Criminal Identification using image capture with alert to remote monitoring station.

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Abstract: *Now-a-days, terrorism has increased all over the world. Not only terrorism but also crime has increased. It is very necessary to identify these criminals and catch them since these criminals always hide their real identity and have a false identification. In order to identify the criminals and their attacks, intelligent and warning systems are used for detecting and preventing future attacks of these criminals. In this study, we introduce a new method to track criminals and use imaged-based face detection techniques. This paper proposes an image capturing technique in an embedded system based on ARM7 board. The experimental result show that the proposed system is fast enough to capture the image, recognize the algorithm and the data stream can flow smoothly between the camera and the board.*

Keywords: *Capture image, embedded system, and ARM7 board.*

I.   Introduction

Traditionally for person identification external thingssuch as keys, Passwords, etc. were used. But such information may be damaged or lost from the record database of police. One of the possible and easy method to solve these problems is through biometrics, for every person has his special biometric features. Biometrics identification technology has achieved a lot attraction from round the whole world. Biometrics features that can be used for identification include fingerprints, palm prints, handwriting, vein pattern, facial characteristics, face, and some other methods such as voice pattern, etc. This paper deals with a framework for criminal face detection via submitted image of the person.The proposed method provides a new approach to anomalous person's face detection via calibrated camera.

1.1 Face recognition:

Facial characteristics (the size and shape of facial characteristics, and their relationship to each other). Although this method is the one that human beings have always used with each other, it is not easy to automate it. Typically, this method uses relative distances between common landmarks on the face to generate a unique "face print". Face image acquisition does not require any physical contact, so the face identification system has not spread widely. Since the face is created in a nearly random morphogenetic process during the gestation, it has little probability to find two people in the world whose face textures are identical. So face recognition is the most accurate method and has the lowest false recognition rate. The face recognition has more stability than other biometric identification methods because the face has much more features than other biometrics and it won't change in people's life. With the advantages of non-invasiveness, uniqueness, stability and low false recognition rate, face recognition has been researched widely and has a broad usage, such as security, attendance, etc .
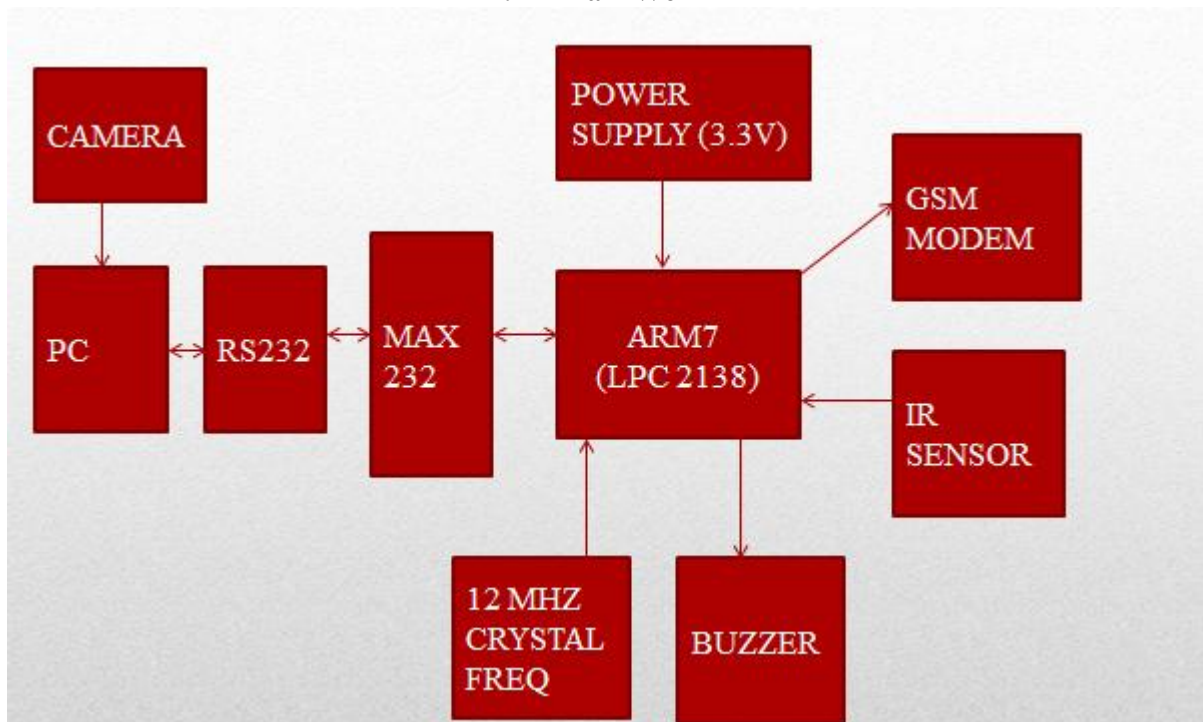
II.   Main Work

