A Smart attendance system

A Minor Project Synopsis Submitted to

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Abstract

A smart atendance System using 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.

Introduction of the Project.

A smart attendance system provides an easy way to collect attendance

Of students using face recognition by capturing an image of a person. The system

Identify person and store information in the database.

Face recognition is one of the most important biometric recognition techniques. It is relatively easy to use.

The attendance system using face recognition is a procedure of recognizing students by using face biostatistics based on high-definition monitoring and other computer technologies. The development of this system is aimed to accomplish the 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.

Objectives :

1. Reducing time wastage during conventional class attendance.

2. Utilizing the latest trends in machine vision to implement a feasible solution for the class attendance system.

3. Automating the whole process so that we have digital environment.

4. Preventing fake roll calls as one-to-one attendance marking is possible only.

5. Encouraging the use of technology in daily lives

Methodology for the System :

• Capture a video and check each frame for a person. • If any person is detected, detect the face and crop the frame around his face. • Generate facial features of that face and match these with the local database. • If the facial features are matched get the name of the person from the local database. • Get the date and name of the person detected and update the attendance in the google sheet.
• Get the email id of the person from the google sheet and send a mail regarding the attendance status.

Methodology for face recognition:

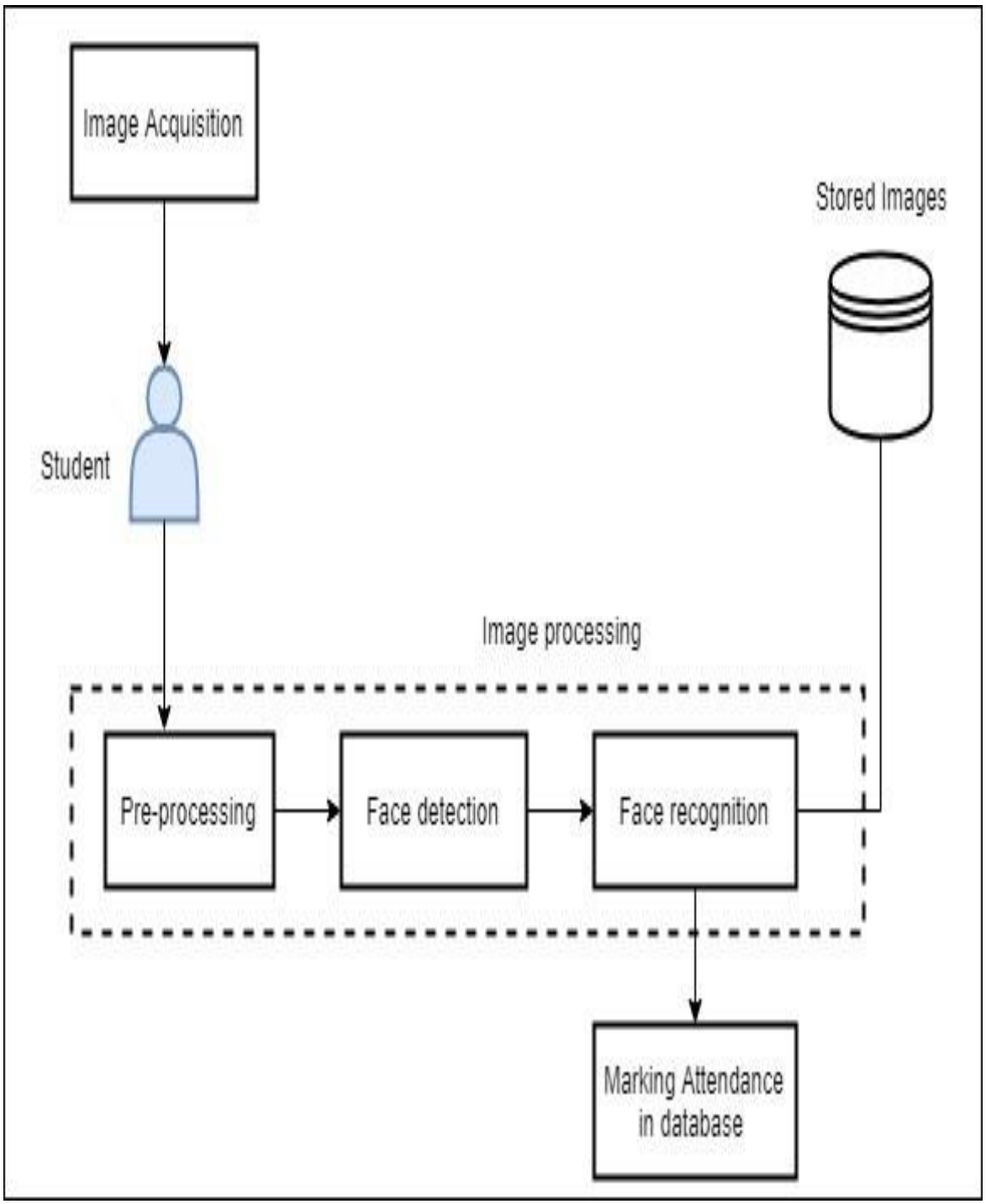
• Capture a video and process each other frames • Capture a video and process each other frame. • Resize the image to 1/4th of the original frame. • Convert the image from BGR to RGB. • generate a 128 byte array of data for each face detected. • Compare this array with the existing arrays in the local database. • Calculate Euclidian distance from each face in the local database and get the index of minimum distance. • Get the name of the best match index.

