International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 03 Issue: 05 | May-2016 www.irjet.net p-ISSN: 2395-0072

Automotive Human Safety and Preventing System in SMART CARS

N.Leela, Pavithra.B, Priyanka.T, Yamini.P

Assistant professor, Dept of ECE, GKM College of Engineering and Technology, Tamil Nadu, India

Students, Department Of ECE, GKMCET, Tamil Nadu, India

Abstract –*In modern world many new techniques such as biometric recognition technique, wireless technology have been integrated into car security and safety system. Face detection subsystem is a computer application for automatically identifying or verifying a person with the help of a source image. This is done by comparing selected facial features of the image and the database image and unauthorisation is carried out using MMS modem. This paper explores the use of histogram equalisation technique for feature-based recognition of objects from database or source image. Also RF technology is being used to reduce the speed of vehicles according to the zones with respect to transmitter and receiver. The MQ-6 sensor detects the electrical signals of flammable gases and alcohol consumption. Creating a new notion to check whether the person has weared seat belt or not, using reed swith sensor.*

Key Words: **Face detection subsystem, Facial biometrics, MMS modem, Histogram equalisation, RF module, MQ-6, Reed switch.**

1. INTRODUCTION

In the Existing system they have investigated the face verification issue in a scrambled domain in which biased random subspace sampling technology is applied. Also autonomous sensor is used for seat belt detection and the sensor is placed under the seat. It provides 50% efficiency. The alcohol sensor senses the electrical signal of alcohol in the breath. RF technology is being used to control the vehicle's speed which can run on an embedded system. Smart Display & Control (SDC) can be designed to fit into a vehicle's dashboard, and displays information on the vehicle.

Our proposed system consists of a face detection subsystem (FDS), seat belt and alcoholic sensing system and a control platform.

2. SYSTEM DESCRIPTION

FDS is used to detect the face of the driver which is obtained using a web camera and compare it with the predefined face. If the image doesn't match then the image is send to the owner through MMS. So now the owner can authenticate the person by sending a reply message to the control platform. Only if the person is authorized by the owner, the car will start. Here we implement a safety measure to detect whether the person has weared seat belt or not and also identifying the consumption of alcohol. Also only if these two conditions are satisfied the driver can start the car. The next module is speed control using RF technology. RF transmitters are placed in speed posts and a common receiver will be placed in cars. When the car enters into the transmitting range, the speed of the car is automatically reduced to the specified limit.

3. HARDWARE COMPONENTS

3.1 ARM7 TDMI Processor

The ARM7TDMI processor in our model is due to its advanced features described below. It is the industry's most widely used 32-bit embedded RISC microprocessor solution. The ARM7TDMI provides the low power consumption, small size, and high performance needed in portable, embedded applications. ARM7 consists of number of peripherals interfaced to it. We used gas sensor, reed switch sensor, RF-TX, UART, GSM.

FEATURES

- 16-bit/32-bit ARM7TDMI-S microcontroller is a tiny LQFP64 package.
- In-System Programming/ In-Application

Programming (ISP/IAP) via on-chip boot loader software, single flash sector or full chip erase in 400 ms and programming of 256B in 1ms.

- In addition, the LPC2148 provides 8kb of on-chip RAM accessible to USB DMA.
- One or two (LPC2141/42 Vs LPC2144/46/48) 10-bit ADCs provide a total of 6/14 analog inputs, with conversion times as low as 2.44ms per channel.
- Single 10-bit DAC provides variable analog output (LPC2148 only).
- Two 32-bit timers/external event counters, PWM unit (six outputs) and watchdog.
- Low power Real-Time Clock (RCT) with independent power and 32KHz clock input.
- Multiple serial interfaces including two UARTs, two Fast I2C-bus, SPI and SSP with buffering and variable data length capabilities.
- Up to 45 of 5V tolerant fast general purpode I/O pins in a tiny LQFP64 package.
- Up to 21 external interrupt pins available.
- A maximum of 60 MHz clock is available from programmable on-chip PLL with settling time of 100ms.
- The On-chip integrated oscillator operates in the range from 1 MHz to 25 MHz and power saving modes include Idle and Power-down modes.
- Additional power optimization is achieved by Individual enable/disable of peripheral functions as well as peripheral clock scaling.

