Available Online at www.ijcsmc.com

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320–088X

IJCSMC, Vol. 3, Issue. 9, September 2014, pg.244 – 258

RESEARCH ARTICLE

Intelligent Vehicle Control Using Wireless Embedded System in Transportation System Based On GSM and GPS Technology

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Abstract— Currently almost of the public having an own vehicle, theft is happening on parking and sometimes driving insecurity places. The safe of vehicles is extremely essential for public vehicles. Vehicle security and accident prevention is more challenging. So in order to bring a solution for this problem this system can be implemented. Vehicle security enhancement and accident prevention system can be developed through the application of ignition control (tracking and locking), fuel theft, accident detection and prevention, driver fatigue, pollution control and speed limiting with efficient vehicle management system. The need for this project is to provide security to the vehicles by engine locking system which prevents the vehicle from unauthorised access. This technique helps to find out the exact location of the accident and with the help of server an emergency vehicle can be sent to the exact location to reduce the human life loss. It also detects the behaviour of the driver through sensors whether he/she is drowsy or drunk, so that occurrence of accident can be prevented. The place of the vehicle identified using Global Positioning system (GPS) and Global system mobile communication (GSM). This is more secured, reliable and low cost.

Index Terms— Vehicle Tracking, Locking, Microcontroller, GPS, GSM

I. Introduction

In the last few decades, India has progressed at such an enormous rate that many companies have strongly established themselves here. These companies bring a huge amount of workforce with them. Arranging transportation to such a huge mass is a cumbersome task involving many intricacies. Generally, this transport is arranged through the local transport vendors on a yearly contract basis, recently happen mishaps such as burglary, rape cases etc. The development of satellite communication technology is easy to identify the vehicle locations. Vehicle tracking systems have brought this technology to the day-to-day life of the common person. Today GPS used in cars, ambulances, fleets and police vehicles are common sights on the roads of developed countries. All the existing technology support tracking the vehicle place and status

The GPS/GSM Based System is one of the most important systems, which integrate both GSM and GPS technologies. It is necessary due to the many of applications of both GSM and GPS systems and the wide usage of them by millions of people throughout the world [1]. This system designed for users in land construction and transport business, provides real-time information such as location, speed and expected arrival time of the user is moving vehicles in a concise and easy-to-read format. This system may also useful for communication process among the two points.

Currently GPS vehicle tracking ensures their safety as travelling. This vehicle tracking system found in clients vehicles as a theft prevention and rescue device. Vehicle owner or Police follow the signal emitted by the tracking system to locate a robbed vehicle in parallel the stolen vehicle engine speed going to decreased and pushed to off. After switch of the engine, motor cannot restart without permission of password. This system installed for the four wheelers, Vehicle tracking usually used in navy operators for navy management functions, routing, send off, on board information and security. The applications include monitoring driving performance of a parent with a teen driver. Vehicle tracking systems accepted in consumer vehicles as a theft prevention and retrieval device. If the theft identified, the system sends the SMS to the vehicle owner. After that vehicle owner sends the SMS to the controller, issue the necessary signals to stop the motor. In this paper, the reviewed related technology in section 3. The vehicle tracking and locking systems Vehicle Tracking and Locking System Based on GSM and GPS **87** carried out in the section 4 and 5.

II. Survey of the Related Work

In [1], this system describes a real time safety prototype that detects the driver condition and adjusts the speed of the vehicle. Sensors are used to detect the driver condition. It uses Psychological signals. When the driver is in abnormal condition first a warning signal is issued to alert the driver and braking will be applied if he continues driving.

In [2], this paper introduces aIntelligent Transport System(ITS) is introduced to identify the accident with the location which is immediately sent to the server, so that nearby hospital is found and emergency vehicle is sent to the accident zone.

In [3], Automation of a Neighbourhood Electric Vehicle (NEV) and the embedded distributed architecture for implementing an Advanced Driving Assistance System (ADAS) with haptic, visual, and audio feedback in order to improve safety with the feature of collision avoidance and motion planning.

