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Face Recognition based Attendance Management System

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Abstract: ***Biometrics are unique, measurable characteristics of an individual that can be used to automatically recognize an individual or to verify an individual's identity. Biometrics can measure both physiological and behavioural characteristics. Physiological biometrics (based on measurements of parts of the human body and data obtained from direct measurements) include finger scans, face recognition, iris scans, retina scans, and hand scans. Everything happens online as technology advances around the world. Facial recognition systems are used to identify people in photos, videos, in real time, etc. It is a category of biometric security. It provides an environment with privacy and authentication that helps organizations keep their data safe. It can be used for security, authentication, identification, accuracy and many other benefits. It can also be used because it is a non-contact, non-invasive procedure. In addition, facial recognition systems can also be used for attendance assessment in schools, colleges, offices, etc. Since the conventional manual attendance system takes time and effort to maintain, it can be used as a class attendance system that uses the concept of face recognition or for attendance scoring within the company, minimizing the burden on administrators. I can. Attendance is on your own and no substitutes are allowed. Therefore, the need for this system is increasing. The system consists of four phases: recording, training, facial recognition, and attendance update. A record is created when a new user uses the software to enroll their face and is assigned an ID. During training, the dataset created is used as input to a training model that uses a k-NN classifier to classify the images present in the dataset.***

Keywords: Creating dataset; Training; Face Detection; k-NN classifier; Haar-Cascade classifier; Updating Attendance;

I. INTRODUCTION

In many schools, universities, and government offices, traditional attendance evaluation methods are tedious. It also creates a burden for faculty and staff who must manually call out student names to mark their attendance. This can take about five minutes for an entire session at a school or university, and it's hectic for administrators to check attendance for each member of staff. This takes time. There is also the possibility of proxy participation. Therefore, many research institutes have started using many other attendance tracking technologies such as: B. Using radio frequency identification (RFID), iris recognition, fingerprint recognition, etc. However, these systems consume more time and are inherently intrusive. Facial Recognition has established an important biometric that is easy to acquire and unobtrusive. Systems based on facial recognition are relatively oblivious to various facial expressions. Facial recognition systems consist of her two categories: verification and facial recognition. Face verification is a 1:1 matching process that compares facial images to template facial images, and comparing challenged facial images is a 1:N problem. The purpose of this system is to build an attendance system based on facial recognition technology. A person's face is considered here to indicate presence. Today, facial recognition is becoming more and more popular and widely used. In this article, we proposed a system that detects a user's face captured by a camera and marks presence if the detected face is found in a database. This new system takes less time than traditional methods

II. LITERATURE SURVEY

The authors of [1] describe the face recognition algorithms (Eigenface and Fisherface) provided by OpenCV by comparing receiver operating characteristic (ROC) curves and implementing them in an attendance system. The ROC curves proved that Eigenface outperforms Fisherface as observed in our experiments. Systems implemented with the Eigenface algorithm achieved accuracies of 70% to 90%. In this article [4], the author developed a face detection model using a series of faces tracked in a single photo or video of him. Applied factors are (CNN) end-to-end learning of tasks using convolutional neural networks and the availability of very large training datasets. A huge data set of 2.6 million images, over 26000 people, can be collected through a combination of automation and human-in-the-loop, and illustrates the trade-off between data purity and time.

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Next, we explore the complexity of deep network training and face recognition. [6], the authors describe a method for a student attendance system integrated with facial recognition technology using a Personal Component Analysis (PCA) algorithm. The system automatically records the presence of students in the classroom environment and maintains a log of clock-in and clock-out times, giving faculty and staff easy access to student information. [8], the authors suggest that the traditional methods practiced by most institutions are very time-consuming and insecure, and to solve this problem, integrate ubiquitous components. implemented an automated attendance management system that improves convenience or data reliability by Secure a wearable student attendance management device that uses facial recognition technology.

