

Security Management of Authentication System based on Multimodal Biometric Features

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ABSTRACT

Even though there are various security systems consuming large power are available in market nowadays, robbery rate is very high. We are proposing a novel system to prevent robbery in highly secure areas with lesser power consumption. This system has face-recognition technology which grants access to only authorized people to enter that area. If others enter the place without access using some other means, then the system alerts the security personnel and streams the video captured by the security camera. The biometrics security system is the lock and biometrics is the key to open that security system, uniqueness, universality, permanence, collectability, performance, acceptability. As mentioned, uniqueness is considered as the priority one requirement for biometric data. In this Security Management of Authentication System based on multimodal Biometric Features. The proposed system the data will be collected and saved as data base in personal computer. The database will contain name, photo, fingerprint, signature etc. will be stored on identification number. The programming of face identification, finger print and sign identification will be done using Matlab software.

Keywords :- Authentication System, Biometric Features, Dynamic Face Recognition, Signature Module, Finger Print Module, Aurdino Platform, Matlab

I. INTRODUCTION

Security systems has become more important in day today life and it will play very important role in near future as it can be used at homes ,assistive healthcare, banking etc. Security system is very necessary these days. World is not getting any safer place to avoid thefts. It is impossible to prevent any accidents such as burglary or robbing without proper security system installed. This security system can be used to secure different places and also to keep information confidential. This security system can also act as a key for cryptography. Biometrics is the science and technology of measuring and analyzing biological data. In information technology, biometrics refers to technologies that measure and analyzes human body characteristics.

The important biometrics characteristics currently in use include fingerprints, Iris, DNA, palm print, retina ear,

gait movement, keystroke patterns, smell, signature and voice. In multimodal biometrics system we use minimum of two and more forms of biometrics some of the examples are the combination of face and iris, combination of fingerprint and palm prints and combination of iris retina and face. Combination of two or more biometrics can generate more powerful key and in the single biometrics, there is chances of noise are more so the it creates problem in feature extraction for further processing. This system consist combination of finger print, face identification and signature verification.

II. PROPOSED WORK

It is proposed to design Security Management of Authentication System based on multimodal Biometric Features. This system can be used anywhere, where security is important. The use of this system can be done in banks for locker system. In the proposed system

the data will be collected and saved as data base in personal computer. The database will contain person's name, photo, fingerprint, etc. which will be stored on identification number. The programming of face identification and finger print will be done using MATLAB software.

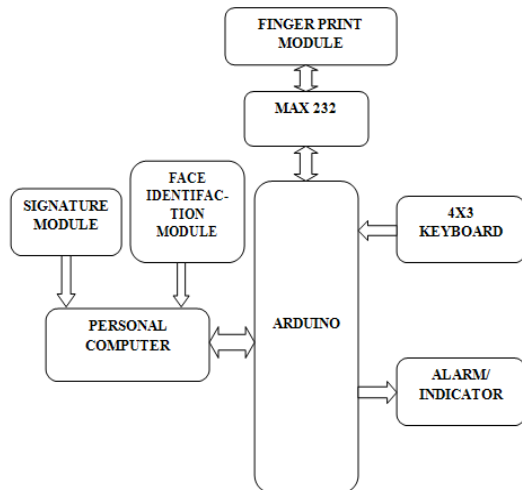


Figure 1: Block Diagram

As a part of security management, at the time of first verification, authorized person's identification number (mobile number) will be entered. The details of the person will be displayed on the personal computer. Then camera will take the image of person who is to be verified. The MATLAB software will do matching of the captured image and image already present in data base. If match occurs then first verification test of face recognition will be passed by authorized person. Then authorized person will be eligible for second verification, otherwise not.

At the time of second verification, verification of authorized person through finger print module will be done. Finger print will be scanned by finger print module. The stored finger characters and scanned finger characters will be compared. If match occurs then second verification test will be passed by authorized person. Then after confirmation of test pass by both verification systems, alarm indicator will alarm and then person is allowed to enter the restricted area e.g. bank locker room.

III. COMPONENTS

1. Arduino Uno

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

2. MAX232

The MAX232 is an integrated circuit first created in 1987 by Maxim Integrated Products that converts signals from a TIA-232 (RS-232) serial port to signals suitable for use in TTL-compatible digital logic circuits. The MAX232 is a dual transmitter / dual receiver that typically is used to convert the RX, TX, CTS, RTS signals.

The drivers provide TIA-232 voltage level outputs (about ± 7.5 volts) from a single 5-volt supply by on-chip charge pumps and external capacitors. This makes it useful for implementing TIA-232 in devices that otherwise do not need any other voltages.

3. Alarm/indicator

A Piezoelectric speaker or buzzer is a loudspeaker that uses the piezoelectric effect for generating sound. The initial mechanical motion is created by applying a voltage to a piezoelectric material, and this motion is typically converted into audible sound using diaphragms and resonators. Compared to other speaker designs piezoelectric speakers are relatively easy to drive; for example they can be connected directly to TTL outputs, although more complex drivers can give greater sound intensity. Typically they operate well in the range of 1-5kHz and up to 100kHz in ultrasound applications.

4. Face-recognition Module

It uses Intex USB 2.0 of 10mega pixel camera. The Face-recognition module is based on PCA (Principal Component Analysis) based on Eigen-faces and it is programmed using MATLAB/Open CV. It is executed in a PC/FPGA which can be chosen depending on the need or the environment where the system is implemented. It is programmed to serially communicate with the micro-controller 1 and capture an image using the Primary camera and process the image and give a response to the microcontroller.whether the person is recognized or not.

5. Finger print Modules

This is an optical biometric fingerprint reader/sensor (R305) module with TTL UART interface for direct connections to a microcontroller UART. The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person. This module can directly interface with any 3.3V or 5V microcontrollers, but a suitable level converter/serial adapter is required for interfacing with the serial port of a PC.

IV. CONCLUSION

The motive of above mentioned system is to provide high security using multimodal biometric features. The working environment for proposed system is matlab software for face, finger and signature verification. For purpose of verification the data base is gathered and saved. The system uses arduino platform for controlling the devices.

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