

An Economical Car Security Authentication System Based On Face Recognition Structure

K. Jaikumar, B.Jaiganesh

computer science and engineering, Saveetha University, Chennai, India
 Electronics and Communication Engineering, Saveetha University, Chennai, India
 Jaikumar61695@gmail.com, Jaiganesh.price@gmail.com

Abstract: Our system fulfils the need of car security, by developing a smart car that allows US to capture the face of the intruder and to trace the car. Here we have a tendency to introduce a low-cost framework for embedded car security system, which consists of a face detection subsystem (FDS), a GPS (Global Positioning System) module, a GSM (Global System for Mobile Communications) module and a control platform. The face detection technique is applied in automobile security system, because this kind of technique is effective and fast, one alarm signal is given to create a “call” to the police and the host soundlessly with the help of other modules in the system epitome.

Keywords: GPS, GSM, MATLAB, FDS, PCA

I. INTRODUCTION

In modern world, many new techniques such as biometric recognition technique, image process technique, communication technique so on, are integrated into car security systems. At the same time, the amount of accident of cars still remains high, specially lost. traditional car security systems rely on many sensors and cost lots. And there are some systems based on face recognition that allows U.S. to drive the car only if the face matches the keep one. Here the major limitation is none other than the keep faces will drive the car, even if they're our relatives and friends. once one car is really lost, no more feedback may be valid to help folks to seek out it back. Major smartness of the of the system is that the entire system are often controlled through the mobile, thus allowing a person to drive the more is our choice. in the night once the car's owner is sleeping and once someone tries to steal the car, then FDS obtains images of the intruder by a tiny net camera hidden inside the car. FDS compares the obtained image with the keep images, if the image doesn't match then the data is sent to the owner through MMS. thus now owner will obtain the image of intruder in his mobile yet as he will trace the location through GPS. the location of the automobile yet as its speed are often showed the owner through SMS. thus by using this system owner will determine the intruder image yet as the location of the car. satellites transmit signals that may be detected by anyone with a GPS receiver. GPS has 3 parts: the house segment, the user section, and the control segment. The house phase consists of a constellation of 24 satellites and some spares, every in its own orbit 11,000 nautical miles above Earth. The user section consists of receivers, that we can hold in our hands or mount in a vehicle, like our car. The control section consists of ground stations (five of them, set round the world) that ensure the satellites are working properly. The master control station at Colorado runs the system.

1.) dallas controller

The DS89C430 is a low-power, superior CMOS 8-bit microcontroller with 4K bytes of In-System Programmable nonvolatile storage. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the Indus-try-standard 80C51 instruction set and pin out. The on-chip Flash permits the program memory to be reprogrammed in-system or by a standard nonvolatile memory pro-grammer. By combining a versatile 8-bit processor with In-

System Programmable Flash on a monolithic chip, the dallas DS89C430 may be a powerful microcontroller that provides a highly-flexible and efficient answer to several embedded control applications. The DS89C430 provides the following normal features: 4K bytes of Flash, 128 bytes of RAM, thirty two I/O lines, Watchdog timer, 2 data pointers, 2 16-bit timer/counters, a five-vector two-level interrupt design, a full duplex port, on-chip oscillator, and clock circuitry.

2.) Ignition control unit

Relay is used here in non-real time and a adaptive controller is used in real time applications. Relay operation once a coil of wire is wound on a non magnetic material like plastic, paper etc. ,it is known as a air-core magnet or just a magnet. If a soft iron core is inserted into the coil, it becomes an magnet. This magnet is that the basic element for relay and many other electromechanical devices like bell, fuse etc. once a current flows through the coil, the ensuing magnetic flux attracts an coil that's automatically joined to a moving contact. The movement either makes or breaks a reference to a hard and fast contact. once the present to the coil is transitioned, the coil is came back by a force some [*fr1] as sturdy because the attraction to its relaxed position. typically this can be a spring, however gravity is also used normally in industrial motor starters. Most relays ar manufactured to work quickly. in a very low voltage application, this is to reduce noise. in a very high voltage or high current application, this can be factory-made arcing

