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Research Article

OPEN CV BASED ATTENDANCE TRACKING AND DATABASE GENERATION TO PROVIDE EASE IN ATTENDANCE MARKING SYSTEM

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A B S T R A C T

We know the fact that attendance plays a vital role not only in school or colleges but also in corporate and business sector. This actually shows your presence during the working hour. However in schools and colleges taking attendance of students is slight hectic procedure and is time intensive as well. You as a teacher or professor needs to do a lot of paper work and then the data goes to database administrator so that he'll put the attendance details on the management information system (MIS). Thus not efficient as it should be. Same as for official purposes the biometric scanner is used i.e here rather than using your roll number you use fingerprint as your unique id. However it's not possible for students or employees due to same arrival time as for this purpose you need to make queue and time required will be much more. However the most relevant solution could be using open CV with python as a image processing tool and managing the database automatically as the image is detected.

INTRODUCTION

Management information system: It is widely used system to track and store data manually or by administrator and is used in Railway Reservations, School and college information management and so on. It is necessary to prevent the time required to mark the attendance and after marking it goes on to database manager one who marks the attendance and manages the overall information of students, teachers and staffs. The MIS manages the control and operation of institute. After management of proper data it makes sure that the decision taking scenario should improve. There are many types of information systems which differs by functionality and application. As we are aware that there are various level of management from top to bottom and it is too specifically provide better facility to organization or institutions and achieving better data interpretations.

Database MIS: Collects, stores, retrieves and show the data that has been collected.

Image Processing: It is a technique of modifying the images, processing the pixels, image quality improvement with the help of some predefined computer algorithms also known as digital image processing algorithms.

Open CV: It is a set of 2400 algorithms mainly a library that is derived from C++ and includes image processing and machine learning algorithms and mainly used in face detection or recognition, object recognition, robotics vision, movement tracking and recording in real time, various 3D processing and conditioning techniques as like 3D modelling , denoising and image editing. It is most suitable to use with python programming language thus providing efficiency with low memory space and precise processing of the image.

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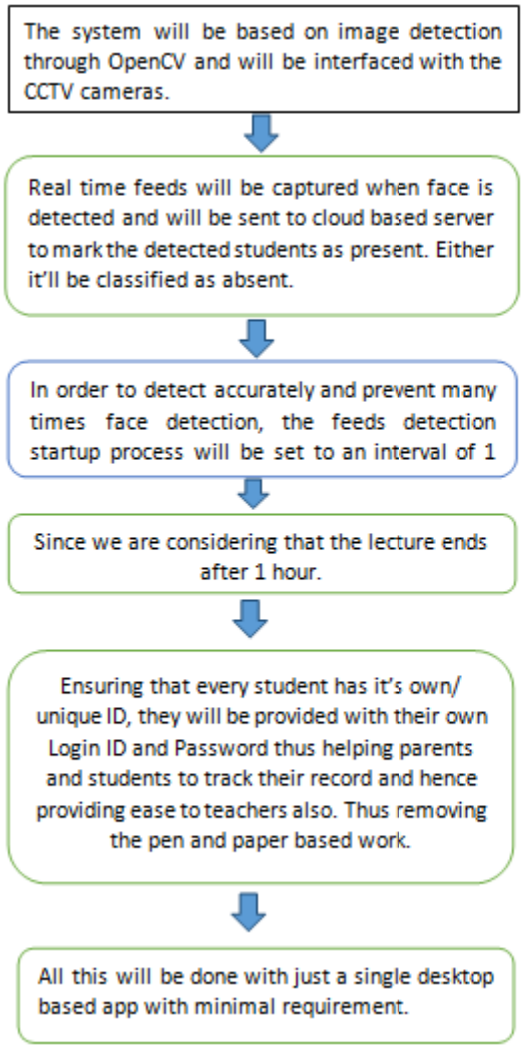
Current Scenario

In Current Scenario the Problems Identified are as Follows

a. Attendance marking is still done manually and a quite pen and paper based work.
b. Later to manage and modify the data base manual work or human efforts are required.
c. Time consuming and inefficient.
d. Too much data is being needed to be process and consumes memory space as well.
e. Tracking of regular and frequent attendance for parents, teachers and students too is not feasible.
f. Although there are many image detection based attendance tracking systems are present but are not applied on large scale because of the database is not present for interfacing to Open CV
g. May require third party help to do so and thus are not preferable by the organizations.
h. Summing all the above it's too hectic, pen and paper based process and time inefficient as well.

