FACE RECOGNITION: THE FOUNDATION OF AN ATTENDANCE TRACKING SYSTEM

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Abstract: It is essential to have a reliable method for tracking attendance. Identity, authentication, and other forms of security have a finite value. Its non-intrusive and frictionless nature has led to its growing appeal. However, its accuracy trails that of iris and fingerprint verification. Despite the fact that there are numerous options, typical misconceptions persist. This article describes a system that will eventually replace the time-consuming manual approach that is now in use. It is precise, productive, and simple to comprehend.

Keywords: Support Vector Machine (SVM), Optimal Separating Hyperplane (OSH), Region of Interest (ROI).

1. INTRODUCTION

An attendance monitoring system (AAS) can authenticate a student's presence in the classroom by using facial recognition technology. It can be used to monitor what students are doing in class to predict who will be present for assessments and who is daydreaming throughout the course.

The terms "attendance" and "attendance system" refer to the same concept in this context, which is physically showing up to a gathering or event. Attendance is accorded significant value by many businesses and organizations because it can be used to track the commencement of critical pre-planned events and guarantee that they continue uninterrupted. Options for tracking presence allow for both covert and objective observation, as well as limiting participation in sensitive activities to individuals who have been granted permission. Companies now have the ability to track the whereabouts of their employees by utilizing specialized systems made available by recent technological advancements.

Taking attendance via "roll call" and manually are two instances of techniques that have been deemed obsolete in favor of more modern options. RFID cards are widely used to track people as they enter and exit a building or other location. The fingerprint biometric scanners that are currently in use are a component of the available staff attendance systems.

In the case of a pandemic, such as COVID-19, a highly developed system that can keep track of everyone who enters and exits the facility is essential necessary. RFID attendance devices pose a security risk due to their proclivity for abuse, but biometric fingerprint scanners retain their accuracy over time.

2. RELATED WORK

SVM

In most cases, supervised learning procedures are employed to train support vector machines. SVMs were created to improve the efficiency of PCA and LDA subspace features, which are both utilized in classification. The SVM use a training set of images in order to make predictions about the OSH. The use of the OSH reduces the inaccurate classification of photos into two distinct categories. This technique was used by Guo et al. to achieve face recognition. He frequently used techniques from the binary tree classification system to visually separate qualities into two categories. Before deciding how to categorize the data, the information is initially

recorded in a binary tree.

Hidden Markov Model

Young and Samaira are claimed to have been the ones responsible for the initial public advertising of the HMM. In comparison to other image processing algorithms, HMM is superior since it takes spatial sequences into account. HMM is frequently employed on images with a variety of settings, angles, and facial expressions on the participants' faces. A customer-oriented algorithm is known as a "Hidden Markov Model," and the name "Hidden Markov Model" describes the method. It is unclear what activities must be performed. Instead of recognizing the particular locations of face features, this approach simply covers the image with one-pixel-wide strips. diverse facial configurations are known to be made up of a wide variety of diverse parts. When it comes to the aesthetic worth of the system as a whole, the surface qualities of the head and neck are only the tip of the iceberg.

Hybrid

Facial recognition algorithms perform better when they are built on a foundation of generalized features. Both local and global eigenvalues are accounted for and used in the eigen modules developed by Pentland and his colleagues.When compared to the faces found in Special Issue 840 of the International Journal of Pure and Applied Mathematics, the 10 Holistic eigenfaces perform badly. Penev and Atiek used local feature analysis, or "mixed LFA" as it is more commonly called. Huang et al. developed Face Area and Components, a face recognition approach that blends component-based identification with 3D morphable modeling. The Face Area and Components technique was built using this method. Lantis and the other members of his team at work came up with the Shape-normalized Flexible Appearance Technique.

3. METHODOLOGY

Dataset Creation

A camera was used to record the children's antics. The moving pupil will be photographed several times. We don't need to be concerned about them anymore. An area of interest (ROI) that has been manually extracted is necessary to perform the recognition process. Before being displayed, images must be cropped and resized after being recorded with a specific width and height in pixels. These formerly colored pictures have been converted to black & white. Following that, each pupil's photograph will be placed in a folder labeled with his or her name and stored.

Face Detection and Extraction

Face recognition is critical since a camera can detect a person only based on how they seem in a photograph. The introduction of a range of image processing algorithms has greatly simplified visual search. HOG was used to determine the exact locations of the people seen in the shot.

The HOG function description can be pretty informative at this time. It is well knowledge that HOGs can recognize people walking down the street. One of a HOG's distinctive features is its capacity to smooth out intensity or edge gradients in a picture. Each pixel in an image gets a gradient applied to it. The pattern on the block has the appearance of a pixelated grid. A gradient is created by varying the intensity of a single pixel in both the direction and magnitude of the change.