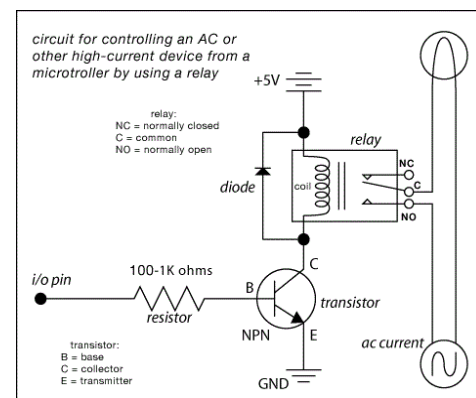


Fig.1 Relay circuit for ICU

3.) RS232 Communication standard

Serial communication is basically the transmission or reception of data one bit at a time. Today's computers generally address data in bytes or some multiple thereof. A byte contains 8 bits. A bit is basically either a logical 1 or zero. Every character on this page is actually expressed internally as one byte. The serial port is used to convert each byte to a stream of ones and zeroes as well as to convert a streams of ones and zeroes to bytes. The serial port contains a electronic chip called a **Universal Asynchronous Receiver/Transmitter (UART)** that actually does the conversion.

II. PROPOSED METHODOLOGIES

In our proposed system we introduce a low-cost framework for embedded car security system with face detection technique to capture the face of the intruder and a GPS module to track the car . Here the image processing is done using the Principle Component Analysis algorithm which is implemented through the MATLAB . And the sending of unauthenticated image through MMS and the location update through SMS are automatically implemented through VB code . Major smartness of the system is that the total system can be controlled through our mobile , thus allowing a person to drive the car is our choice. As the tools used to implement this design are simpler , implementation of the system becomes easier and cheaper. The FDS consists of a PC that is used to store the image of drivers and to carry out the image processing with the help of MATLAB software using the principle component analysis (PCA) algorithm. The web camera interfaced to PC is used to capture the image of the person driving the car and the image is processed using the MATLAB software running in PC .A GSM modem that is connected to a serial port of PC is a wireless modem that works with a GSM wireless network, which sends the unauthorized image after image processing to the owner's mobile. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. A GSM modem can be an external device or a PC Card / PCMCIA Card.

ECU which provides the location of car to the PC, which updates the owner every 5-10 seconds using GSM modem. The Ignition control unit (ICU) consists of a relay that is connected to controller. When a stop code is received from the owner, a 5V signal becomes active on the pin connected to base of the transistor in the relay. Now the transistor is short circuited, which makes a current to flow through the coil connected to collector of transistor. A magnetic field is induced in the coil which trips the relay, which stops the car. A power supply unit connected to ECU provides a +5V supply to all the circuits to function and the RS232 Serial communication link that is used between ECU ,GPS and PC is basically the transmission or reception of data one bit at a time.