BLOCK DIAGRAM

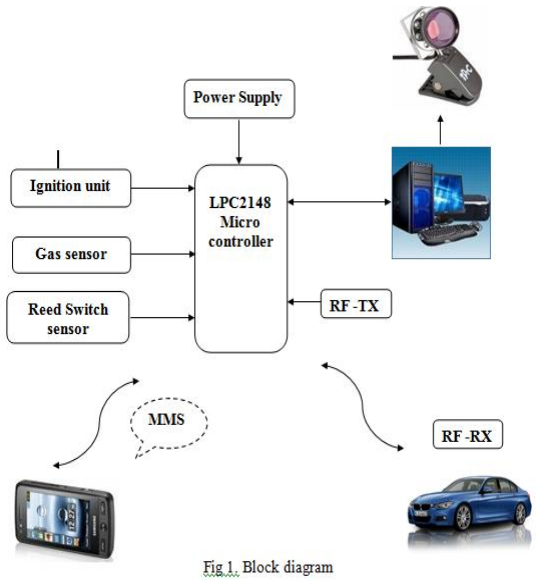

Fig 1. Block diagram

3.2 MQ-6

Model No.			MQ-6
Sensor Type			Semiconductor
Standard Encapsulation			Bakelite (Black Bakelite)
Detection Gas			Isobutane, Butane, LPG
Concentration			300-10000ppm (Butane, Propane, LPG)
Circuit	Loop Voltage	V_C	≤24V DC
	Heater Voltage	V_H	5.0V±0.2V ACorDC
	Load Resistance	R_L	Adjustable
Character	Heater Resistance	R_H	31Ω±3ΩRoom Tem.
	Heater consumption	P_H	≤900mW
	Sensing Resistance	R_s	2KΩ-20KΩ(in 2000ppm C_3H_8)
	Sensitivity	S	Rs(in air)/Rs(1000ppm C_4H_{10})≥5
	Slope	α	≤0.6($R_{2000ppm}/R_{1000ppm}$ LPG)
Condition	Tem. Humidity		20±265%±5%RH
	Standard test circuit		Vc:5.0V±0.1V V_H: 5.0V±0.1V
	Preheat time		Over 48 hours

Table-1: Techncal data of MQ-6

The structure and configuration of MQ-6 gas sensor is composed by micro AL2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer, measuring electrode and heater are fixed into a crust made by

plastic and stainless steel net. The heater provides necessary work conditions for work of sensitive components. The MQ-6 have 6 pins, 2 of them are used for providing heating current and other 4 pins are used to fetch signals.

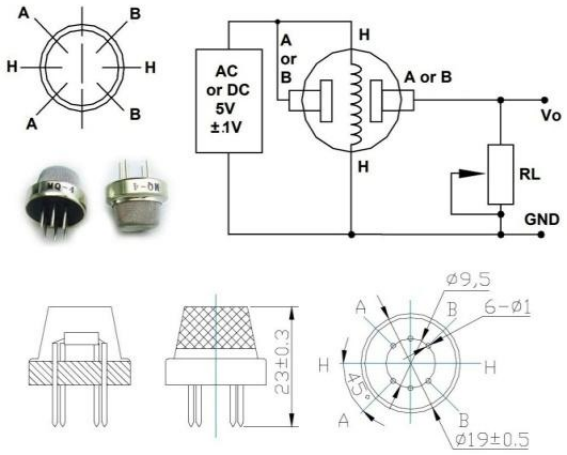

Fig-2: Electric parameter measurement circuit and configuration of MQ-6

SENSITIVITY CHARACTERISTICS:

Symbol	Parameter Name	Technical Condition	Remarks
R_S	Sensor Resistance	10Kohm-60Kohm (1000ppm LPG)	Detecting Concentration Scope: 200-10000ppm LPG, iso-butane, propane, LNG
α (1000ppm/4000ppm LPG)	Concentration slope rate	≤0.6	
Standard detecting Condition	Temp.: 20°C±2°C VC: 5V±0.1 Humidity:65%±5% VH:5V±0.1		
Preheating Time	Over 24 hours		

Table 2. Sensitivity characteristics of MQ-6

3.3. REED SWITCH

The reed switch is an electrical switch operated by an applied magnetic field. It consists of a pair of contacts on ferrous metal reeds sealed inside a glass envelope. A magnetic field (from an electromagnet or from a permanent magnet) will cause the reeds to come together, thus completing an electrical circuit. The stiffness of the reeds inside the glass envelope causes them to separate, and open the circuit as well, when the magnetic field ceases.