III. PROPOSED SYSTEM

The system includes two roles: administrator and user. In the proposed system, the user has to contact the administrator to train his face in the dataset. The administrator must fill out a small registration form and then train the user's face. After completing the step, the user is assigned a unique ID and is now part of the system. The user can now mark his attendance and view the attendance overview. The whole process consists of four stages:

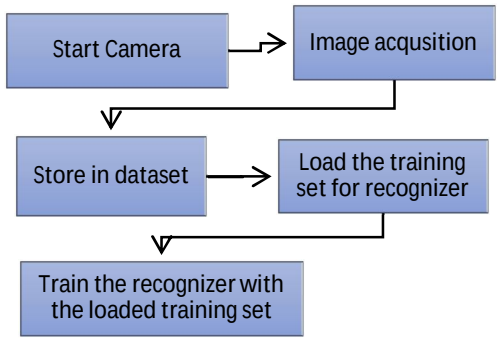

Fig 1.: Process of face training.

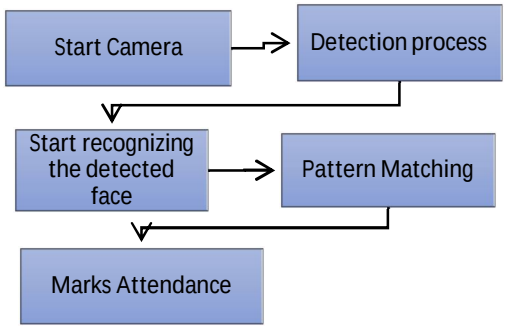

Fig 2.: Process of face detection

1) *Creation of A Data Set:* for each new user, our software addresses a face to register it and associate it with an identity so that it is recorded in the system. This step is performed by an administrator who can control access to the system. The administrator registers a new user by adding basic data through a form and then trains his face into the system.
2) *Training:* The generated dataset is used as input for our training model, which uses a k-NN classifier to classify the images present in the dataset. K-Nearest Neighbor is one of the simplest machine learning algorithms based on the supervised learning technique. The K-NN algorithm assumes similarity between the new case/data and the available cases and assigns the new case to the category most similar to the available categories. The KNN algorithm assumes that similar things exist in close proximity. In other words, similar things are close together. KNN captures the idea of similarity (sometimes called distance, closeness, or closeness).

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3) *Face Detection*: the classifier is fed a new image and predicts the image along with the user's identity. Simply put, the face of the user requesting to mark their attendance is matched against the identities stored in the dataset and then returned with a success or failure message. If the user is registered and his identity is stored in the dataset, his attendance is marked successfully. However, if they did not register, the system would not recognize their identity.
4) *Attendance Update:* This is the final step; the predicted identity of the user is marked in the attendance sheet along with the date and time.

IV. RESULTS

The system has an easy-to-use GUI, which makes it easy for users to operate. No knowledge of high-end technology is required. A basic computing foundation is sufficient. In the system he has two modules. 1. Administration module 2. Employee module. Employees have options such as mark attendance, download attendance sheet, and administrators can train employee face and update attendance sheet. Employees should contact their manager if they want to train their face and continue using the system to mark their attendance. During training, when an employee enters their details, the camera opens and takes 120 photos of that person until she hits 'q'. After training the face, the employee data is updated into an Excel file and a unique ID is generated for each employee. Presence During her marking, the camera captures the user's face to display her ID and notify the employee that her presence has been marked. This system reduces the chances of proxies and saves you time doing the same thing the traditional manual way.

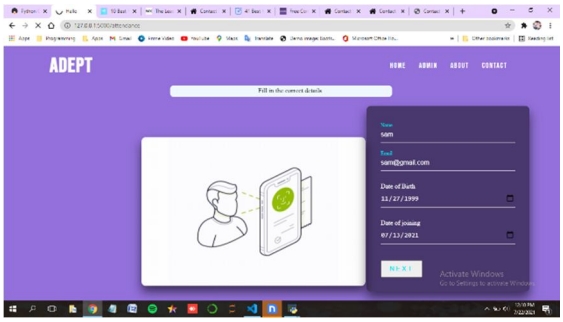

Fig : Registration page for face training.

