

Automatic Face Recognition System

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Abstract— The Automatic Face Recognition system is widely applied in new technologies. The basic purpose of face recognition system is to compare the image which is stored in a database with the real time image. Many techniques have been used in face recognition system. An Efficient method for face recognition using Pattern matching technique. The Pattern matching has been extensively employed for face recognition algorithms. It is one of the most popular representation methods for a face image.

Keywords: Image processing, Pattern matching, Microcontroller, MATLAB and Camera

I. INTRODUCTION

Face Recognition becomes one of the most useful techniques from the past few years. Face recognition system has two main tasks: verification and identification. The process of face detection in images is complex because of variability present across human faces such as: pose; expression; position & presence of glasses or facial hair; differences in camera gain. A general face recognition system includes many steps; face detection; feature extraction; and face recognition. There are various types of techniques of face recognition such as wavelet transform, novel module, pattern matching and so on. The pattern matching is one of the best techniques in face recognition. By using the pattern matching technique we get better accuracy. The goal of face reorganization is to implement the system for a particular face and distinguish it from a large number of stored faces with some real-time image. [1] PCA is one of the most popular methods used for feature selection and dimension reduction. PCA is used as a dimension reduction technique in and for modeling expression deformation in. Subtract the mean of the data from each variable (our adjusted data). LDA is the most dominant algorithm for feature selection in appearance based method. The problem created in PCA method is overcome by LDA method. Any LDA based face recognition system uses first PCA to reduce dimension and the LDA is used to maximize discriminating power of feature selection. [2]

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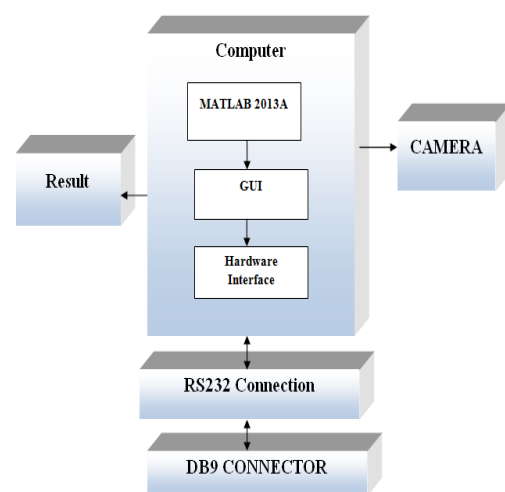
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II. PROPOSED SYSTEM

A. Software

The software section is completely based on MATLAB. In our interface we have used MATLAB for face recognition. We have used it in such a way that it matches the face from the predefined database and generates an event. [3]



“Fig.1” Block diagram of face recognition system (SOFTWARE)

i) Matlab (Matrix Laboratory)

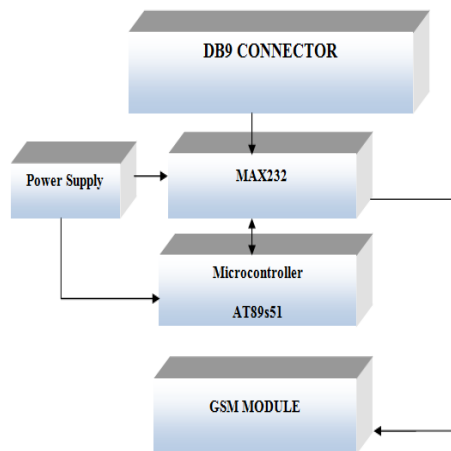
MATLAB is a multiparadigm numerical computing environment and fourth generation programming language developed by Mathworks. MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages including C++, C, Java. [3][1]

ii) KEIL uVISION4

It is the most popular 8051 C compiler in the world. It supports more features than any other 8051 C compiler available today. The C51 Compiler allows you to write 8051 microcontroller applications in C. It has good efficiency and speed of assembly language. The C51 Compiler converts C source files into reloadable object modules which contain full symbolic information for debugging with the µVision Debugger.

B. Hardware

In hardware the components are serial port, MAX232 voltage level converter controller to take input and generate output. RS-232 Level converters circuit for UART communication.



“Fig.2” Block diagram of face recognition system(HARDWARE)

i) Camera

A VGA(video graphics array) camera is considered as an early evolution of film cameras. It is supported the very basic and obsolete resolution 640x380 pixels. It was invented by IBM in the year 1987. It supports display mode of 640x380 pixel with 16 bit and 256 bit colors. By the year 1990 it was slowly replaced by more high technology creation such as the Extended Graphics Array (XVGA) Super VGA (SVGA) and followed by many others

ii) DB9 Connector

The term “DB9” refers to common connector type, one of the D-subminiature or D-sub types of connectors. DB9 has smallest “footprint” of D-subminiature connectors, and houses 9 pins (for the male connector) or 9 holes (for the female connectors). DB9 connectors are designed to work with the EIA/TIA 232 serial interface standard, which determine the function of all 9 pins as a standards, so that multiple companies could design them into their product. DB9 connectors were commonly used for serial peripheral device like keyboards, mice, joy sticks etc. also they are used on DB9 cable assemblies for data connectivity.

