"Face Recognition Based Attendance System using SIFT Algorithm"

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Abstract - *In this project an approach to the detection and identification of human faces is presented and then recognizes the person by comparing characteristics of the face to those of known individuals is described. And we introduced a new approach that gives report by SMS to parents or principles mobile using GSM modem. In this project we use arm controller to send SMS and camera to capture an image. project base on biometric system. Biometric system is essentially a pattern recognition system that recognizes a person based on a feature vector derived from a specific physiological or behavioral characteristic*

Key Words: SIFT Algorithm, GSM Module, ARM Processor and Camera.

1. INTRODUCTION

A biometric system is essentially a pattern recognition system that recognizes a person based on a feature vector derived from a specific physiological or behavioral characteristic. The behavioral characteristic includes signature, gait, speech, face these character are changer with age and environment. Physiological characteristic include fingerprint, face and iris etc. This character is remaining unchanged through life of person .so because of this reason we are using physiological biometric parameter.

In this project an approach to the detection and identification of human faces is presented and then recognizes the person by comparing characteristics of the face to those of known individuals is described. And we introduced a new approach that gives report by SMS to parents or principles mobile using GSM modem. Here we use ARM processor to send message to register mobile number.

1.1 Operation of biometric system

Characteristic to produce its digital representation:

Here we take a image and find characteristic from the image. These characteristics store in database.

Here we use sift algorithm to store characteristic.

Verification mode: In verification mode the system validates a person's identity by comparing the captured biometric characteristic with the individual's biometric template, which is pre stored in the system database.

Identification mode: In identification mode, the system recognizes an individual by searching the entire template database for a match. The system conducts a one-to-many comparison to establish an individual's identity (or fails if the subject is not enrolled in the system database.

SMS sending: here ARM processor use. If person Authenticate Then information of that person send to pattern mobile. If person unauthenticated then show unauthenticated.

2. HARDWARE AND SOFTWERE

HARDWARE DESCRIPTION

1. ARM 7 Microcontroller (LPC2148):

Arm Microcontroller is the heart of the system. The ARM7 TDMI is general purpose 32-bit microprocessors, which offers high performance, small size and low-power. The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles.

The RISC instruction set and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs. This simplicity gives

- A high instruction throughput.
- An excellent real-time interrupt response.
- A small and cost-effective processor core

The ARM7TDMI processor has two instruction sets:

- The 32-bit ARM instruction set
- The 16-bit Thumb instruction set.

The ARM7TDMI processor supports the following data types:

- 8-bit (bytes).
- 16-bit (half words).
- 32-bit (words).

The ARM7TDMI processor has a total of 37 registers:

- 31 general-purpose
- 6 status registers.

1. LPC2148 GPIO

- Port 0

Port 0 is a 32-bit I/O port with individual direction controls for each bit. Total of 31 pins of the Port 0 can be used as a general purpose bidirectional digital I/O. while P0.31 is output only pin. The operation of port 0 pins depends upon the pin function selected.Pins P0.24, P0.26 and P0.27 are not available.

- Port1

Port 1 is a 32-bit bidirectional I/O port with individual direction controls. For each bit the operation of port 1 pins depends upon the pin function selected via the pin connect block. Pins 0 through 15 of port 1 are not available.

2. GSM Module (SIM 300):

In our project we are using SIM 300 GSM module.it is also connected to relay is connected through arm. SIM300 is a Tri-band GSM/GPRS engine that works on 900 MHz, 1800 MHz and 1900 MHz frequency. SIM300 can fit almost all the space requirements in your applications such as smart phone, PDA phone and other mobile devices.

3. LCD

The LPC2148 development board is included with 4-bit HD44780 based LCD interface. The board we used is shipped with 16*2 character LCD display. 16×2 LCD means it can display 16 characters per line and there are 2 such line.

- Read /write bit
- control signal

4. BUZZER

Buzzer is interface with to ARM microcontroller.
Logic '0' will turn ON buzzer. port is open drain type and it requires external pull-up for proper operation.

The LPC2148 development board has a pull-up on buzzer side. If using this pin for some other purpose then it is recommended to use a pull-up of 10Kohms on the external board.