Before processing a photograph of a person's face, a feature descriptor extraction approach such as HOG is used. The gradient vector of each individual pixel is used in their creation. The amount and direction of the gradient in each pixel are determined by the techniques listed below:

$g = \sqrt{gx2 + gy2}\ gy\ \theta = arctan\ gx$

Gradient Calculation

Finding the gradient number is the first step in any necessary calculation. The first method employs 1D derivative masks in both the vertical and horizontal dimensions. In this case, we used both 1x3 and 3x1 filters at the same time. Before utilizing this method, the image's color and intensity data must be cleaned up with one of the filter kernels discussed above.

Orientation Binning

HOG feature extraction is done out in conjunction with orientation binnin. The pixels in each cell correspond to one of the histogram's channels. The gradient processing values define the channel's orientation. Depending on the sign of

the gradient, they can range from 0 to 360 degrees or 0 to 180 degrees and be radial or rectangular. Dalal et al. discovered in a study that using nine histogram channels in conjunction with unsigned gradients produced the most accurate results for human identification. The magnitude of the gradient or a function can be used as the input to a pixel. The gradient steepens as the experiment's results improve.

Face Placement

Face patches come in 68 different varieties. This is significant since it demonstrates that 68 distinct During this stage, we look for the photo and identify the people in it. Face detection is accurate and automatic thanks to Python-based technologies.

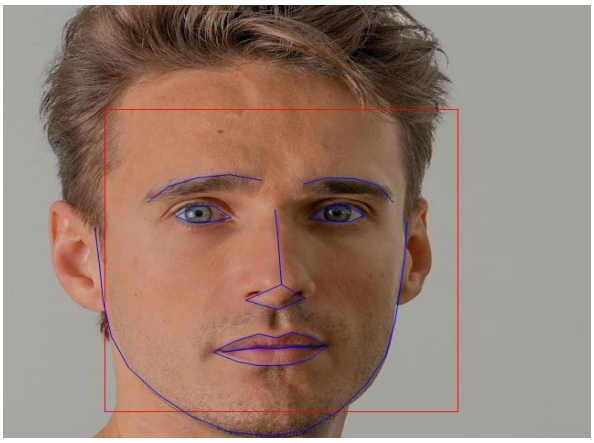

Figure 1: Characteristics That Set You Apart

Figure 2: 68 different locales

Face Encoding

After the profiles have been identified, the distinguishing facial attribute that was used to separate them is removed. When a face is detected in an input image, the 128 most essential facial coordinates are obtained and recorded in a database.

Face Matching

ID checks are no longer required at this time. We employ a technology called 128-dimensional encoding (verification) to ensure that each face is real. We may use the compare features tool to calculate the Euclidean distance between each face in the dataset and the matching face in a picture. For a dataset to be called present, at least 60% of its features must be identical to those of its predecessor.

Updating Attendance

If the presented face matches the one in the database, the student's name and registration number will be reported as present, and the student's attendance will be recorded. The file that represents the completed project will be named Excel.csv. The.csv file will be handed over to the relevant instructor at the end of the course.

4. ARCHITECTURE

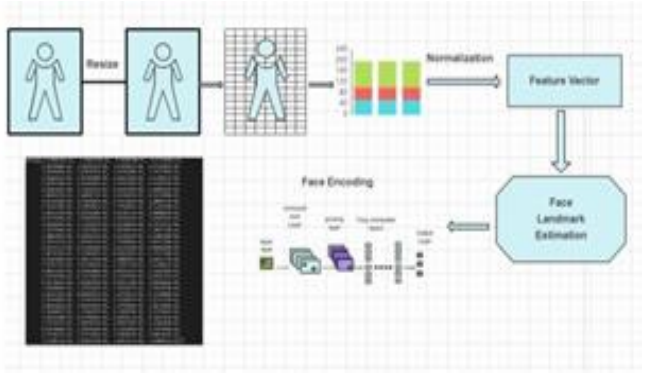

Figure 3: Creating an infrastructure model.

5. RESULT AND DISCUSSION

Figure 4: Having Specific Traits or Characteristics

	A	B	C
1	Name	USN	Time
2			
3	MILAN KARKI	19BTRCI066	14:58:28
4	SHOVA NYAUPANE	19BTRRI032	15:04:23
5	ARPAN ACHARYA	19BTRRK045	15:05:23
6	DEEPAK BASNET	19BTRDP078	15:10:43
7	RANJU	19BTRRN043	15:11:32
8			
9			
10			

Table 1: Attendance Recording and Reporting Procedures

6. CONCLUSION

Despite the fact that different attendance solutions based on face recognition and detection libraries are already available for use, paper and pencil are still required to take roll in class. Artificial intelligence-based attention approaches have little practical application in the real world. This is common when the vendor recommends an extravagant sum for the bidder to offer.

We have found a very low-cost solution to this problem, and it will only be used by our firm. Teachers could save more time if they didn't have to waste time and mental energy trying to remember each of their students' names and faces.

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