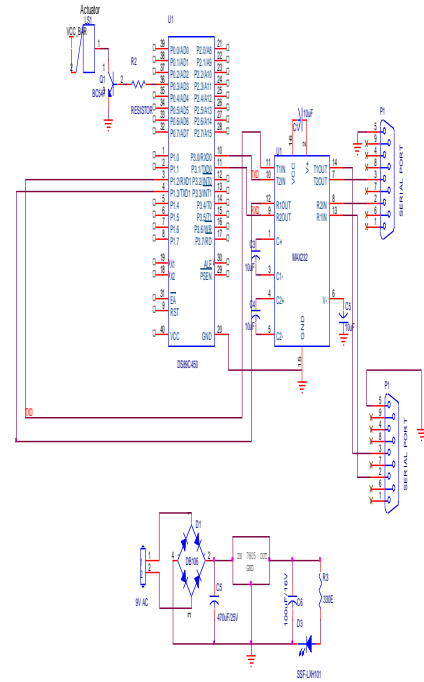


Fig.3 circuit diagram of proposed methodology

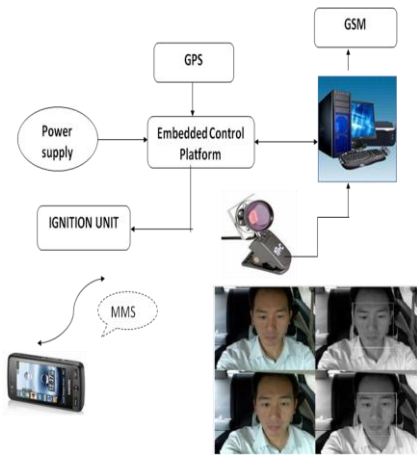


Fig.2 Block diagram for proposed methodology

The Embedded control unit (ECU) consists of a DS89C430 Microcontroller that is interfaced to PC through a MAX232 IC to make the voltage levels between the two devices compatible. The Dallas controller is programmed using KEIL software to control the car. A GPS module is interfaced to

Image processing algorithm

The Principal Component Analysis (PCA) is one of the most successful techniques that have been used in image recognition and compression. PCA is a statistical method under the broad title of factor analysis. The purpose of PCA is to reduce the large dimensionality of the data space (observed variables) to the smaller intrinsic dimensionality of feature space (independent variables), which are needed to describe the data economically. This is the case when there is a strong correlation between observed variables. The jobs which PCA can do are prediction, redundancy removal, feature extraction, data compression, etc. Because PCA is a classical technique which can do something in the linear domain, applications having linear models are suitable, such as signal processing, image processing, system and control theory, communications, etc. The main idea of using PCA for face recognition is to express the large 1-D vector of pixels constructed from 2-D facial image into the compact principal components of the feature space. This can be called eigenspace projection. Eigenspace is calculated by identifying the eigenvectors of the covariance matrix derived from a set of facial images(vectors). Once the eigenfaces have been computed, several types of decision can be made depending on the application. What we

call face recognition is a broad term which may be further specified to one of following tasks:

- **identification** where the labels of individuals must be obtained
- **recognition** of a person, where it must be decided if the individual has already been seen,
- **categorization** where the face must be assigned to a certain class.

PCA computes the basis of a space which is represented by its training vectors. These basis vectors, actually eigenvectors, computed by PCA are in the direction of the largest variance of the training vectors. As it has been said earlier, we call them eigenfaces. Each eigenface can be viewed a feature. When a particular face is projected onto the face space, its vector into the face space describe the importance of each of those features in the face. The face is expressed in the face space by its eigenface coefficients (or weights). We can handle a large input vector, facial image, only by taking its small weight vector in the face space. This means that we can reconstruct the original face with some error, since the dimensionality of the image space is much larger than that of face space. In this report, let's consider face identification only. Each face in the training set is transformed into the face space and its components are stored in memory. The face space has to be populated with these known faces. An input face is given to the system, and then it is projected onto the face space. The system computes its distance from all the stored faces. However, two issues should be carefully considered:

1. What if the image presented to the system is not a face?
2. What if the face presented to the system has not already learned, i.e., not stored as a known face?

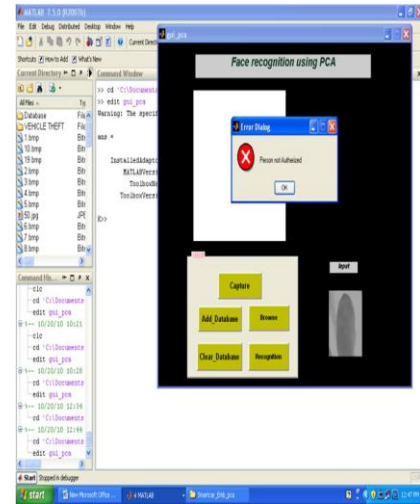
The first defect is easily avoided since the first eigenface is a good face filter which can test whether each image is highly correlated with itself. The images with a low correlation can be rejected. Or these two issues are altogether addressed by categorizing following four different regions:

1. Near face space and near stored face => known faces
2. Near face space but not near a known face => unknown faces
3. Distant from face space and near a face class => non-faces
4. Distant from face space and not near a known class => non-faces

Since a face is well represented by the face space, its reconstruction should be similar to the original, hence the reconstruction error will be small. Non-face images will have a large reconstruction error which is larger than some threshold μ . The Euclidean distance determines whether the input face is near a known face.