SOFTWARE DESCRIPTION

1. KEIL µvision4 IDE:

Keil software is a compiler and debugger use to compile C code for microcontroller. It compile code, assemble assembly source files, link and locate object modules and libraries, create HEX files, and debug your target program. Keil is Project management, source code editing, and program debugging in one single, environment.

2. Flash Magic

The LPC series of microcontrollers are preloaded with the boot loader firmware which allows self programming of microcontrollers using serial port.

Flash magic is a utility which provides an interface for reading, writing and verifying the flash memory of the microcontroller. Or in simple way we can say that flash magic is used to dump the hex file in microcontroller.

3. MATLAB:

The MATLAB section consists of the face recognition module. Face Recognition module- Initially the images of each of the users is provided for the MATLAB & generate a set of facial features using of the feature extraction methods. During real time, the images of human face may be extracted from a USB camera. This involves MATLAB's Image Acquisition Toolbox, using

Which a camera is configured, accessed & brought one frame at a time into MATLAB's workspace for further processing using MATLAB's Image Processing Toolbox.

Database Creation using MATLAB

- Database Creation using MATLAB:

By using this we can store the features of students with the help of their face

- Image Recognition using MATLAB

By using this we can compare the features of live students with store database features.

3. PROPOSED METHODOLOGY

A face recognition system using the SIFT (Space invariant feature transformation) algorithm was implemented. The algorithm is based on Image features approach which represents a SIFT method in which a small set of significant features are used to describe the variation between face images. Experimental results for different numbers of faces are shown to verify the viability of the proposed method.

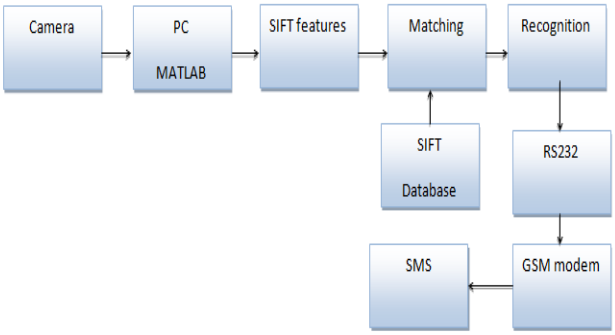

Fig -1: Block Diagram of Face Recognition System

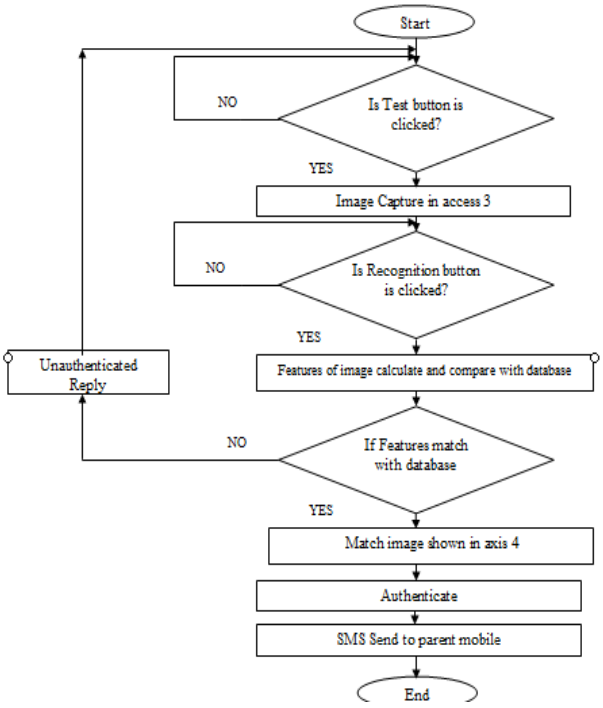

Chart 1. Flow chart of face recognition

Here camera is use to capture an image then. Features of that image calculate and that feature store in database. These feature calculate from SIFT algorithm []. Here we create 20 student databases. For recognition person camera use to capture am image then find feature of that image that feature compare with database features. If features match then person is authenticate otherwise

That person is Unauthenticated. If person match then attendance of that person send to parent mobile number. If person unauthenticated then red light blinks. Here ARM and GSM module use to send message.

3. CONCLUSIONS

By combine different method to recognithion of person we will develop face recognition attendance system and we use ARM processor to increase the speed.

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