Automatic Attendance Camera

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Abstract- *This paper explains proposed algorithm for face recognition using image processing and manipulation of the output pin state of Arduino board with ATmega328P controller by tracking the face of a human. The face recognition algorithm has been developed on MATLAB platform by the combination of several image processing algorithms. Using the theory of Image Acquisition and Fundamentals of Digital Image Processing, the face of a user has been detected in real time. By using Face Recognition and Serial data communication, the state of Arduino board pin has been controlled. MATLAB programming develops a computer vision system in the real time for face detection and tracking using camera as image acquisition hardware. Arduino programming provides an interfacing of a hardware prototype with control signals generated by real time face detection and tracking. The automatic face recognition attendance system was designed with the aim of marking attendance of the students present in a classroom based on facial recognition and give out a marked attendance sheet. The system provides an efficient way of marking and storing the attendance without having to physically call out the name of each student. It helps save time and the attendance shall be directly stored without having to maintain a physical record.*

I. INTRODUCTION

The revolutionized computers open up the chances of using images and video frames as input signals of the signal processing. Such signal processing is named as image processing. Image processing transforms various sets of characteristics of image parameters into output as control signals. The constant revolution in the field of digital image processing opens up a multitude of application in various areas, in which innovative technologies could have been developed. The best platform on which many image processing algorithms have been developed so far is MATLAB. Major advantage using MATLAB as an image processing algorithm development environment is it's built in image processing functions and its compatibility with hardware such as cameras, Arduino Raspberry Pie and many more. The aim of this paper is to propose a prototype model which both detects and matches a face with distinct features and generates and sends a control signal to the hardware according to the face recognized. This proposed prototype system contains both software and hardware tools. Software includes MATLAB and Arduino IDE software whereas hardware includes Camera, Arduino board with ATmega328P microcontroller. The goal of this work is to visually detect and match a face and send the data to the Arduino board to glow LEDs connected with the microcontroller's digital output port. The most challenging issue rose while developing the face recognition algorithm is that detection of face against complex background. Here, we are using PCA method with Eigen faces to recognize the face.

While the move towards the digital era is being accelerated every hour, biometrics technologies have begun to affect people's daily life more and more. Biometrics technologies verify identity through characteristics such as fingerprints, faces, irises, retinal patterns, palm prints, voice, hand-written signatures, and so on. These techniques, which use physical data, are receiving attention as a personal authentication method that is more convenient than conventional methods such as a password or ID cards. Biometric personal authentication uses data taken from measurements. Such data is unique to the individual and remains so throughout one's life. This technology has been applied for controlling access to high-security facilities, but it is now being widespread developed in information systems such as network, e-commerce, and retail applications. In these technologies, fingerprint becomes the most mature and popular biometrics technology used in automatic personal identification. In the beginning, fingerprint verifying used in the military affairs and in the criminal identification. But now, this technology is also being used in several other applications such as access control for high security installations, credit card usage verification, and employee identification. The reason for the popularity of fingerprint verifying is that fingerprints satisfy uniqueness, stability, permanency and easily taking. Just for this, a number of fingerprint verification approaches have been proposed until now This system is an application of the fingerprint verifying and serial port communication techniques and it is mainly used for employee identification. Through practices, this system is proved to be easy-to-use and effectively. And this paper is organized as follows. Section 2 describes the technological requirements for this system design. Section 3 outlines the functions of this system briefly and describes the hardware and software design of this system. Section 4 introduces some key problems in the implement of this system and finally Section 5 contains

conclusions and future research plan. The information age is quickly revolutionizing the way transactions are completed. Everyday actions are increasingly being handled electronically, instead of with pencil and paper or face to face. This growth in electronic transactions has resulted in a greater demand for fast and accurate user identification and authentication.

What are biometrics?