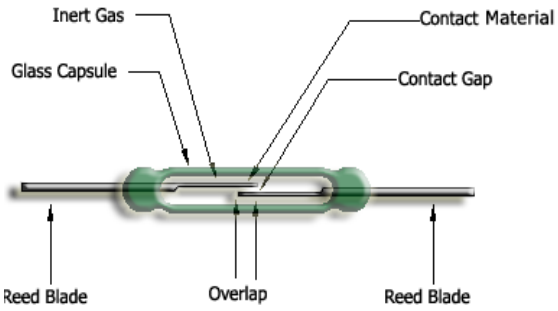

Fig-3: Structure of Reed switch sensor

3.4. GSM MODEM

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem more or less behaves like a dial-up modem. The major 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. The GSM modem works on the basis of commands. The commands usually starts with AT (Attention) and finish with a <CR> (character).

The AT commands are given to the GSM modem with the help of PC or controller. The GSM modem is serially interfaced with the ARM controller using MAX 232 voltage convertor. The MAX 232 acts as driver which converts TTL logic levels to the RS 232 logic levels and vice versa. The T1_OUT and R1_IN pin of MAX 232 is connected to the TX and RX pin of GSM modem.

MULTIMEDIA MESSAGING SERVICE

Multimedia Messaging Service (mms) is a standard way to send message that includes multimedia content to be transmitted and received by mobile phones over a cellular network.Users and providers may refer to such a message as a PXT, picture message, or a multimedia messaging. The MMS standard extends the core SMS (Short Message Service) capability of allowing the text messages having greater than 160 characters in length. Unlike text-only SMS, MMS can deliver a variety of media, including up to 40 seconds of video, one image, a slideshow of multiple images or audio.

3.5. MOTOR CONTROL

PULSE WIDTH MODULATION

As its name suggests, in pulse width modulation speed control is done by driving the motor with a series of "ON and OFF" pulses and varying the duty cycle. The fraction of time that the output voltage is "ON" compared to when it is "OFF", of the pulses while keeping the frequency constant.

The power applied to the motor can be controlled by varying the width of these applied pulses and thereby varying the average DC voltage applied to the motors terminals. By changing or modulating the timing of these pulses the speed of the motor can be controlled, ie, the longer the pulse is "ON", the faster the motor will rotate and the shorter the pulse is "ON" the slower the motor will rotate.

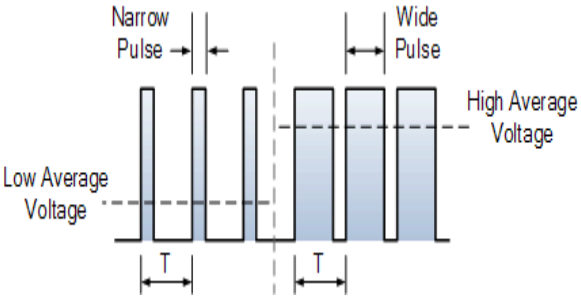

Fig-4: PWM wave

In other words, the wider the pulse width, the more average is the voltage applied to the motor terminals. Also more stronger the magnetic flux inside the armature windings and hence the faster the motor will rotate.

The time T_H, for which the output is "ON" is given by:

$T_H = 0.693(R_A).C$

The time T_L, for which the output is "OFF" is given by:

$T_L = 0.693(R_B).C$

The Total "ON-OFF" cycle time is given by:

$T = T_H + T_L$

The output frequency is,

$f = 1/T$

3.6. SPEED CONTROL

RF module comprises of an RF Transmitter and an RF Receiver. The TX/RX pair operates at a frequency of 434MHz. An RF transmitter receives serial data and transmits it wirelessly through RF.this transmission is supported by the antenna connected at pin4. The rate of transmission is 1Kbps - 10Kbps. The transmitted data is received by an RF-RX operating at the same frequency as that of the TX. The RF module is often used along with a pair of encoder/decoder. Here we use HT12E-HT12D encoder/decoder pair IC.