In [4], this system provided vehicle cabin safety, security based on embedded system by modifying the existing modules. This method monitors the level of the toxic gases such as CO, LPG and alcohol within the vehicle provided alert information as alarm during the dangerous situations. The SMS sends to the authorized person through the GSM. In this method, the IR Sensor used to detect the static obstacle in front of the vehicle and the vehicle stopped if any obstacle detected. This is avoiding accidents due to collision of vehicles with any static obstacles.

In [5], explores location solution, map matching and data compress the associated with the positioning, shows a program flowchart and predicts the trend of the vehicle location system in the future.

In [6], the hardware and software of the GPS and GSM network were developed. The proposed GPS/GSM based System has the two parts, first is a mobile unit and another is controlling station. The system processes, interfaces, connections, data transmission and reception of data among the mobile unit and control stations are working successfully. These results are compatible with GPS technologies.

In [7], a vehicle tracking system is an electronic device, installed in a vehicle to enable the owner or a third party to track the vehicle's place. This paper proposed to design a vehicle tracking system that works using GPS and GSM technology. This system built based on embedded system, used for tracking and positioning of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). This design will continuously watch a moving Vehicle and report the status of the Vehicle on demand.

In [9], Face Detection System used to detect the face of the driver, and compare with the predefined face. The car owner is sleeping during the night time and someone theft the car. Then Face Detection System obtains images by one tiny web camera, which is hidden easily in somewhere in the car. Face Detection System compared the obtained images with the stored images. If the images don't match, then the information sends to the owner through MMS. The owners get the images of the thief in mobile phone and trace the place through GPS. The place of the car and its speed displayed to the owner through SMS. The owner can recognize the thief images as well as the place of the car and can easily find out the hijackers image. This system applied in our day-to-day life.

In [10], Kai-Tai Song and Chih-Chieh Yang have a designed and built on a real-time visual tracking system for vehicle safety applications. In this paper built a novel feature-based vehicle-tracking algorithm, automatically detect and track several moving objects, like cars and motorcycles, ahead of the tracking vehicle. Joint with the concept of focus of expansion (FOE) and view analysis, the built system can segment features of moving objects from moving background and offer a collision word

of warning on real-time. The proposed algorithm using a CMOS image sensor and NMOS embedded processor architecture. The constructed stand-alone visual tracking system validated in real road tests. The results provided information of collision warning in urban artery with speed about 60 km/hour both at night and day times.

In [11], the remote monitoring system based on SMS and GSM was implemented. Based on the total design of the system, the hardware and software designed. In this paper, the GSM network is a medium for transmitting the remote signal. This includes two parts that are the monitoring centre and the remote monitoring station. The monitoring centres consist of a computer and communication module of GSM. The software-monitoring centre and the remote monitoring station implemented by using VB. The result of this demonstration shows that the system can watch and control the remote communication between the monitoring centre and the remote monitoring station.

In [12] this paper, the proposed tracking system based on cloud computing infrastructure. The sensors are used to monitor the fuel level, driver conditions, and speed of the vehicle. All the data transferred to cloud server-using GSM enabled device. All the vehicles equipped with GPS antenna to locate the place. To avoid the drunk and drive, the alcohol sensor installed to monitor the driver status. The proposed technology significantly avoids the accident in highways.

III. Proposed Method

In this proposed work, a novel method of vehicle tracking and locking system used to track the theft vehicle by using GPS and GSM technology. This system puts into sleeping mode while the vehicle handled by the owner or authorized person otherwise goes to active mode, the mode of operation changed by in person or remotely. If any interruption occurred in any side of the door, then the IR sensor senses the signals and SMS sends to the microcontroller. The controller issues the message about the place of the vehicle to the car owner or authorized person. When send SMS to the controller, issues the control signals to the engine motor. Engine motor speeds are gradually decreases and come to the off place. After that all the doors locked. To open the door or restart the engine, authorized person needs to enter the passwords. In this method, tracking of vehicle place easy and doors locked automatically, thereby thief cannot get away from the car.

