# FACIAL RECOGNITION BASED ATTENDANCE SYSTEM

SYNOPSIS TO A PROJECT, SUBMITTED TO ST. XAVIER’S COLLEGE(AUTONOMOUS), KOLKATA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE B.SC COMPUTER SCIENCE(HONOURS).

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# INTRODUCTION

1.1 BACKGROUND

In schools and universities, student attendance is a vital part of the administration process. The common or classical method of taking attendance in universities is that, the professor calls the names or roll numbers of the students, to which they verbally respond and the attendance is noted. This method works effectively only when the class size is significantly small.

For very large classes with the number of students exceeding 50 or more, this classical method turns out to be ineffective and tedious, taking up valuable time from the total duration of the lecture. This process could be automated using different techniques like biometrics and face recognition.

Biometric based technologies include identification based on physiological characteristics (such as face, fingerprints, finger geometry, hand geometry, hand veins, palm, iris, retina, ear and voice) and behavioral traits (such as gait, signature and keystroke dynamics).

Face recognition appears to offer several advantages over other biometric methods, a few of which are outlined here: Almost all these technologies require some voluntary action by the user, i.e., the user needs to place his hand on a hand-rest for fingerprinting or hand geometry detection and has to stand in a fixed position in front of a camera for iris or retina identification.

However, face recognition can be done passively without any explicit action or participationon the part of the user since face images can be acquired from a distance by a camera. This is particularly beneficial for security and surveillance purposes. Furthermore, data acquisition in general is fraught with problems for other biometrics: techniques that rely on hands and fingers can be rendered useless if the epidermis tissue is damaged in some way (i.e., bruised or cracked).

Face detection is used to locate the position of face region and face recognition is used for marking the understudy’s attendance. The database of all the students in the class is stored and when the face of the individual student matches with one of the faces stored in the database then the attendance is recorded.

1.2 OBJECTIVES

The objectives of our project are as follows.

* To develop a prototype that implements face detection and face recognition algorithms for students in a classroom to facilitate attendance registering by the use of a webcam.
* To implement measures that will detect spoofing, i.e., attempting to recognize an image of a student instead of the real person.
* To implement a friendly graphical user interface that will help in the process of registering the attendance.
* To implement a robust database that will be updated automatically.

# 2.SURVEY OF TECHNOLOGIES

Several software technologies have been used to develop the prototype. They are enumerated below.

* Python 3.6 – A multi-paradigm programming language that supports a large number of external utility modules. We have used Python version 3.6 to develop the software.
* OpenCV – Open Source Computer Vision is a library of programming functions mainly aimed at real-time computer vision. The library is cross-platform and free for use under the open source BSD license.

# 3.REQUIREMENTS AND ANALYSIS

3.1 PROBLEM DEFINITION

Students’ attendance is an important part of any university administration and also a measure of student performance. Manual classroom attendance in which verbal response is required is time-consuming and error-prone (i.e., a student might miss their attendance if they cannot respond on time). Hence there is a requirement to automate this process. A possible solution to this problem that might make the attendance process more secure and free of human errors is the use of facial detection and recognition algorithms to record attendance in which no active action by the student is required.

3.2 PLANNING AND SCHEDULING

Firstly we created the facial recognition module. It took the maximum amount of time. After that the GUI for the entire project was done using Tkinter. Then we created the database system backend including faculty and administrator functions. Then the anti-spoofing measures were added.

3.3 SOFTWARE AND HARDWARE REQUIREMENTS

* 2Ghz dual-core processor is recommended
* 1 GB RAM is recommended
* Webcam with at least 2 MP resolution
* Python 3.6
* OpenCV 3 or above

3.4 PRELIMINARY PRODUCT DESCRIPTION

The software will initially create a database of the students’ faces. Then subsequently it will identify the faces of students with the help of the database created earlier. Then the records of the attendance of the day will be automatically updated to an MS-Excel spreadsheet.

3.6 CONCEPTUAL MODELS

Administrator

Faculty

Students Database

Matching student Records

by face recognition of attendance

Taking attendance supervision of entire

procedure, access to database