FACE RECOGNITION BASED STUDENT ATTENDANCE USING PYTHON AND OPENCV

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Abstract

Face recognition is one of the important applications of image processing, where we can scan the face of an individual using Open source Computer Vision library (OpenCV). Introducing this software had proliferated the digital market in security and safety. These days Facial recognition is used around the globe for multiple purposes like tracking & security. And it's not just for security and safety; facial recognition software is now being used in transportation, the hotel industry, and online banking. As it's actively working in different domains according to their needs, our main goal is to introduce the facial recognition in attendance management system for universities using CC camera as the input medium. Using this software, we can note the number of students attended for the class without any manual entry. Our software uses facial recognition for identifying the candidates present and also gives the headcount of the students which makes the process very easy with precise attendance.

KEYWORDS: *Face Recognition, Cascade, Local Binary Patterns, OpenCV, Image processing.*

I. INTRODUCTION

In recent years, attendance has become a requirement in every organization that keeps track of a student's or employee's start and stop times at work, as well as the amount of time he or she has spent there. Attendance system provides various benefits to the organization. Traditionally attendance is taken using pen and paper to record the attendance. But it's time taking process as we have keep track of each and every student or employee. To save time automatic process is used which is developed using Python. The system can constitute 2 classes as face detection (1:1) and face recognition (1: N). Face detection requires distinguishing between facial and non-face regions, whereas recognition requires comparing a single face image with numerous images from the input image. A Face Detection and Recognition System is a system that uses digital photos or a video frame from a video source to automatically identify and verify a person's identification.

Existing System: The existing system is nothing but a manual method of taking attendance. Professor calls student names & mark attendance. Suppose duration of one class is about 50 minutes, it takes 5 to 10 minutes to mark attendance.

Problems of Existing System Dual priorities:

- Proxy is done.
- It is possible that a human error will occur.
- Ineffective and noncurrent.

- It takes time.
- The data can be vanished.

II. LITERATURE SURVEY

In a project report, a literature survey or literature review is the section that shows the various analyses and research done in the field of your interest, as well as the results already published, while considering the project's numerous criteria and scope. It is the most significant portion of your report because it directs your research in the right way. It assists you in determining a goal for your analysis, resulting in your problem statement.

[1] G. Gangagowri "Attendance Management System"

The Way to SMS programme is being used in this project. This app allows them to send SMS to their parents quickly and simply. This system can store their data about the students and those cares absent student details. It is an efficient method to store the attendance in the virtual way. It also updates the student report directly on the server, saving staff time by eliminating the need to log in from a computer.

[2] "College Student Management System Design Using Computer Aided System," authored by Liangqiu Meng.

A computer-assisted system is used in the project model. The model is critical in any organization or business. In the field of college administration. The system had four levels at first, each of which was based on the Web display layer, which is where an application is

deployed and displayed for end users. The business logic layer is responsible for the product's functionality. Data accessibility is important. The data is managed by the data viewing layer. The database layer is in charge of storing the information about the students. The Database layer's ER diagram was built to help with data normalization. This technique provides access to all information about students, faculties, and educational institutions. Third goal of this project is to allow users to search for items depending on their categories.

[3] "Computer vision and face recognition methods in attendance management." by Visar Shehu and Agni Dika's.

The purpose of this project is to develop an attendance tracking system that uses computer vision and face recognition algorithms to manage attendance. A non-intrusive digital camera is mounted in a classroom, which scans the room, detects, and extracts all faces from the acquired photos. After the faces have been retrieved, they are compared to a database of student photos, and if they are successfully recognized, a student attendance list is generated and recorded. With the applicable technology, Face recognition algorithms, social and educational challenges, and real-time face identification in scenarios with many objects are all addressed in this study.

[4] Jian Xiao, Gugang Gao, Chen Hu, and Haidong Feng's "Embedded face identification system based on three components."

His solution, which is based on three concepts, provides the groundwork for a quick-to-deploy embedded facial detection system module.One quick face detection method based on the AdaBoost algorithm, which has been improved for high accuracy. SOC hardware framework to speed up detection operations, speed and high detection rate. The memory subsystem is optimised using one software distribution approach and one software distribution strategy.

[5] "Web Based Student Information Management,"

S. R. Bharamagoudar and Geeta R.B.

This project will help to automate the current manual system. This project always offers reliable data. All of the years came together. Information can be preserved and retrieved at any point in time. The goal is to create a college website that offers up-to-date college information. The efficiency of college record management should improve as a result of this.

III. PROPOSED METHOD

The suggested solution is "Face recognition-based student attendance using python and OpenCV," which minimizes staff time spent taking attendance. Using this software, we can note the number of students attended for the class without any manual entry. Our software uses facial recognition for identifying the candidates present and also gives the count of the students, which makes the process very easy with precise attendance.