- Accident location and vehicle theft identification involves vehicle tracking using GPS technology.
- Vehicle security is enhanced by ignition control system
- Anti-vehicle theft using engine locking system.
- Fuel theft can be prevented by monitoring the fuel level in fuel tank
- Accident identification system provides the location at which accident occurs
- Driver fatigue system provides information about drivers heart beat rate, eye blink rate which prevent accident because of the drowsiness or drunk and drive by the driver
- Obstacle detection system helps in stopping the vehicle when an obstacle is detected using IR sensor and pollution detection helps in controlling pollution from vehicle using CO sensor
- GSM and GPS is used for tracking the location of vehicle and for providing SHORT MESSAGE SERVICE (SMS)

3.1 Block Diagram

The Block diagram of Vehicle tracking and locking system based on GSM and GPS technology is shown in the figure1.

It consists the power supply section, keyboard, GSM, GPS, microcontroller, MAX232driver, relay driver, IR Transmitter, IR receiver, LCD, Accident Sensor, Fuel Sensor, Heartbeat Sensor, Lane detection Sensor, Ultrasonic obstacle sensor, Vehicle Parking Motors, Emergency Button and door locker. The GSM board has a valid SIM card with a sufficient recharge amount to make outgoing calls. The circuits powered by +5v Dc.

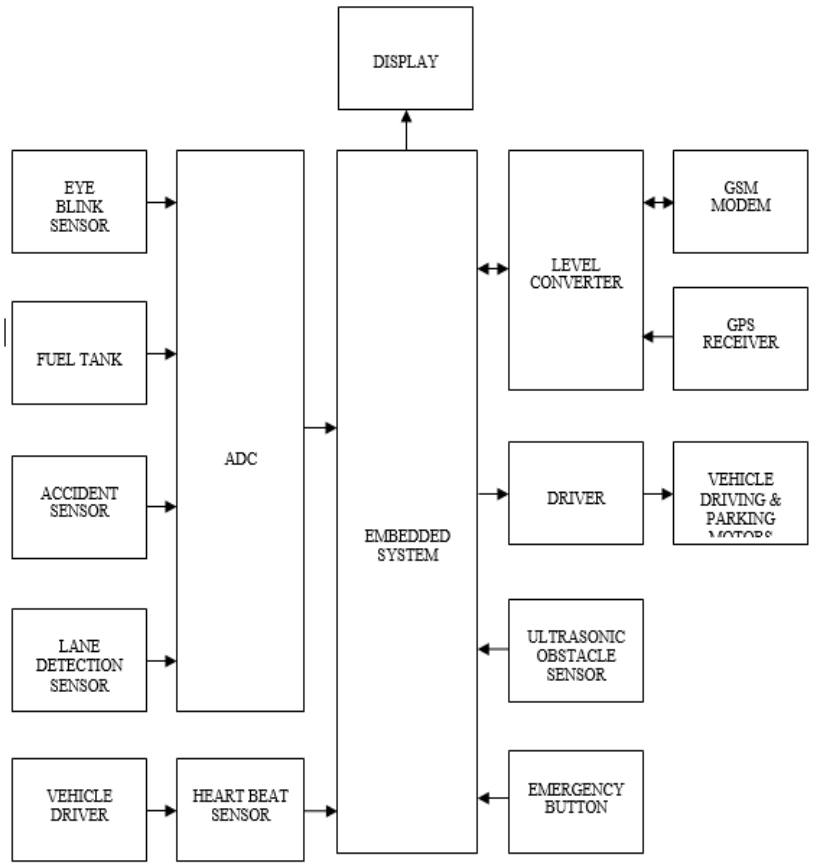

Fig. 1: Block diagram of Vehicle tracking and locking system based on GSM and GPS

3.2 Power Supply

The power supply section is very important for all electronic circuits. The 230V, 50Hz AC mains is stepped down by transformer X1 to deliver a secondary output of 12V, 500 mA. The transformer output is rectified by a full-wave rectifier comprising diodes D1 through D4, filtered by capacitor C1 and regulated by ICs 7812 (IC2) and 7805 (IC3). Capacitor C2 bypasses the ripples present in the regulated supply. LED1 acts as the power indicator and R1 limits the current through LED1.The power supply section is shown in the figure2.

