Face Recognition Attendance Management System Based on Data Analytics

[1]T. R. Lekhaa and [2]R. Ashok Kumar
SNS College of Engineering, Coimbatore, TamilNadu, India.
[1]lekhaa86@gmail.com, [2]rashok28@gmail.com

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Abstract - Face recognition systems are utilized in a variety of situations. In this digital age, every industry is affected. One of the most well-known Face recognitions is one of the most widely used biometrics. It can be used for a variety of things. Among other things, security, authentication, and identification are all important. Considering its limited accuracy when compared to retina and thumbprint recognition, and because it is a popular method of identification, it is widely used. Recognition of people's faces for Attendance tracking systems can also be utilised in Educational Institutions, Organizations. Because the Current manual is outdated, it takes a long time to set up and maintain an attendance system. Fundamentally, this approach aims to establish a class attendance system Face recognition technology is used in this system. There's also the option of having a proxy attend. As a result, as a result, demand for this system is increasing. Database development, face detection, face recognition, and attendance updating are the four steps of this system. The photos of the kids in class are used to generate the database.

Keywords – Face Recognition, Data Analytics, Data Management, Biometric.

I. INTRODUCTION

In all institutes, keeping track of attendance is critical for evaluating staff performance. In this sense, each institute has its unique technique. Some people take attendance manually using outdated paper or file-based systems, while others use biometric technology to take attendance automatically. Employees, on the other hand, must wait a long time to form a line when they enter the office using these methods [1]. There are a multitude of biometric authentication methods accessible, but the essential authentication systems are the same for all of them. Each biometric system starts with registration, which involves entering a person's unique traits into a database, followed by identification and recognition procedures. These two procedures compare a person's biometric feature to a template stored at the time of enrollment [2]. Employees are automatically logged in and out of the office without the need for human intervention, thanks to our system's facial recognition approach [3].

Face recognition is split into 2 steps: one, faces are detected in the image, and then these identified faces are verified by comparing them to a database. Many algorithms have proven very effective in the face detection and have achieved high accuracy. Few such algorithms to be mentioned are Booth that have classified as Ada and float. Face recognition algorithm efficiency can be improved by using a quick face detection algorithm. SURF is the most efficient of all the techniques mentioned above. In order to distinguish faces in the office room image, our system employed this strategy. There are two sorts of face recognition techniques. Appearance based, in which the complete face can be taken into consideration with respect to textural characteristics, and feature based, in which geometric aspects of the face and various elements of the face are taken into account. Face templates were created using Many well-known algorithms which are considered very effective. The lighting influence in the office room is removed using an illumination invariant technique [4].

EMPATHY

Based on facial recognition a management system is a procedure in which a teacher in charge of a particular subject must personally call the students' names and record their attendance.Manual attendance may be viewed as a time-consuming process, and it is possible that the instructor will miss someone, or that pupils will respond to the absence of their friends many times.As a result, the issue emerges when we consider the usual method of taking attendance in the classroom.We use an Automatic Attendance System to address all of these difficulties (AAS) [5].

DEFINE

The system comprises of a camera that collects the employee's images and delivers them to an image enhancement module for processing. Followed by the detection, the next step is to save the attendance for the respective person in the data store using a relevant method. For each person the photos are saved in the respective storage medium during registration process. The programme finds all of the faces in the input image and matches them to the face database one by one. In case any matches found it is logged into the server and those who have authority can utilize it for the other related activities. Because no one can mark the attendance of everyone else, Exploratory Environment saves time and is a very prevent unauthorized access. Participation is stored on the database that can be viewed by anyone for administrative and employee-related needs. To avoid false detection, we use the skin classification technique. Our method increases the effectiveness and reliability of the detection procedure. This process starts by categorizing the skin, then only skin cells exist and all other dots inside the picture are rendered black, greatly boosting the image recognition procedure' efficiency. Two data sets are displayed in the experimental configuration. The first system stores employee information and is also used to track attendance, whereas the other system collects facial images and features derived from employees throughout the day during the registration process [6].

IDEATE

The Automated Attendance System (AAS) is a procedure that uses face recognition technology to automatically estimate a student's presence or absence in the classroom.It is also feasible to detect if a student is sleeping or awake during a lecture, and it can be used to ensure the student's presence during exam sessions.By capturing students' faces on a high-definition monitor video streaming service, the system can reliably understand the presence of all pupils in the classroom [7].

II. SYSTEM ALGORITHM

Following steps list the number of phases of our system.

- Photo Collection
- Histogram equalization
- Noise elimination
- Skin categorization
- Face identification
- Recording

Pictures from the camera is recorded in first step. Because of the various lighting circumstances, the acquired image has illumination effects and some noise that must be eliminated before proceeding to the next steps. In the spatial domain, histogram normalization is employed to improve contrast. Noise can be eliminated using the various techniques of filtering. Even though many different levels of filters are available the median filter is very effective.

III. TOOLS AND TECHNOLOGIES

Pandas: One of the modules currently exists with many features and utilized by many because of it provides rapid, adaptable and simple to use [8].

Pickle: This is utilized for transform the byte stream of the object which is otherwise called as serializing and de-serializing process.

Sklearn: One of the top tools most popularly used by data analyst for prediction and forecast analysis.

Numpy: Another popular tool mainly utilized by many for its simple and effective way of process many maths calculation and working with arrays.

Sip: Another extension module generator that can take existing C or C++ libraries and turn them into Python extension templates.

Matplolib: Numpy's numerical mathematics extension and the python programming language provide a charting library.

Scipy: It is an open-source tool for using the calculation that involve extensive use of science formulas and also to process many technical and engineering solutions.

Random: This tool is a function library that can be used to widen Python's fundamental features.

kivy: The random module is a function library that can be used to extend Python's fundamental features.

Tensor flow: Another topnotch tool used mainly in the area machine learning where it can be exploited for extensive use of libraries make the process very simple and effective manner.

Keras: A python-based open source neural network library.It has the ability to run on top of tensor flow.The Microsoft Cognitive Toolkit, Theamo, or XNet are all examples of Microsoft's cognitive toolkit.It is user-friendly, modular, and expandable, with the goal of allowing quick experimentation with deep neural networks.

OpenCV - python: Popular tool used for applications that are extensively deal with computer vision and to increase the

speed of process and the use of machine perception in customer-based products.

Openpyxl: This tool mainly contributes to the conversion of spreadsheets. It makes the process of reading and writing of Excel files in a very simple manner [9].

Pyexcel: Similar to the above but this tool is very effective for applications and have great interactive tools and features that can be used to operate over many varieties of functions such as getting inputs from and to store to databases and excel files.

IV. CONCLUSION

The goal of this article is to collect video of students, transform it into frames, and link it to a database to assure their presence or absence, as well as to record attendance for each student. The Automated Classroom Attendance System aids in the improvement of accuracy and speed, resulting in high-precision real-time attendance to fulfil the demand for automatic classroom evaluation.

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