

Automated Attendance System using Facial Recognition

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Abstract - Attendance management is crucial for the smooth flow of any educational organization; The conventional way being : a person calls out a name & records attendance, computing this becomes an arduous task as manual computation produces errors, and is time consuming. Attendance management system is basically to record and maintain the attendance details. It generates the attendance based on one's presence in a particular class.. The main objective of this paper is to manage the attendance system using facial recognition and open CV which would enhance the current system by reducing the inaccuracy and making it efficient. We use Natural traits such as human face that is exclusively used to identify an individual which reduces the probability of recording attendance of fake identities. While taking the attendance, the face of a person will be verified against the data to look for identity. If the individual is recognized, the attendance will be noted and the information will be saved to a data sheet. Once the process is done the data containing the attendees' information will be sent to the respective organization.

Key Words: Attendance management, Facial recognition, Open CV, Datasheet, Numpy

1.INTRODUCTION

Today, Proxy attendance and handling the manual attendance register for every class has become a huge problem for organizations. This is when biometrics took over, Biometrics involve scanning fingerprints of a person and they are stored in a database. While a person gives his fingerprint for scanning it is verified with the stored fingerprints. Though Bluetooth systems are helpful in removing proxies over limited crowd it can be used for only eight connections at a time.

The above mentioned systems are based on hardware devices while facial recognition uses a software system for recording attendance. Facial recognition has become popular in recent times and there is a steady development with respect to research. Furthermore, facial recognition plays a pivotal role in image analysis. It is a challenging task to design an automated system that works on detecting faces with high accuracy. Research to resolve the issues faced by manual attendance system are being conducted and these

researches have also provided ways for hassle free attendance recording process.

1.1 OBJECTIVE

The main objective of this project is to provide a system that simplifies and automates the process of recording attendance through facial recognition. This is a biometric way of identifying or verifying a person from an image or surveillance video. We use preprocessing techniques to detect, recognize and verify the captured faces.

1.2 LITERATURE SURVEY

AUTHOR	ALGORITHM	PROBLEM
Kasar, M., Bhattacharyya, D, and Kim, T.	NEURAL - NETWORK	Detection process is slow and computation is complex. Overall performance is weaker than Viola-Jones algorithm.
Pratiksha M. Patel	Contrast Limited Adaptive Histogram Equalization (CLAHE)	More sensitive to noise compared to histogram equalization.
Nirmalya	PCA, ANN	High Computational cost due to combining PCA and ANN

AUTHOR	ALGORITHM	PROBLEM
Neerja	PCA	Low accuracy in lighting
Kar, Nirmalya	PCA Using eigen value and vector	Repeat image capturing
Syen navaz	PCA, ANN	Low accuracy with the big size of images to train with PCA. High Computational cost due to combining PCA and ANN

2.1 METHODOLOGY

For the attendance system to work, there is a collection of data which is the input, the dataset is later merged into the system. This dataset primarily consists of a person’s basic information such as ID and face.

As python was used for this project we had enough libraries without any shortfall. This project is totally based on image processing and is integrated on open computer vision which acts as a great strength.

Here are some of the major python module used :

1. OpenCV - Helpful in high level understanding, automates task and recognition.
2. Pandas - Pandas is used in analyzing data and value over specific axis.
3. Numpy - Used in scientific computing, path of multidimensional array object, linear algebra and Fourier transform.
4. Imutils - series of convenience functions to make basic image processing functions used in translation, rotation, resizing, skeletonization, and also helps in easy display Matplotlib images.
5. Pickle - Primarily used in serializing and deserializing a Python object structure, it’s the process of converting a Python object into a byte stream to store it in a file/database, maintain program state across sessions, or transport data over the network.

The automated attendance system consists of three ways to create a customized dataset which was used for facial recognition / detection to get the required output for fulfilling the user requirements.

The method used in the project is

Use open computer vision and webcam – The method involves creating and collecting the primary datasets which is loaded in system using the computer vision library.

The steps that were used in completing the project is mentioned below :

Collecting data is utterly difficult due to numerous constraints for instances the volume of data and the throughput required for proper and timely ingestion. Once the dataset is collected and merged , the image has to be captured through the web cam. As soon as the image is captured the image is then detected. Preprocessing the next step , this step involves sorting the dataset , analysing and making it efficient. In Feature Extraction, algorithm always expect the input to be integers/floats, so we need

2. ARCHITECTURE DIAGRAM

The Fig.1 shows the system architecture, the entire program runs in python and is classified using py libraries. The diagram shows the working methodology of the project.

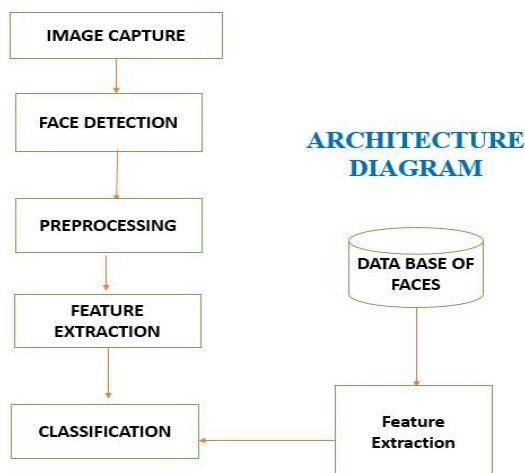


Fig -1: Architecture diagram

to have some feature extraction layer in the middle to convert the words to integers/floats.

The working structure is given below,

For encoding faces, the packages are imported, argument parser is constructed and parsed. Paths are collected to input images present in the dataset. Already known names and images are initialized. Person's name is extracted from the given image path. Input images are loaded and converted from Open CV ordering (RGB) to dlib ordering (RGB). The coordinates of the boundaries for each input image is detected. Facial embedding for each face are computed. These encodings and names are added to our set of already known names and encodings. Now, the whole facial encodings along with names are dumped to the disk.

The facial recognition working structure is as follows, the required packages are imported and the course name is also specified. The camera source is given as internal and external cam. The encodings are then imported and the size of each image is adjusted or edited. Here the text is drawn into the image before comparing them with the dataset and then the images will be checked for a match. Once the match is found, the list is updated with names. The recognized faces are taken and their coordinates are rescaled. Next, the predicted name of the face is drawn on the image. Once the face is recognized edits can be done if necessary. If the person's face is detected successfully, the attendance is marked as present. The list of total number of persons with the number of persons present is displayed. Now, a .csv file is used to add the new attendance along with their names. The data contains names, attendance, time and date on which the attendance is taken. The data is then read from the .csv file and the final attendance is displayed. A new data frame will automatically be create for every new entry , then the attendance is taken from these data frames and is added to the .csv file.

3. CONCLUSION

The project with an efficient system helps us solve real world problems like legit attendance with no proxies and it is also time saving. This system will be helpful in every organization which is in need of an effective attendance monitor. The credible system helps in not only reducing the proxy attendance but also in managing the collected data efficiently.

The paper mainly discussed about various methods used for face detection that can be used by educational or commercial organizations for monitoring attendance of an individual.

4. FUTURE SCOPE

Any organization requires a proper and effective attendance system to manage the attendance record of individuals. Managing hard copy records is tedious and consumes more time so, it is made easier with the help of this Automated Attendance System involving facial detection which eliminates the errors we usually get. The system tends to minimize the proxy attendance and the data is stored and managed efficiently. In future, this system can be optimized to capture more details present in the image and many methods can be introduced to store data. This system can also be used in non-educational / commercial organizations by altering it according to their requirements.

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BIOGRAPHIES

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