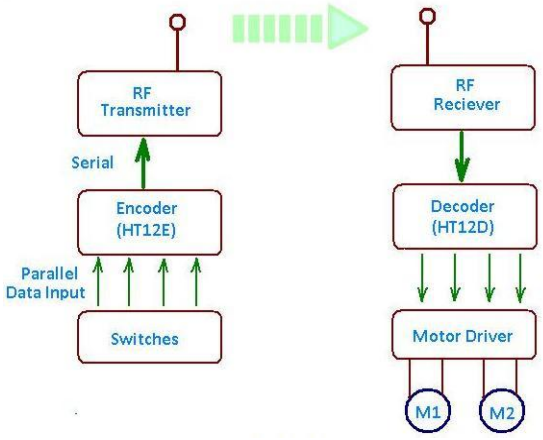

Fig-5: Communication flow of RF

4. CIRCUIT DIAGRAM

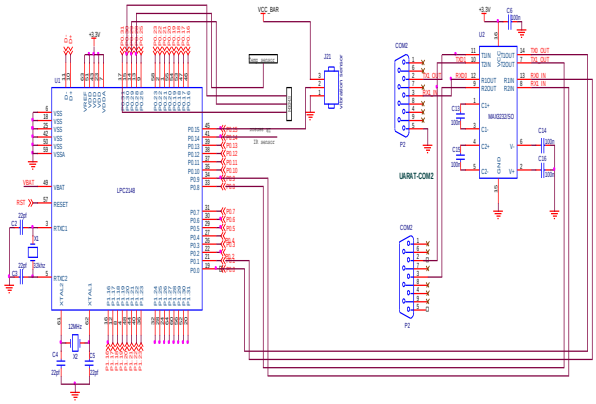

Fig-6: Circuit diagram

5. RESULTS

Here we are providing an authentication for security using face recognition and implementing a new concept to check whether the person has weared seat belt or not and also to check whether the person has consumed alcohol using sensors. Speed control in the sense, using RF transmitters at speed posts and a common receiver at cars, the speed of the vehicle is automatically reduced to the specified speed limit while it enters into the coverage area of the transmitter.

6. FUTURE SCOPE

The main problem during implementation of code is that,more time is taken for MATLAB to recognize the gesture.The proposed model is highly sensitive to rough background.The use of static gesture can also be implemented in future to overcome from this issue.Thus it enhances the human lives in security applications.

7. CONCLUSION

The main aim of this project is to provide safety and security to human. The paper explores the use of local feature histograms for feature-based recognition of objects from database images. Nowadays people drive very fast, accidents occur frequently and there is loss of property and life. In order to avoid such kind of accidents, in order to control their vehicle speed, RF technology is being used. It controls the speed of the car with respect to the zone automatically. Developing safety measures to prevent drunk and drowsy driving is major technical challenges for the car industry .We has developed a system for this that involves the reed switch sensor. It detects breath of the alcohol and any toxic gases. The selected application is intended for seat belt detection in which it results in a condition that if a person wears seat belt then the car tends to start else it doesn't. Hope this project provides a better solution to save human lives.

8. REFERENCES

[1] Minoru Sakairi, "Water Cluster Detecting Breath Sensor And Applications in Cars for Detecting Drowsy Driving", IEEE sensor jounal,vol.12,No.5,May 2012.

[2] Joan Albesa and Manel Gasulla, Member IEEE," Occupancy and Belt Detection in Removable Vehicle Seats Via Inductive Power Transmission", IEEE transaction on vehicular technology,vol.64,no.8,Aug 2015.

[3] Junhyung Lee , Jayun Huh, Bongsoo Son, "Variable Speed Limits Model to minimize Confliction without change in Total travel time using Queuing Theory" , IEEE 18th International Conference on Intelligent Transportation System 2015.

[4] Samuel Woo, Hyo Jin Jo, and Dong Hoon Lee, fellow, IEEE., "A Practical Wireless Attack on the Connected Car abd Security Protocol for In-Vehicle CAN", IEEE transaction on intelligent transportations systems.

[5] Manjunath Chincholi, student, ECE, SJCE, Mysuru, India., Dr.K. Chandrashekara, Professor, Mechanical Engineering, SJCE, Mysuru, India, "Design and Analysis of Vehicle Speed Control Unit Using RF Technology",International Advanced Research Journal in Science, Engineering and Technology, vol.2, Issue 8, August 2015.

[6]Mahyar Vajedi and Nasser L. Azad, "Ecological Adaptive Cruise Controller for Plug-in Hybrid Electric Vehicles Using Nonlinear Model Predictive Control", IEEE transactions on intelligent transportations systems, vol.17, no.1, jan 2016.

[7] Jullierme Emiliano Alves Dias, Guilherme Augusto Silva Pereira, Reinaldo Martinez Palhares , "Longitudinal Model Identification and Velocity Control of an Autonomous Car", IEEE transaction on Intelligent Transport Systems,vol.16,No.2,April 2015.

[8] Vadim Butakov, Petros Ioannou, fellow IEEE, "Driving Autopilot with Personalization Feature for Improved Safety and Comfort", IEEE 18th International Conference on Intelligent Transportation Systems, 2015.

[9] Richard Jiang, Ahmed Bouridane, Danny Crookes, M. Emre Celebi, Hua-Liang Wei, "Privacy-Protected Facial Biometric Verification using Fuzzy Forest Learning" Privacy-Protected Facial Biometric Verification using Fuzzy Forest Learning.