Advantages of proposed system

- Proxy attendance is eliminated.
- It allows them to save time and effort.
- It stores the faces that are detected and automatically marks attendance.
- This system is convenient and secure for the user

A. PROPOSED ARCHITECTURE

The relationship between different components might be depicted using a system architecture diagram. Typically, they are made for systems that comprise both hardware and software, which are shown in the diagram to explain how they interact.

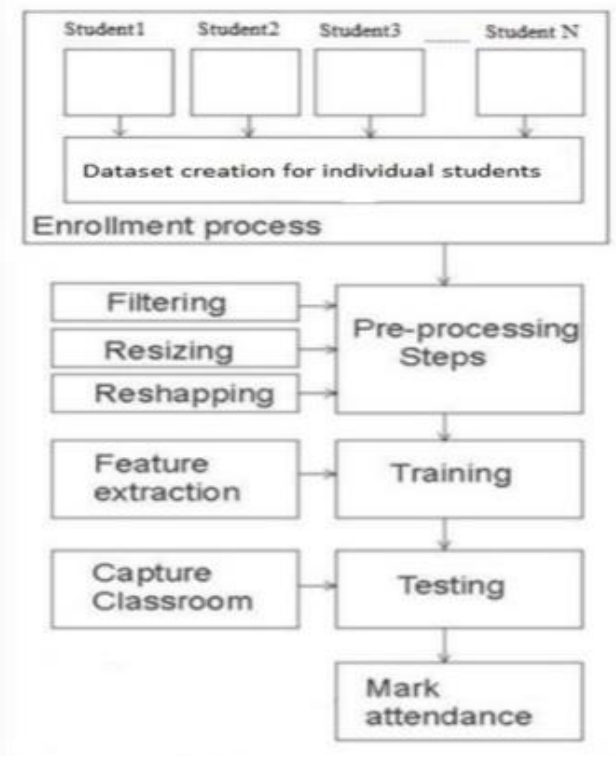

Fig 1: The Architecture of the System

B. IMPLEMENTATION

All activities necessary to transition from an old to a new system are included in the implementation phase. The old system consists of manual operations, which is operated in a very difficult manner from the proposed system. A competent implementation is required to deliver a dependable system that meets the organization's needs.

- **Datasets**: This module is for registration, here we need to enter the roll no and we need to capture image of the student's .This will store all the registered student images in a dataset folder.
- **Training Data:** In this module, machine is trained with registered student images. So that when a Person face is detected in the captured image he is marked with attendance.
- **Face Recognition:** In this module, the face recognition is done. When a face is detected the features are extracted and recognition is done. Here when a registered student is detected his name is displayed and attendance is marked.

We have to follow these steps to create student's dataset and mark their attendance:

1**. Creating the dataset:** A datasets of all the students will be created using Python and OpenCV. It is a onetime process so that we will have a real time dataset to train our system and to match the captured faces. For creating a person's dataset, the person has to sit in front of the

camera around 80cms away from the camera with light on the opposite side of the face. The camera must be at eye level with the subject's face. When the code runs, the person has to give totally different poses with different expression so a dataset of various sorts of photo gets created. And the faces detected from the captured images will be added to the dataset so that the dataset is updated continuously. Once the datasets are created we are ready with our implementation part.

2. Capturing the image: A high-definition camera will be mounted above the board in the classroom to capture all the students in the room. The camera can be controlled manually or automatically, depending on the user's preferences. The image will be transmitted to the system for additional processing after it has been captured.

Fig 2: Image Capturing

3. Haar cascades for face identification and segmentation: The system will analyse the input image and recognise all of the faces using OpenCV's haar cascade feature. After that, the photograph will be segmented to include all of the people in it, and saved in a file for that particular day.

4. Face recognition using LBP: The face recognition algorithm will be run when all of the faces have been divided into individual faces. Using the local binary pattern technique, each face from a single date folder will be compared to the datasets.

5. Attendance Marker: If a face from the particular date folder is matched with the datasets, then the particular student will be marked present.

IV. RESULTS

Dataset generation: In our project the main task is to create a dataset of students enrolled in a class and then to compare these images with the live captured images. These photos aid in identifying the person, whether known or unknown. The photos of the faces are saved in a default folder.