Fig.2.1 System block diagram

2.1 Block Diagram Description
2.1..1.Microcontroller(ARM 7) :
        ARM7 is one of the widely used RISC based micro-controller family in embedded system application.LPC2138 is the widely used IC from ARM-7 family. It is manufactured by Philips and it is pre-loaded with many inbuilt peripherals making it more efficient and a reliable option for the beginners as well as high end application developer

Specifications
MCU NXP's ARM7TDMI LPC2138 MCU
Memory:
512K Flash – Program Memory
32K+8K RAM – Data Memory
Clock:
12MHz crystal for maximum (5xPLL = 60MHz CPU clock) | 32 KHz RTC crystal
Power
9-12V, AC/DC- Adaptors, Power form USB (+5V) (+3.3V, 800mA)

2.1.2. SIM900
        The SIM900 is a complete Quad-band GSM/GPRS solution in a SMT module which can be embedded in the customer applications. Featuring an industry-standard interface, the SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data, and Fax in a small form factor and with low power consumption. With a tiny configuration of 24mm x 24mm x 3mm. SIM900 can fit almost all the space requirements in your M2M application, especially for slim and compact demand of design.
General features
Supply voltage range 3.4 ... 4.5 V
Low power consumption
Operation temperature: -30 °C to +80 °C
Compatibility: AT cellular command interface

2.1.3. Camera:
The Camera uses a CMOS image sensor from Omni vision. It has a digital video port that supplies a continuous 8/16 bit image data stream. All the camera functions, such as exposure, gamma, gain, white balance, windowing, can be changed through I2C interface by writing in some registers. The communication from the microcontroller to the camera to change the properties of the camera is made using the I2C.
To control all the communications the microcontroller is connected to the computer via a serial port. The microcontroller reads commands from the computer and performs the appropriate actions.

2.1.4. Buzzer:
A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.

2.1.5. IC555:
The 555 timer IC is an integrated circuit (chip) used in a variety of timer, pulse generation, and oscillator applications. The 555 can be used to provide time delays, as an oscillator, and as a flip-flop element. Derivatives provide up to four timing circuits in one package.

2.1.6. IR sensors
The basic concept of IR (infrared) obstacle detection is to transmit the IR signal(radiation) in a direction and a signal is received at the IR receiver when the IR radiation bounces back from a surface of the object

III.   Methodology Of Work
The person will come in front of the IR sensor .If IR sensor activates camera will take photo of the person. It will continuously scan the images, scanned images will send through USB to the system. This method works in two different states i.e. first it captures and compares the images pixels by pixels which is available on the databases, if captured image is same as predefined images then system will on the buzzer, display on LCD and send the message to the remote monitoring station through GSM.
Here in this process front end is written in matlab code in windows operating system and back end is written in keil code. Matlab is used for convenient display of results, and it has more options to select, optimize. The image that to be matched is given in front end and that display is shown. The data that is to be matched is given as another input for comparison.

3.1 A generic face recognition system
The input of a face recognition system is always an image or video stream. The output is an identification or verification of the subject or subjects that appear in the image or video. Some approaches [125] define a face recognition system as a three step process - see Figure 3.1.
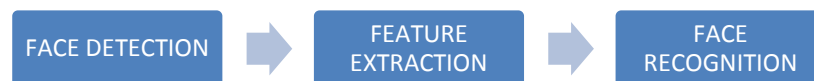

Figure 3.1: A generic face recognition system.

3.2 Detection methods divided into categories
1. Knowledge-based methods
2. Template matching
3. Appearance-based methods
4. Feature-invariant methods

Acknowledgement

IV.   Conclusion

Hence, we described the design methodology in this paper. Based on this method, we design the system to find the criminals by capturing the image and compare with predefined images.

An image capture system with embedded computing can extract information from images with-out need for an external processing unit, and interface devices used to make results available to other devices. The choosing of an Embedded platform is very unique and easy to implement.

Face Detection is about providing security in terms of person Identification in army area. This project aims to create one more step towards solving of this serious problem.

The design is based on computer vision and embedded system application principles. There has been significant pro-gress in improving the performance of computer-based face recognition algorithms over the last decade.

Security and surveillance are the two important aspects of human being. In this paper we propose face detection and recognition system that will capable of processing images very fast while ac-quiring very high true positive face detection rate.

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