A biometric is a unique, measurable characteristic of a human being that can be used to automatically recognize an individual or verify an individual's identity. Biometrics can measure both physiological and behavioral characteristics.
Physiological biometrics (based on measurements and data derived from direct measurement of a part of the human body) include:

• Finger-scan
• Facial Recognition
• Iris-scan
• Retina-scan
• Hand-scan

Behavioral biometrics (based on measurements and data derived from an action) include:

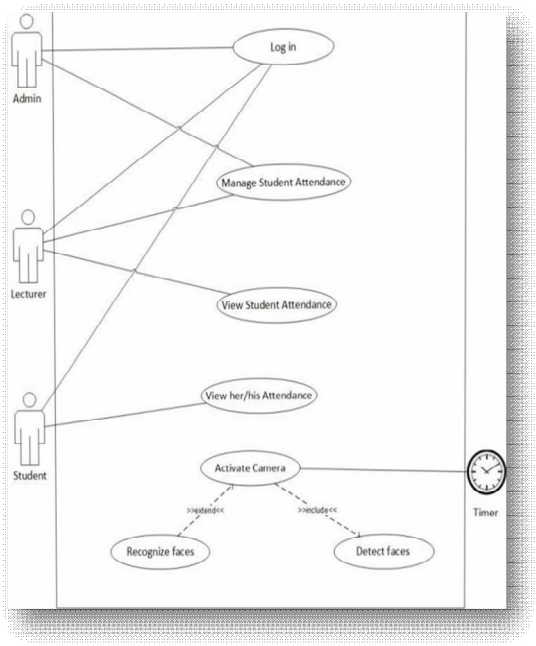
• Voice-scan
• Signature-scan
• Keystroke-scan

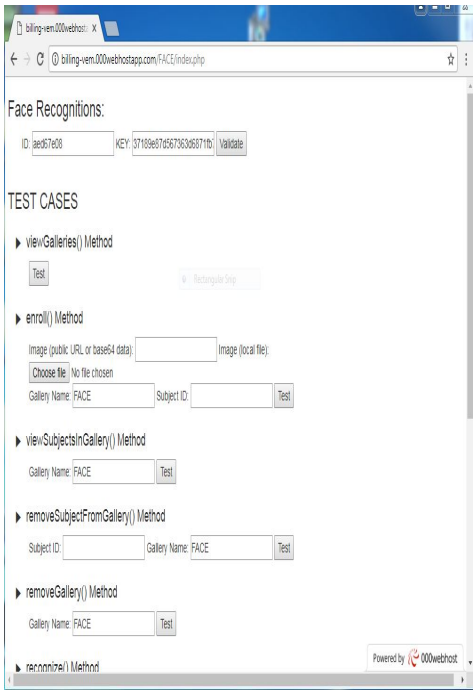
A "biometric system" refers to the integrated hardware and software used to conduct biometric identification or verification. Why we choose face recognition over other biometric

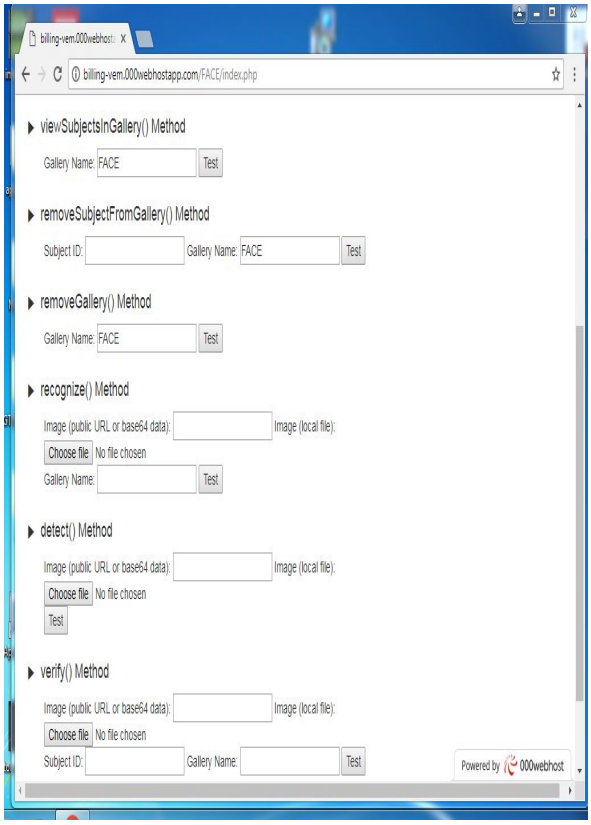
There are a number reasons to choose face recognition. This includes the following

