Project Report

Course Name:

Artificial Intelligence Lab (CS-371L)

Project Topic:

Student Attendance System using Face Recognition

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Abstract

Face recognition is among the most productive image processing applications and has a pivotal role in the technical field. Recognition of the human face is an active issue for authentication purposes specifically in the context of attendance of students. Attendance system using face recognition is a procedure of recognizing students by using face biostatistics based on the high-definition monitoring and other computer technologies. The development of this system is aimed to accomplish digitization of the traditional system of taking attendance by calling names and maintaining pen-paper records. Present strategies for taking attendance are tedious and time-consuming. Attendance records can be easily manipulated by manual recording. The traditional process of making attendance and present biometric systems is vulnerable to proxies. This paper is therefore proposed to tackle all these problems.

Introduction

In our world, Biometric face recognition is used everywhere. It is an advanced, automated, and sensible identification system that can identify a person by facial features. It uses a digital camera to capture the image of the face, a computer for processing and analysis, and an output device for displaying the identification result.

It is straightforward to identify any person from different facial images. The face recognition system is a high-speed and reliable technology. This biometric is very safe because it can identify people without any mistakes.

Face recognition is considered the first step toward building biometric access control-based application scenarios, where biometric features are extracted from the individuals. This system is used in many government offices, firms, banks, and other places.

Features

- Real time face detection
- Logging Security System (Username &Password)
- Home Page
- Student management system (Save, Take Photo Samples, Update, Delete, Clear)
- Train Photo Samples
- Take Attendance with Face Detection
- Attendance Report (Excel file & MySQL database)
- Help Desk
- Exit System

Working of the System

- Firstly, you have to login in the system. If you are a new user, you can also register first yourself. You can also forget password in case of forgotten password.
- Then home page is displayed that contains different features.
- Then, you can also add, update, delete and upload photo of student with the help of OpenCV. It takes 100 samples of photo through webcam.
- Then, you have to trains those sample which you were added through webcam.
- You can also check through face recognition feature that will show your name and reg-no.
- You can also check the attendance report and also import or export csv files.
- In help desk, basically a chatbot is implemented which will help you in case of any query.
- You can also exit it through exit button.

Algorithm

LBPH Algorithm:

LBPH algorithm (Local Binary Pattern Histogram) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighbourhood of each pixel and considers the result as a binary number. Following steps for lbph algorithm:

- Parameters (Radius, Neighbours, Grid X, Grid Y)
- Training the Algorithm
- Applying the LBP operation
- Extracting the Histograms
- Performing the face recognition

Libraries

Open CV:

OpenCV library is used in this project. Open CV is the most popular library for computer vision. Open CV uses machine learning algorithms to search for faces within a picture. Because faces are so complicated, there isn't one simple test that will tell you if it found a face or not. Instead, there are thousands of small patterns and features that must be matched. The algorithms break the task of identifying the face into thousands of smaller, bite-sized tasks, each of which is easy to solve. These tasks are also called classifiers.

Applications and Uses

- Facial recognition technology is one of the emerging innovative technologies that help companies, organizations, and government agencies to improve their business productivity. It helps in identifying and recognizing people.
- It is an analytical tool that identifies a person by matching their face with the stored image in the database. Then, an algorithm compares a person's facial features against the facial features of the stored images on the database. This technology has gained rapid acceptance globally among global brands.
- It is a fast, high-accuracy system that accurately identifies and recognizes faces for identity verification, customer identification, security, access control, and other uses.
- The technology is used in various sectors, including finance, retail, government, and industry. For instance, it can be used in automated teller machines, retail banking, airport check-in, customer identification, and credit/debit card payments.