Proposed Methodology

Currently we are marking an attendance marking and classification as present or absent oriented system. To explain it thoroughly the flow is as follows:



Minimum Requirements

CCTV camera: Minimum – 8 MP.
Software set : For camera interfacing.

Arduino for prototyping of camera and programming.
OpenCV with Python on which programming will be done.
PC with at least 4 GB of RAM and 500 GB hard disk or higher.

Thus assuring the lowest cost requirement and feasible plat form for MIS as well. Note that for the process to detect and identify accurate objects or faces it is necessary to train the model with 30-35 images of each student differently. Hence efficiently achieving accuracy of up to 90%.

Advantages

1. Easy to manage overall decision making.
2. Low cost and minimal system requirements.
3. Accurate record tracking and classification as present or absent.
4. Apart from Colleges it can be implemented in corporate sectors as like offices and organizations.
5. Stimulate proper decision making and reduces pen and paper work.
6. Less requirement of human efforts.
7. Easy to modify, edit or remove.

Flowcharts and Diagrams

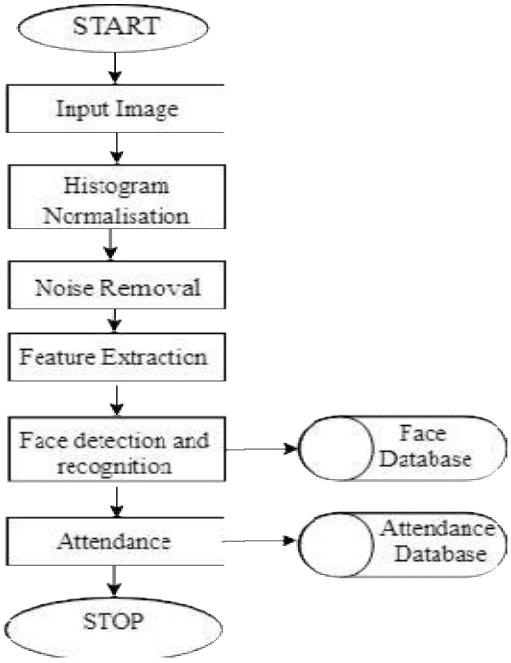


Fig Flowchart for the attendance system

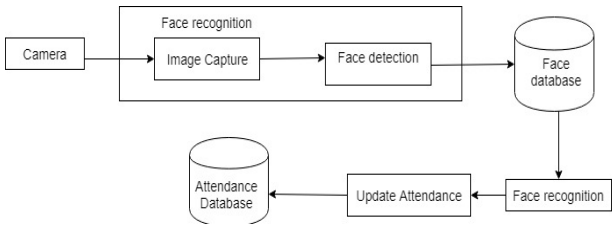


Fig System Architecture for face recognition attendance system

Technology and Impact

i. Face recognition is the fastest biometric technology, the only purpose of using this technology is to identify faces.
ii. Using this technology in attendance tracking system makes the tedious manual process faster and more accurate.
iii. The face recognition systems analyze the characteristics of a person's face from the images that were taken with the CCTV camera.

These features include length of jawline, cheekbones shape, distance between eyes, etc. These measurements gathered by the system are put in the database and compared to other detected faces in the image taken by the camera.
Thus resolving issues like:

- Improvement of security level
- Easy integration process
- High accuracy rates
- Full automation
- Increases the speed of process

Process or Approach work

The algorithms of biometric facial recognition follow several stages of image processing such as

Capture

The first step is for the system to collect physical or behavioural samples in predetermined conditions and during a stated period of time.

Extraction

All the gathered data should be extracted from the samples to create template based on them.

Matching

The final stage of face detection technology is to take decision whether the face's features in the image are matching with the one from facial database or not.

Monitoring Attendance

The attendance of the students whose faces are recognised is updated in the attendance database system automatically.

CONCLUSION

It is found that the current approach is having certain gaps which includes Biometric scanning through fingerprints and pen and in paper based attendance marking system.

a. It can be modified and the system implemented will be semi- sutonomous with edit and go features.
b. The system can be more optimized and accurate.
c. No additional/ extra system requirements.
d. The organization will no longer needed to change the entire system just the interface and algorithms are required to change.
e. This change will result in ease and errorless manipulation, thus promoting efficient decision making.

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