V. CONCLUSION

This system aims to build an effective class participation system using face recognition technology. The proposed system will be able to mark presence via Face ID. Face detection and face recognition via webcam. After recognition, the recognized student's presence is recorded and the attendance list is updated.

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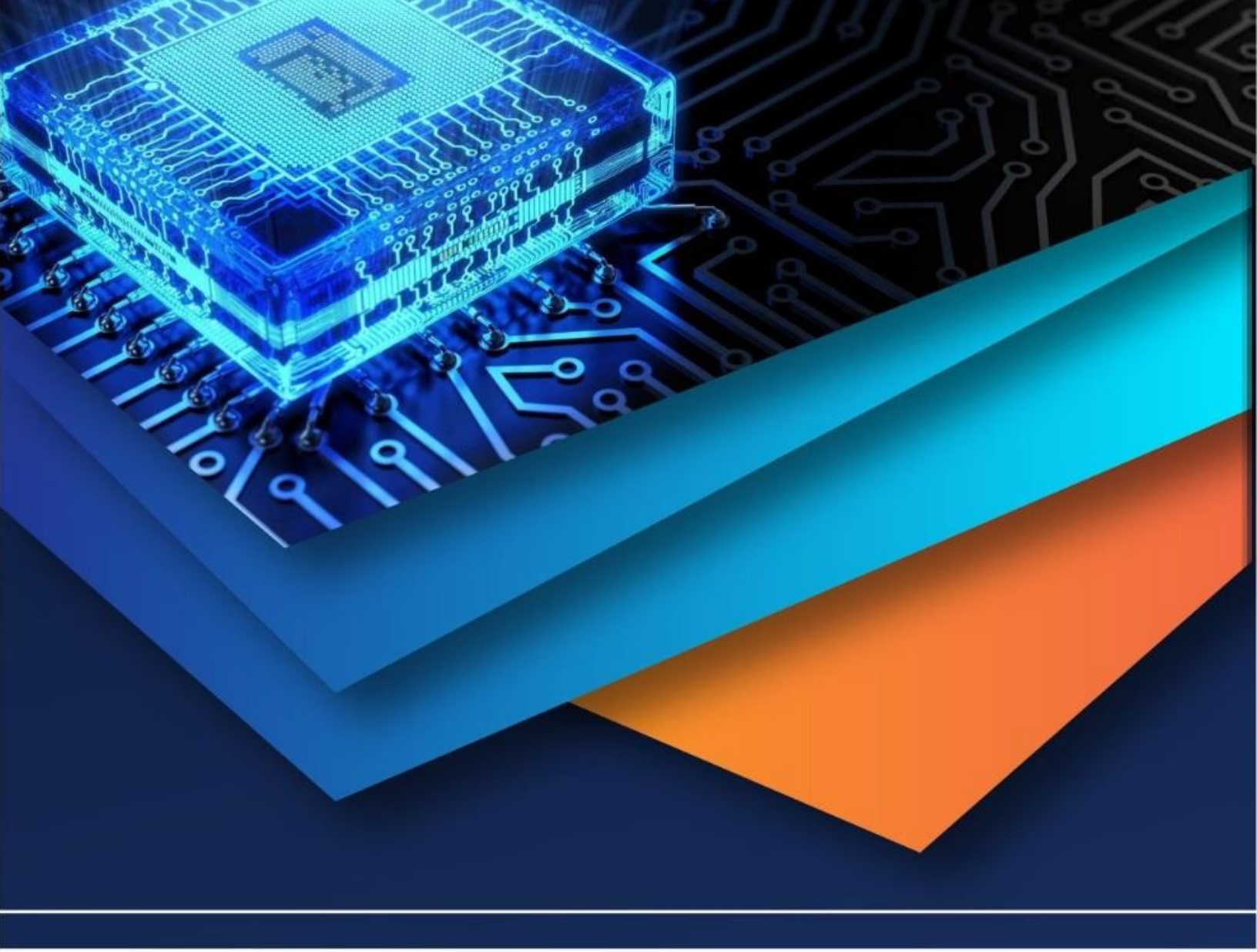

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