iii) MAX232

The MAX232 is an integrated circuit first created in 1987 by maximum integrated products that converts signal from a TIA-232 (RS232) serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and convert the RX, TX, CTS and RTS signals. The driver provide TIA-

232 voltage level output (approximately, +7.5 to -7.5 volts) from single five volts supply through on chip charge pumps and external capacitors. This makes it useful for implementing TIA-232 in device that otherwise do not need any other voltages. It is helpful to understand what occurs to the voltage levels. When a MAX-232 IC receives a TTL level to convert, it changes a TTL logic 0 to between +3 and +15 volt, and changes TTL logic 1 to between -3 to -15 and vice versa for converting from TIA-232 to TTL. The MAX232 has two receivers that convert from RS-232 to TTL voltage levels and to driver that convert from TTL logic to RS232 voltage levels.

iv) RS232 Connector

The RS232 first introduced in 1962 by the radio sector of the EIA. In telecommunication RS232 is a standard for serial communication transmission of data. The RS232 standard is commonly used in computer serial port. The standard defines the electrical characteristics and timing of signal, the meaning of signal, and the physical size and pinout of connectors. The current version of the standard is TIA-232-F interface between data terminal equipment and data circuit-terminating equipment employing serial data interchanges issued in 1997.

v) GSM MODULE

GSM MODEM: A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. There are many GSM modems available in the market and most of them are on TTL logic but some of them use RS232 standards and again it becomes a problems to communicate with GSM modem by using microcontroller, aurdino or any other TTL platform. MAX232 is used to solve this problem.

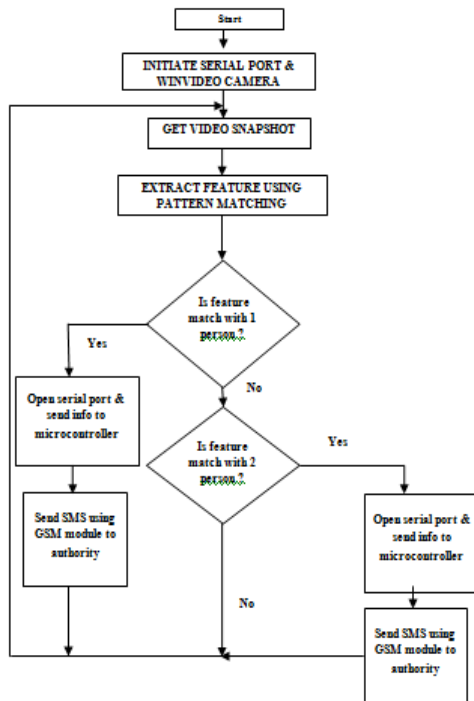
vi) AT89S51 Controller

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel’s high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89C51 is designed with static logic for operation down to zero frequency and supports two Software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer / counters, serial port and interrupt system to continue functioning. The Power-down Mode saves the

RAM contents but freezes the oscillator disabling all other chip functions until the next Hardware

III. FLOW CHART

A. Flow Chart



“fig. 3” flow chart of face recognition system

B. Operation

How to recognize face: Face recognition system consist of mainly three steps as follow

i) Image Acquisition

Image acquisition is first step of face recognition system. In this step image is collected from various sources. The sources may be camera and image data base. This image may be consist of some expression, variation, to check the performance of face recognition system. Under those condition we can calculate performance of a face recognition system. This performance is depends on illumination condition, camera distance, effect of back ground, effect of lightening condition etc. hence input image or data base image normalized by using some transformation method.

ii) Feature Extraction

This is the second step of face recognition system. It consist of process of increasing an information from the image. Feature extraction consist of

mathematical representation of original image which is nothing but biometric reference and it is stored in data base. After this extracted feature of image can be used in recognition. In feature extraction initial feature of image is considered as gray scale pixel.

iii) Face Recognition

This is final step of face recognition system in which image from data base compared with the new image which comes from snapshot of the continuous video. This continuous video taken by camera. If match will found then message will be send through GSM to the control room. If match will not found then loop will be continued as shown in the flow chart.

III. FUTURE SCOPE

This project can be used in bank security system. This project also can be used in Industries, office. It can also be used in the shop application. It can also be used in the local areas.

IV. ADVANTAGES

Our project model is helpful to detect crimer and send her information to nearest control room station. Due to our project model less time will be consumed to identify crimer. This project model is also useful in highly sensitive area. It has very less maintenance is required. It is more secure.

V. LIMITATION

The camera could be able to capture good images.

VI. CONCLUSION

The face recognition system is one of the major medium to recognize face of any crimer and by using GSM the information of that particular person send to control room or authorized person. Also we realize that this project saves time, energy and hence environment. Thus we can conclude that this project is give an idea to make use of GSM in crime detection to a next level.

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