1. It requires no physical inetraction on behalf of the user.
2. It is accurate and allows for high enrolment and verification rates.
3. It does not require an expert to interpret the comparison result.
4. It can use your existing hardware infrastructure, existing camaras and image capture devices will work with no problems.
5. It is the only biometric that allow you to perform passive identification in a one to many enviornment (eg: identifying a terrorist in a busy Airport terminal.)

Figures







II. REVIEW OF LITERATURE

System Existing

- Most of the attendance systems use paper based methods for taking and calculating attendance and this manual method requires paper sheets and a lot of stationery material. Previously a very few work has been done relating to the academic attendance monitoring problem. Some software's have been designed previously to keep track of attendance. But they require manual entry of data by the staff workers. So the problem remains unsolved. Furthermore idea of attendance tracking systems using facial recognition techniques have also been proposed but it requires expensive apparatus still not getting the required accuracy.

- **Authentication Using Fingerprints:-** A attendance management is an important part of companies management system. It can be in contact with salary of employee, work efficiency of company and even affects business image of company and staff morale. So the problem of reasonably, effectively and scientifically managing of staff attendances has become all companies facing issue. Traditional styles of attendance management include hand-written signatures, card bell, magnetic card, IC card and RF card attendance machines. These styles cannot avoid replacer checking out just because that people can be separated from cards. The great advantage of the authentication using fingerprints is the irreplaceable nature. Through the analysis of the overall and local characteristics of fingerprint such as ridges, valleys, ending, bifurcation points and ridge divergence points, we can extract enough detail data. Such data is unique to the individual and remains so throughout one's life. We can use these data to identify or verify a person operating as follows: (1) a digital image of one person's fingerprint to be verified is captured; a feature extracting algorithm is carried out; minutiae are extracted and stored as a template for verifying later; people to be verified place his finger on the fingerprint sensor so as to extracting the minutiae from the captured image; a matching algorithm is applied to matches the minutiae with the stored template previously.

III. PROPOSED SYSTEM

The Face Recognition is done by detecting and matching the face of a user. Here, a hardware set up is required which can be used as an image acquisition hardware such as camera. This camera is connected to a computer. Computer captures the video from the camera. An algorithm for face recognition is written in MATLAB environment. This program recognizes the face of a user in real time. Depending on the face recognized, the control signal is generated and sent through serial communication to Arduino board. State of LEDs connected to digital output pin.

IV. CONCLUSION

It can be concluded from the above discussion that a reliable, secure, fast and an efficient system has been developed replacing a manual and unreliable system. This system can be implemented in academic institutes for better results regarding the management of attendance. This system will save time, reduce the amount of work the administration has to do and will replace the stationery material with electronic apparatus. Hence a system with expected results has been developed but there is still some room for improvement. Face recognition technologies have been associated generally with very costly top secure applications. Today the core technologies have evolved and the cost of equipments is going down dramatically due to the intergration and the increasing processing power. Certain application of face recognition technology are now cost effective, reliable and highly accurate. As a result there are no technological or financial barriers for stepping from the pilot project to widespread deployment. The system provides an efficient way of marking and storing the attendance without having to physically call

out the name of each student. It helps save time and the attendance can be directly stored without having to maintain a physical record. Its algorithm for face recognition can be updated easily without an expense with advancement in technology. The system will also help save tons of paper which is wasted every academic year maintaining attendance of the students in schools and colleges throughout the globe.

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