System Design

Activity diagram :

The System process can be separated into three working modules. They are face representation, feature extraction and classification. The first and foremost task is modelling a face. The way is face is represented determines the next two steps. The image acquired is transformed to match the positions of images already present. In

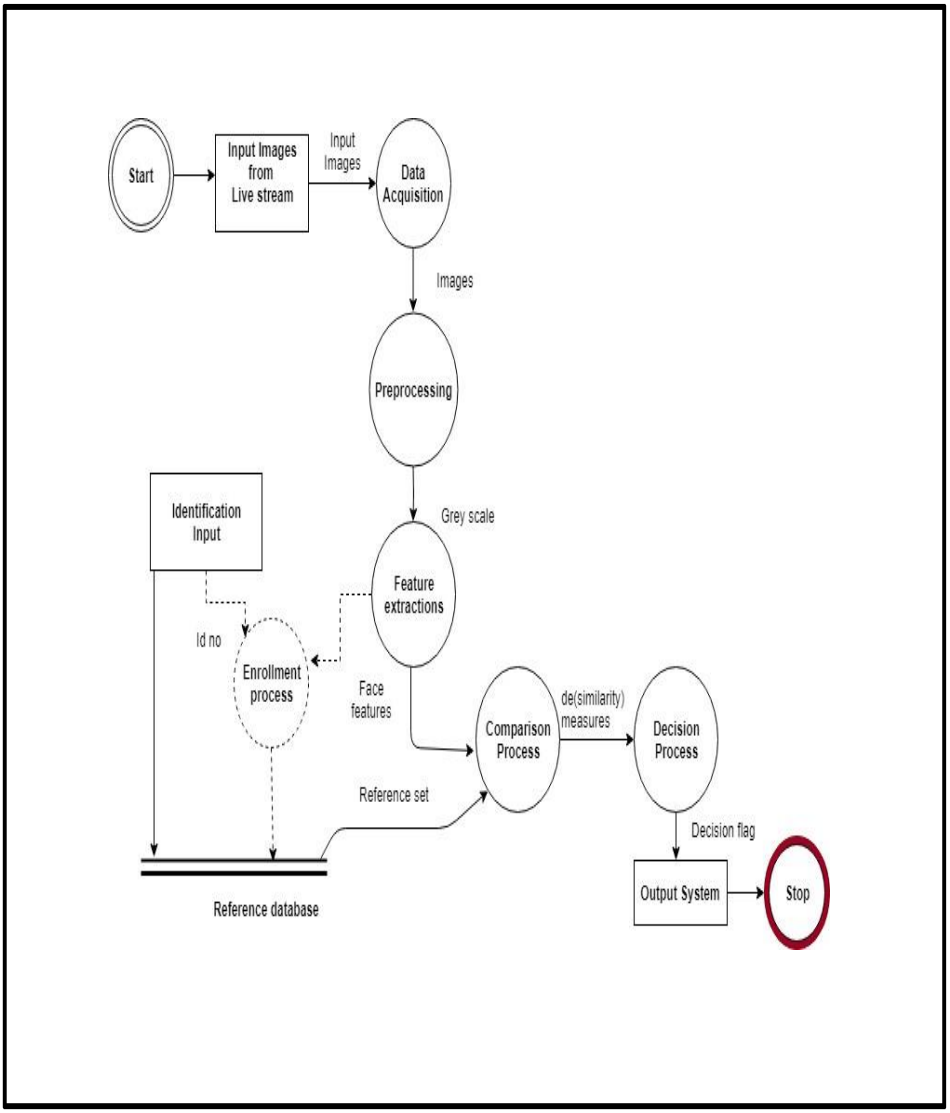
feature extraction the features of the face are mapped as histograms with gradients [3][4]and they are stored as binary values. The final step is recognizing a familiar face. The system compares the face seen in the camera with records that are already stored



Activity diagram of system

Data flow diagram :

The above diagram shows how the flows in the system. Images from a live stream are passed as input to the system. These images are converted to greyscale as LBPH works with images in greyscale. From the greyscale images features of the face are extracted. Features refer to the gradients in the face. The features are then compared with existing records to check if there is a match. If the face matches it is displayed and output is in the form of attendance being marked for the person whose face was recognized. The below figure explains the flow of data.



Technology Used :

The following tools will be used in the implementation of the designed system :

- Programming language :
  - **Python 3**

- Tools :
  - **OpenCV library:** OpenCV is the huge open-source library for the computer vision, machine learning, and image processing and now it plays a major role in real-time operation which is very important in today's systems. By using it, one can process images and videos to identify objects, faces, or even the handwriting of a human.
  - **NumPy :** NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays
  - **Spyder :** Spyder is an open-source cross-platform integrated development environment for scientific programming in the Python language.
  - **Google cloud :** It provides a series of modular cloud services including computing, data storage, data analytics and machine learning. We use google spreadsheet to store students' attendance .

Conclusion and future Scope

Attendance System using Facial Recognition has been designed for the purpose of minimizing the labor work being done and decrease the errors that occur in the current manual attendance taking system. The goal is to automate and deploy a system that is useful to organizations like institutes or offices.

The implemented system works at optimum levels of efficiency in low-lit conditions up to a certain degree. The system can accurately recognizes faces between 80-90 percent of the time under normal daytime conditions. Future enhancements include improving the efficiency of the algorithm to detect faces at a farther distance, increase the capacity to recognize faces in low-lit environments and mark attendance for multiple faces detected at once.

References:

- https://www.researchgate.net/publication/326986115_Face_Detection_and_Recognition_Student_Attendance_System
- https://www.slideshare.net/VigneshLakshmanan8/smart-attendance-system-using-facial-recognition