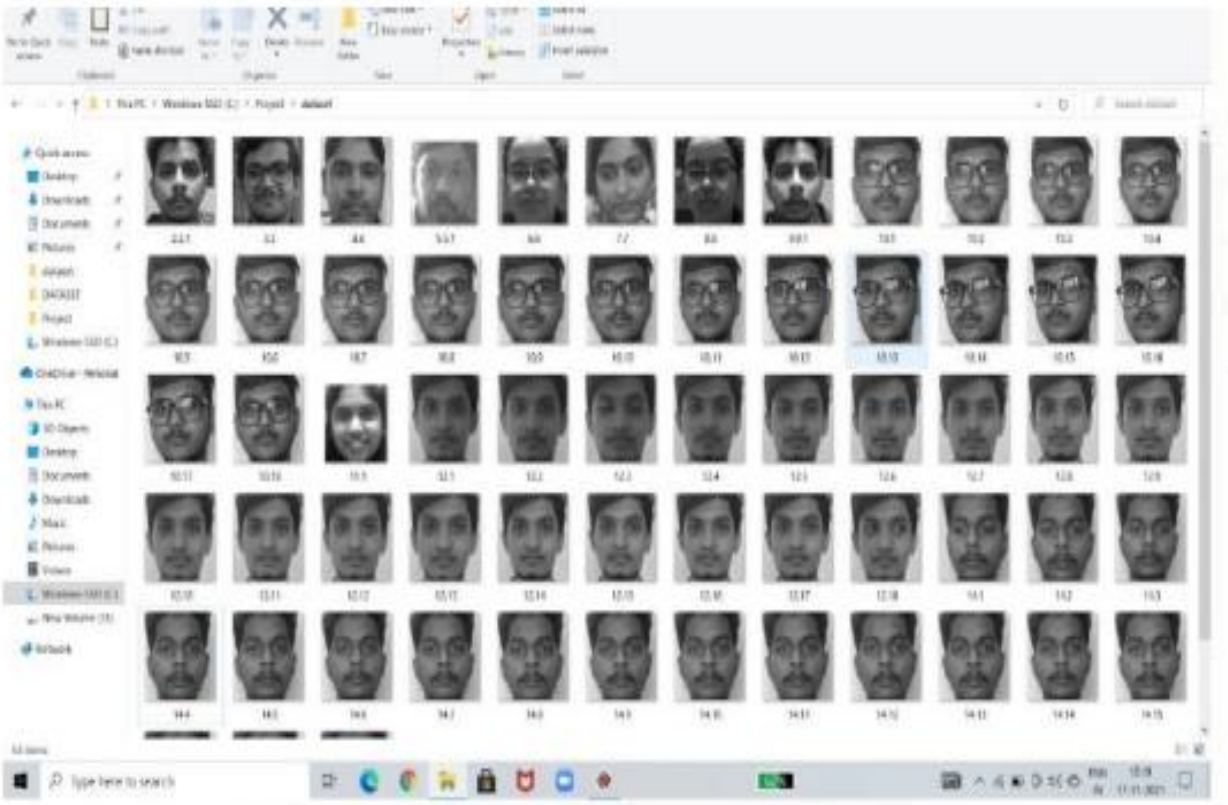

Fig 3: Dataset generation after registration

Face detection of unknown student: The captured image is of unknown person. Because we have created an enrolled students' datasets in the system and this captured image is unknown to the system after comparing with the datasets and hence indicated by unknown. Hence attendance cannot be marked.

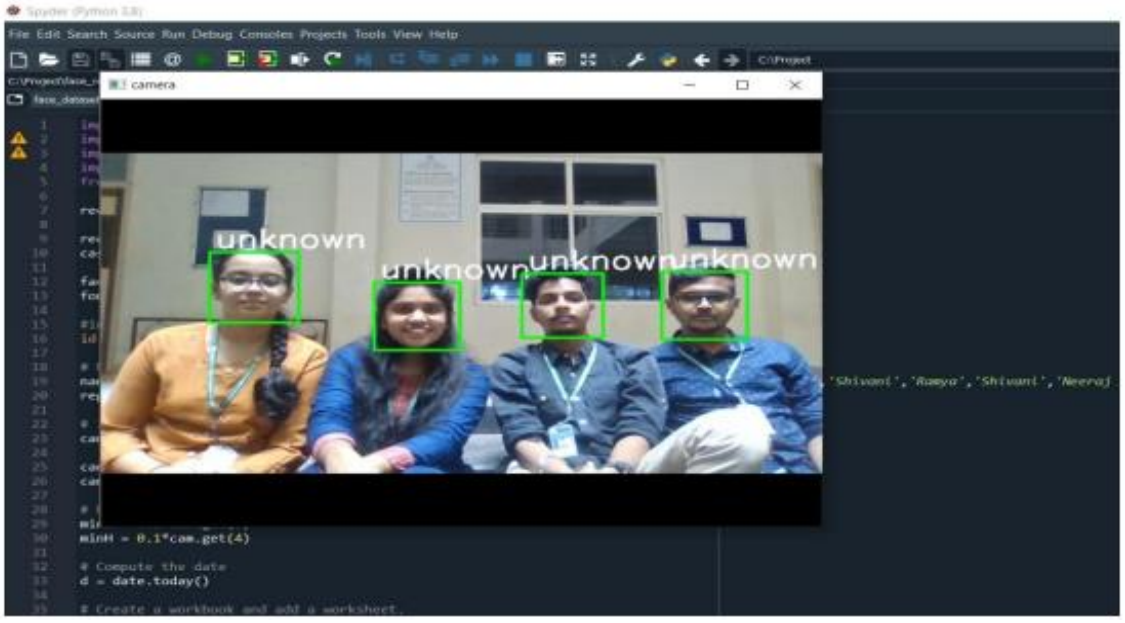

Fig 4: student's detection before registration

Face detection of enrolled student: Now live captured image is taken as a test face to identify whether the student is enrolled or not.

