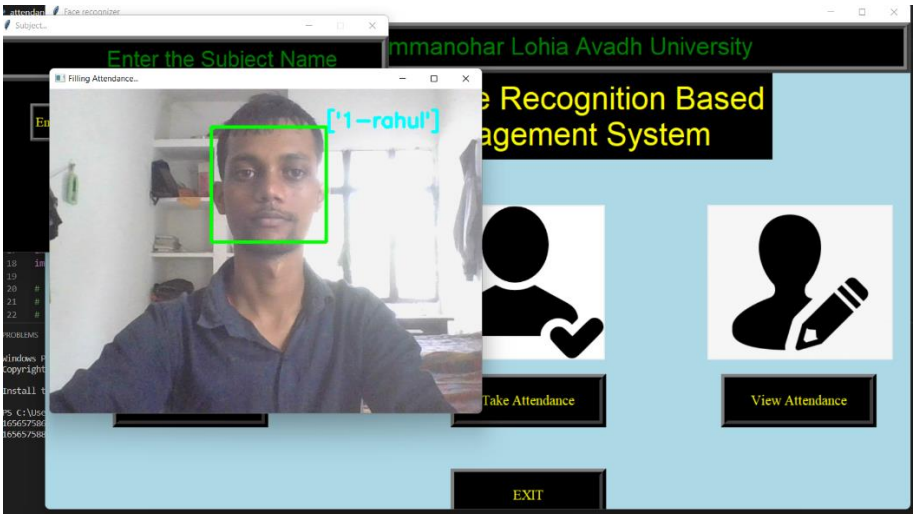
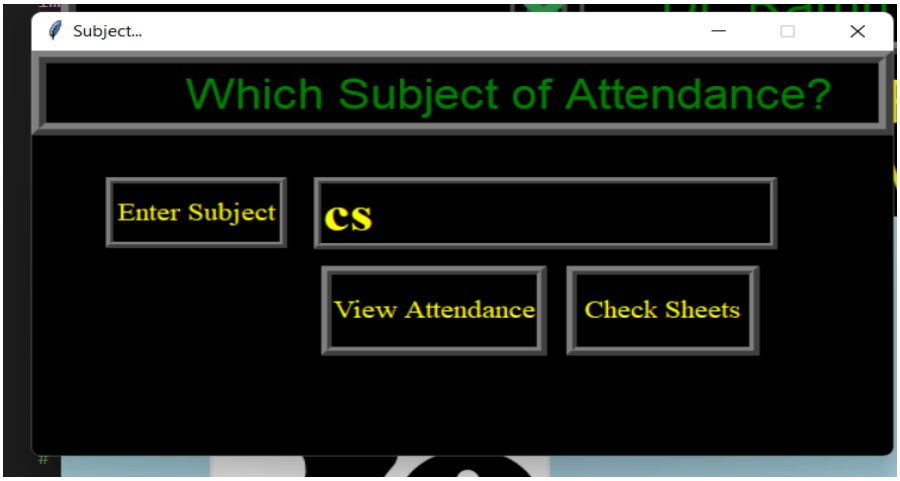
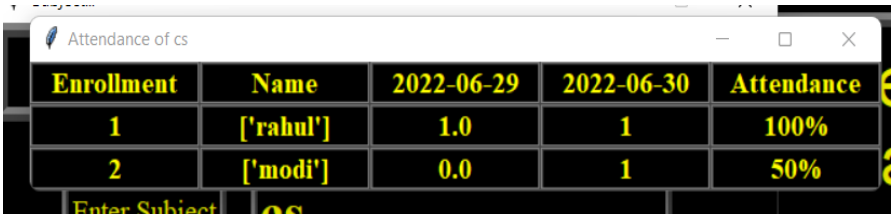
STEP 4 : A new window which will take your image and match with saved yml matrix.



STEP 5 : For viewing attendance click on view Attendance and fill subject.





IV. CONCLUSION

In this paper, we have illustrated that how we can easily take attendance of student without wasting time and with more accuracy. We have used Dlib's HOG facial detection based on machine learning methodology to find out the unique character from image and convert this into matrix form (128 different characters) and store in csv file. We have used NumPy for fast creating and accessing matrix. In this way we have developed a Machine Learning based attendance management system through face recognition. This kind of attendance system can be broadly used in different industries and school, colleges or universities.

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BIOGRAPHY

Dr. Deepak Kumar Verma have done MCA from University of Lucknow in 2011 and Ph.D. in Computer Science in 2016 and currently working as Assistant Professor of Computer Science in Dr Ram Manohar Lohia Avadh University, Ayodhya, India. His research interests are Artificial intelligence, data security and Cyber Security.

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Mr. Rahul Singh is scholar of final year of graduation with computer science from Dr Rammanohar Lohia Avadh University, Ayodhya, India. His research interests are Web designing, Application development using python.

Mr. Raman Tiwari is scholar of final year of graduation with computer science from Dr Rammanohar Lohia Avadh University, Ayodhya, India. He has developed several mini projects based on Networking during his graduation. His research interests are data science and cloud computing.