III. RELATED WORKS

A. GSM modem



GSM modem are often an external device or a pc Card / PCMCIA Card. Typically, an external GSM electronic equipment is connected to a pc through a serial cable or a USB cable. A GSM modem in the style of a pc Card / PCMCIA Card is designed for use with a laptop pc. It ought to be inserted into one amongst the computer Card / PCMCIA Card slots of a laptop computer. sort of a GSM mobile, a GSM modem needs a SIM card from a wireless carrier so as to work.

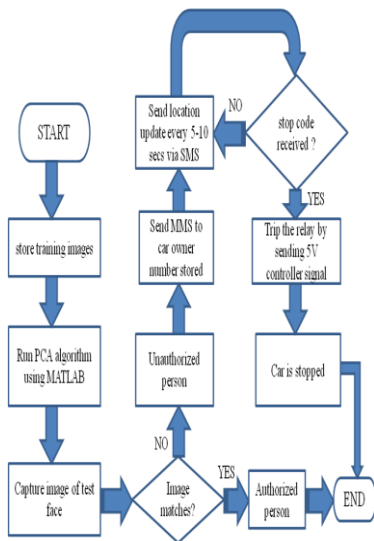
B. MAX232

MAX-232 is primarily used for folks building electronics with an RS-232 interface. Serial RS-232 communication works with voltages (-15V ... -3V for high) and +3V ... +15V for low) that aren't compatible with traditional pc logic voltages. To receive serial data from an RS-232 interface the voltage has to be reduced, and the low and high voltage level inverted. in the other direction (sending data from some logic over RS-232) the low logic voltage should be "bumped up", and a negative voltage has to be generated, too.

C. GPS

GPS, the global Positioning System, is the only system today able to show U.S. our exact position on Earth at anytime, anywhere, and in any weather. GPS satellites orbit eleven,000 transport miles above Earth. they're monitored unendingly at ground stations set round the world. The

PROCESS FLOWCHART



IV. MMS MODULE

The multimedia messaging Service module is a crucial emerging service, that permits the sending of multiple media in a single message, and the ability to send a message to multiple recipients. An example of a way to transfer a transmission Message

- victimisation an MMS compatible phone, take a photo
- Use your phone to modify the message
- Send the MMS message

On a compatible phone, the MMS message can seem with new message alert. the image message can open on the screen. a similar method is used in the car security system where the image of the unauthorized person will be sent through MMS to the multimedia MMS compatible phone.

D. Hardware Description

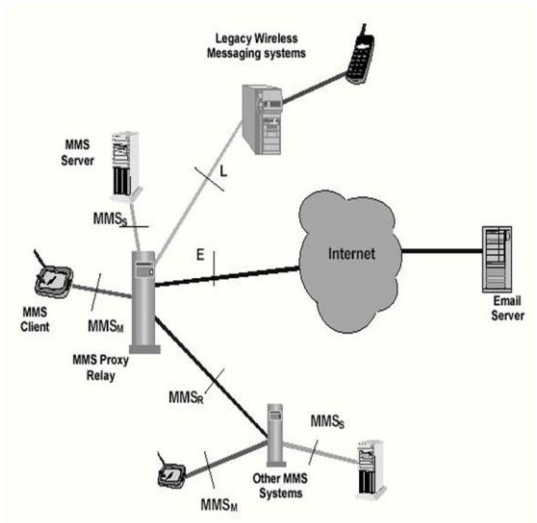


Fig.4. MMS Architecture

V. CONCLUSION

From this we implement image-recognition techniques that can offer the vital functions needed by advanced intelligent car Security, to avoid vehicle theft and protect the usage of unauthenticated users. So this system creates a Secured and safe surroundings for automobile users and also the investigators will simply find out the hijackers using the received image. we will predict the larceny by using this system in our day to day life. This project can help to reduce the quality and improve security, also much cheaper and 'smarter' than traditional ones. In future we will extend this system in real time by appending further options like car locking the door when stopping the car and informing the police mechanically through GSM, so the thief is captured.

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