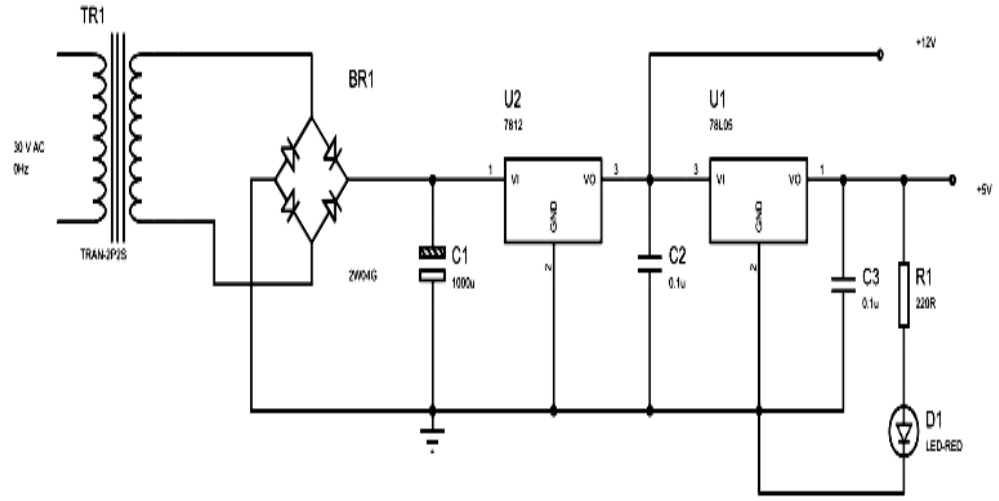

Fig. 2: power supply

3.3 PIC 16F887

PIC is a family of Harvard architecture microcontrollers made by Microchip Technology, derived from the PIC1640 originally developed by General Instrument's Microelectronics Division. The name PIC initially referred to "**Peripheral Interface Controller**". PICs are popular with developers and hobbyists alike due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming (and re-programming with flash memory) capability.

Core architecture:

The PIC architecture is distinctively minimalist. It is characterized by the following features:

- Separate code and data spaces (Harvard architecture)
- A small number of fixed length instructions
- Most instructions are single cycle execution (4 clock cycles), with single delay cycles upon branches and skips
- A single accumulator (W), the use of which (as source operand) is implied (i.e. is not encoded in the opcode)
- All RAM locations function as registers as both source and/or destination of math and other functions.
- A hardware stack for storing return addresses
- A fairly small amount of addressable data space (typically 256 bytes), extended through banking
- Data space mapped CPU, port, and peripheral registers

The program counter is also mapped into the data space and writable (this is used to implement indirect jumps).

Unlike most other CPUs, there is no distinction between memory space and register space because the RAM serves the job of both memory and registers, and the RAM is usually just referred to as the register file or simply as the registers

3.4 GPS Technology

The Global Positioning System (GPS) is a satellite-based navigation system consists of a network of 24 satellites located into orbit. The system provides essential information to military, civil and commercial users around the world and which is freely accessible to anyone with a GPS receiver. GPS works in any weather circumstances at anywhere in the world. Normally no subscription fees or system charges to utilize GPS. A GPS receiver must be locked on to the signal of at least three satellites to estimate 2D position (latitude and longitude) and track movement. With four or more satellites in sight, the receiver can determine the user's 3D position (latitude, longitude and altitude). Once the vehicle position has been determined, the GPS unit can determine other information like, speed, distance to destination, time and other. GPS receiver is used for this research work to detect the vehicle location and provide information to responsible and provide information to responsible person through GSM technology.

