Face Recognition Using Machine Learning

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Abstract – *Now a day's most of the education system introduces the concept of smart classroom which involves the smart attendance system. In this project we are going to describe the student attendance system with face recognition that uses the machine learning algorithms like haar cascade algorithm and local binary pattern histogram LBPH algorithm. This project contains two main parts of attendance system that is face detection and face recognition. In this proposed system we use the OpenCV library along with python that provides various functions or algorithms related face recognition. The main objective of this project is to make the attendance management system reliable, efficient, simple, time saving and easy.*

Key Words:- machine learning, haar cascade, LBPH, face detection, face recognition, OpenCV, python, attendance.

1.INTRODUCTION

The success of an educational institute begins by engaging students and having regular attendance of students. Having a higher attendance score results in higher marks, higher retention rates, and a better educational experience. It is difficult for teachers and students to build a strong relationship if students are frequently absent. This hampers teachers and students to develop their skills and make progression. In many schools, the school budgets are based on the average daily attendance of the school. If the attendance rates are low, then school budgets suffer.

Computer Vision is one of the most fascinating and challenging tasks in the field of Artificial Intelligence. Computer Vision serves as a link between computer software and the visuals we see around us. It enables computer software to comprehend and learn about the visuals in its environment. Facial Recognition represents the event of a system which may determine the person with the assistance of a face using Computer Vision (Open CV).

The term "OpenCV" is an abbreviation for "open source computer vision." The architecture is made up of software, databases, and plugins that are pre-programmed with support for integrating computer vision applications. It is one of the most used toolkits with a large developer group. It is well-known for the size at which it builds real-world usage cases for industrial use. OpenCV follows C/C++, Python, Java programming languages and can be used to build computer vision software for desktop and smartphone platforms such as Windows, Linux, macOS, Android, and iOS.

OpenCV is a video and image processing library and it is used for image and video analysis, like facial detection, license plate reading, photo editing, advanced robotic vision, and many more. The method in which with the help of python and OpenCV in deep learning is the most efficient way to detect the face of the person. This method is useful in many fields such as the military, for security, schools, colleges and universities, airlines, banking, online web applications, gaming etc. this system uses powerful python algorithm through which the detection and recognition of face is very easy and efficient.

When the system detects the face, it will produce an sub-image and this sub-image is scaled such that the face appears in the center and presented at a uniform size. OpenCV already provide an algorithm to locate faces.

1.1 Problem Statement

Implementing Attendance System using Machine Learning. Traditional student attendance marking technique is often facing a lot of trouble. The face recognition student attendance system emphasizes its simplicity by eliminating classical student attendance marking technique such as calling student names or checking respective identification cards. There are not only disturbing the teaching process but also causes distraction for students during exam sessions. In this project we are going to describe the student attendance system with face recognition that uses the machine learning algorithms. This project contains two main parts of attendance system that is face detection and face recognition. In this proposed system we use the OpenCV library along with python that provides various functions or algorithms related face recognition. The main objective of this project is to make the attendance management system reliable, efficient, simple, time saving and easy.

1.2 Motivation

• Reducing time wastage during conventional class attendance.

• Utilizing latest trends in machine vision to implement a feasible solution for class attendance system.

• Automating the whole process so that we have digital environment.

• Preventing fake roll calls as one to one attendance marking is possible only.

• Encouraging the use of technology in daily lives.

2. LITERATURE SURVEY

With the rapid development of video monitoring, the massive informa- tion of the monitoring image has far exceeded the effective processing range of human resources. A face recognition is prevalently carried out by using „perfect" data of full-frontal facial images without any sort of damage like due to accident on the image. Nowadays the number of thefts and identity fraud has become a serious issue. In order to avoid these thefts and identity fraud, a face recognition system must be established. An application for tracking and detecting faces in videos and in cameras which can be used for multipurpose activities. The intention of the paper is deep study of face detection using open CV.
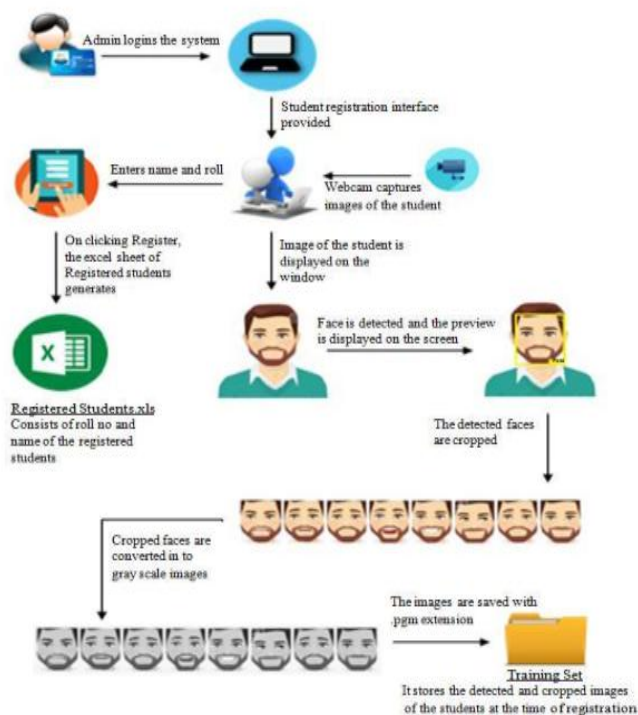
3. ARCHITECTURE

Fig -1: Architecture Diagram

Face Detection:-Face detection also called facial detection is an artificial intelligence (AI) based computer technology used to find and identify human faces in digital images. Face detection technology can be applied to various fields including security, biometrics, law enforcement, entertainment and personal safety to provide surveillance and tracking of people in real time. Face

Feature Extraction:- The facial features such as distance between the eyes, width of the nose, depth of the eye sockets, the shape of the cheekbones, the length of the jaw line, etc. are registered into the database folder by using the facial recognition xml file from the „OpenCV" python library. Once the features are registered, the model is trained using the gathered.

Face Recognition:-Although the terms face detection and face recognition are often used together, facial recognition is only one application for face detection albeit one of the most significant ones.

OpenCV:- OpenCV is a video and image processing library and it is used for image and video analysis, like facial detection, license plate reading, photo editing, advanced robotic vision, and many more.

Dlib:-The dlib library contains our implementation of „deep metric learning" which is used to construct our face embeddings used for the actual recognition process.

Attendance Update:- Once the facial recognition is done successfully, the attendance for the corre- sponding student is updated into the database automatically, without any hu- man intervention. If a match is found from the existing database, the student is marked as present, in all other cases the student is marked absent.

4. FUTURE SCOPE

In the future this system can be implemented as a part of the smart classroom objective. However, the efficiency could be improved by integrating high speed computers with a good RAM and Usage of a good quality video camera capable of capturing live feed.

5. CONCLUSIONS

Face recognition technology is one of the most popular application of artificial intelligence which is used in several places for security purpose. In this project we describe the student attendance system will be helpful for many as it is simple, effi- cient, time saving and cost effective. The use of machine learning algorithms makes it an easier and reliable system which can be made by anyone according to their re- quirement.

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