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## ATTENDANCE MANAGEMENT SYSTEM USING FACIAL RECOGNITION AND IOT TECHNOLOGY

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### Abstract

Today's buzzwords are Automation, AI and Machine Learning. Automation is very important requirement in all the fields. It makes all the process perform automatically with efficiency. The humans only checks whether the system is on or off. Process automation leads to errorless output and if anything happened wrong then rectification is also very easy. Attendance capturing is a routine task in every organization. Automation can also be applied in this attendance management process which saves our time. In this paper, an efficient way of attendance capturing systems is proposed that uses IoT based facial recognition system which is very convenient and more effective. Automation is a necessity in the current times as it makes processes more economical and affordable in the long run. It also frees humans from performing banal tasks day in and day out. Once a process is automated the only check that is to be performed is whether it is turned on or not. Automated processes are not prone to errors and even if an error is identified rectification is easy and can be applied system wide without any delay. Taking attendance is a mundane but necessary task in many academic institutions. In this paper, an alternate and more efficient method of taking attendance is proposed that uses facial recognition and cloud based IoT technology to automate the entire system.

### Existing System

Capturing attendance is an important mechanism in judging a student's commitment to his/her coursework and regularity in many professional educational institutions. Currently in majority of educational institutions in India, this process is carried out by the teacher, who manually calls all the students by name, verifies his/her presence and marks the attendance.

This is a very labor-intensive process and is prone to errors. It also wastes a lot of time at the beginning of the class which could otherwise have been used productively. The solution to this problem must be a complete system, as it has to be implemented throughout the academic or professional institution for the solution to be even considered. IoT provides a perfect platform for a solution of this archetype. With the

current rate of growth in the field and the ever-increasing demand for automation, the cost of sensors and other essential resources required to implement such systems has drastically reduced. With all this in mind, we decided to implement a feasible and efficient IoT based solution for the problem at hand.

## Introduction

To make all the attendance related work automatic we have designed an attendance management system which could be implemented for our lab purpose. It uses a facial recognition system developed in this project. This face recognition system uses existing as well as new techniques in face recognition and matching. A new one to many matching algorithms for large databases has been introduced in this identification system. Automated Attendance system has been implemented using different technologies available. Many systems have been proposed using RFID technology. This system is easy to implement but prone to fraudulent usages. System which is based on biometric details like fingerprint and iris, takes more time to give their attendance. So, the time-consuming process of traditional attendance system has not been eliminated by this system.

## Proposed System

Manual attendance taking and report generation has its limitations. It is well enough for 30-60 students but when it comes to taking attendance of students large in number, it is difficult. For taking attendance for a lecture, a conference, etc. roll calling and manual attendance system is a failure. Time waste over responses of

students, waste of paper etc., is the disadvantages of manual attendance system. The automated attendance system implemented with face recognition using image processing with combination of IoT technology will overcome the disadvantages of other proposed technologies

This explains how students and teachers will use this attendance management system.

Following points will make sure that attendance is marked correctly, without any problem:

- (1) All the hardware will be inside lab. So outside interference will be absent.
- (2) To remove unauthorized access and unwanted attempt to corrupt the hardware by students, all the hardware except raspberry pi could be put inside small cabin.
- (3) When student enters the lab, the attendance marking will start.

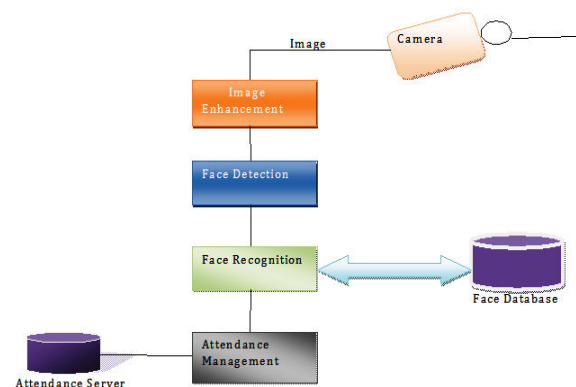


Figure: Attendance Management approach

The proposed model contains 5 phases to capturing the attendance:

**1. Face Training:** Train the system using trained dataset. The dataset contain number of pictures of different persons with different poses.

```

saikumar@saikumar-Dell:~/face-recognition-opencv$ python encode_faces.py --datas
et dataset --encodings encodings.pickle
[INFO] quantifying faces...
[INFO] processing image 1/15
[INFO] processing image 2/15
[INFO] processing image 3/15
[INFO] processing image 4/15
[INFO] processing image 5/15
[INFO] processing image 6/15
[INFO] processing image 7/15
[INFO] processing image 8/15
[INFO] processing image 9/15
[INFO] processing image 10/15
[INFO] processing image 11/15
[INFO] processing image 12/15
[INFO] processing image 13/15
[INFO] processing image 14/15
[INFO] processing image 15/15
[INFO] serializing encodings...
saikumar@saikumar-Dell:~/face-recognition-opencv$

```

**Fig: Train the images in the dataset**

**2. Image Capturing:** In this phase, using the camera, we run the program to start the camera that capture the images from the students.

**3. Face Detection:** The face detection phase identifies the face part from human bodies.

**4. Face Recognition:** In this phase it matches faces with the trained dataset. If any face is matched to the trained data, that displays the roll number. Otherwise it displays the unknown. Even more than once it recognizes the same faces of the persons, it considers only one time per day.

**5. Database Development:** The recognized faces can be stored in the database.

**Results:**



**Fig: Recognized faces**

rollno	day	logtime	status
15MT1A0501	2019-03-07	14:25:10	present
15MT1A0508	2019-03-07	14:31:08	present
15MT1A0516	2019-03-07	14:25:10	present
15MT1A0518	2019-03-07	14:25:10	present
15MT1A0521	2019-03-07	14:25:11	present
15MT1A0535	2019-03-07	14:34:44	present

**Fig: Identified faces storing in the database**

**Conclusion**

The facial recognition techniques embedded in the attendance monitoring system can not only ensure attendance to be taken accurately and also eliminated the flaws in the previous system. By using technology to conquer the defects can not merely save resources but also reduces human involvement in the whole process. The only cost to this solution is to have sufficient space in to store all the faces into the database storage. Fortunately, there is such existence of micro SD that can compensate with the volume of the data. In this project, the face database is successfully built. Apart from that, the face recognizing system is also working well. A webpage is also successfully built with fully functioning feature which is user-friendly. The database created is hidden from the user, however they can still access and make changes to it through the developed webpage with excellent interface.

## Feature work

Since the development time for this project is very limited, the designed system only consists of the minimum function required for it to work.

- Improve the face recognition algorithm.
- Provide better search functions in the webpage.
- Expand the storage of the raspberry pi.
- Develop a fingerprint recognition mechanism to enhance the recognition system.

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