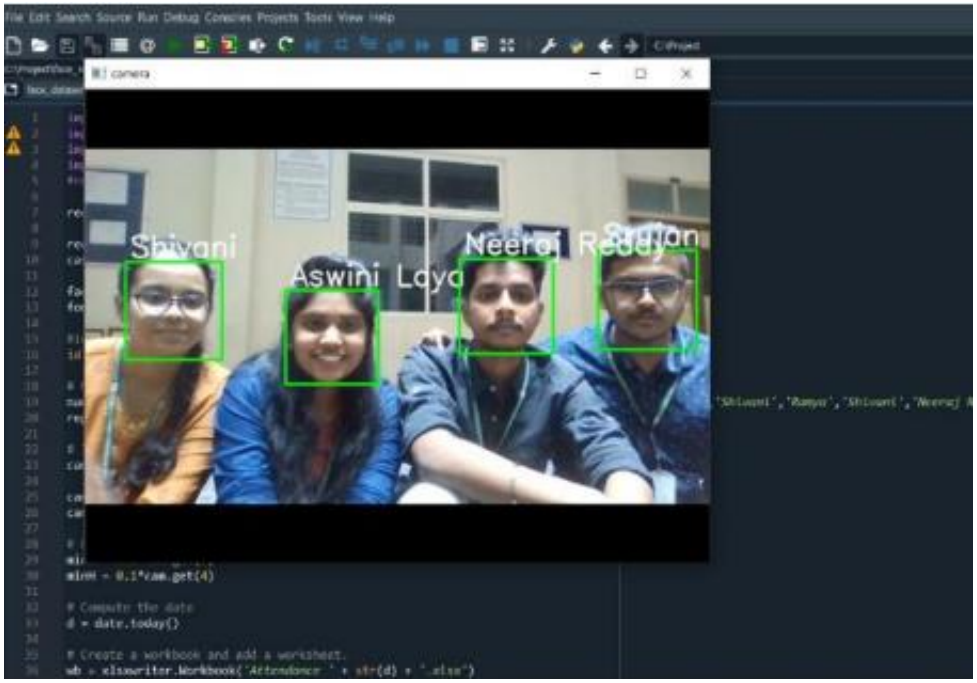

Fig 5: enrolled student's

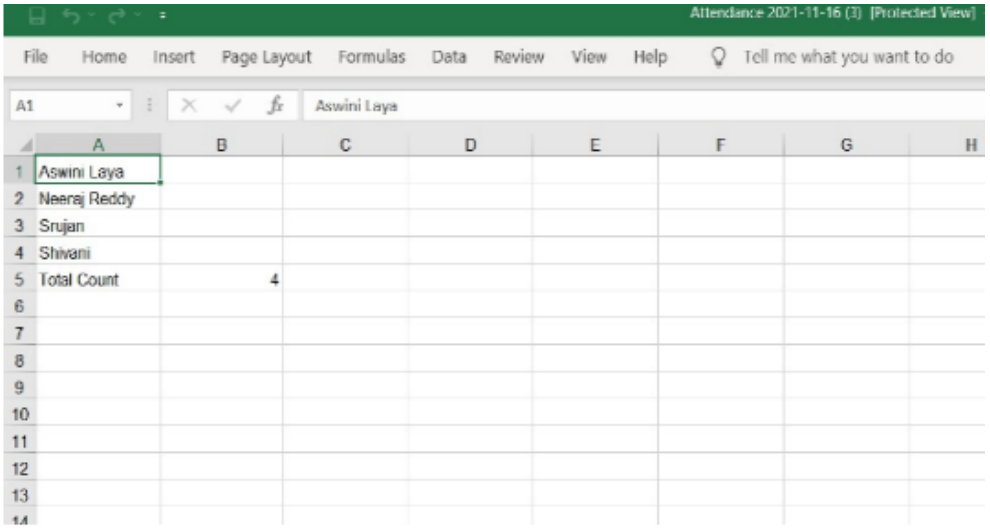

Fig 5: Attendance of student's present in the class.

V. CONCLUSION

Machine learning algorithms were applied progressively to mark student attendance system. In this project, using machine learning we had designed face recognition-based student's attendance system is introduced to solve teacher's burden of taking attendance and save their time and efforts. This system is convenient and secure for the user.

VI. REFERENCES

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