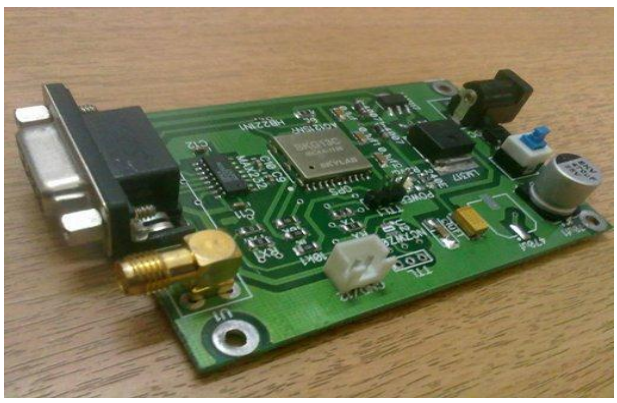

Fig. 3 GPS module

3.5 GSM Modem SIM300 V7.03

The GSM modem is a specialized type of modem which accepts a SIM card operates on a subscriber's mobile number over a network, just like a cellular phone. It is a cell phone without display. Modem sim300 is a triband GSM/GPRS engine that works on EGSM900MHz, DCS1800MHz and PCS1900MHz frequencies. GSM Modem is RS232-logic level compatible, i.e., it takes-3v to -15v as logic high and +3v to +15 as logic low.MAX232 is used to convert TTL into RS232 logic level converter used between the microcontroller and the GSM board. The signal at pin 11 of the microcontroller is sent to the GSM modem through pin 11 of max232.this signal is received at pin2 (RX) of the GSM modem. The GSM modem transmits the signal from pin3 (TX) to the microcontroller through MAX232, which is received at pin 10 of IC1 [9].

Features of GSM

- Single supply voltage 3.2v-4.5v
- Typical power consumption in SLEEP Mode: 2.5mA.
- SIM300 tri-band

- MT, MO, CB, text and PDU mode, SMS storage: SIM card
- Supported SIM Card: 1.8V, 3V

Fig. 4: GSM module

3.6 Eyeblink Sensor

Vehicle accidents are most common if the driving is inadequate. These happen on most factors if the driver is drowsy or if he is alcoholic. If sensor detects that the driver is unconscious while driving in traffic or at the middle of the road, the vehicle is expected to detect the edge of the road and then stop. If it does so the vehicle may not disturb the other vehicles**.**

Function

It involves measure and controls the eye blink using IR sensor. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low.This to check the eye position. This output is given to logic circuit to indicate the alarm.

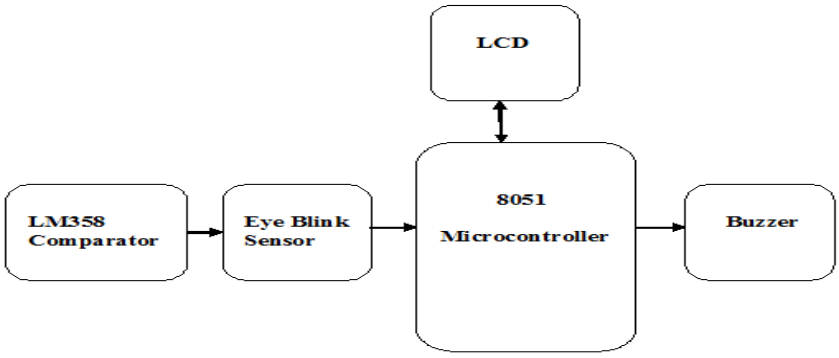

Fig 5: Eye blink Sensor

3.6.1 IR Sensing Circuit

IR Transmitter is an LED which emits infrared rays. IR Receiver is used to receive the IR rays. Both IR transmitter and receiver should be placed straight line to each other.The transmitted signal is given to IR transmitter whenever the signal is high, the IR transmitter LED is conducting it passes the IR rays to the receiver. The IR receiver is connected with comparator

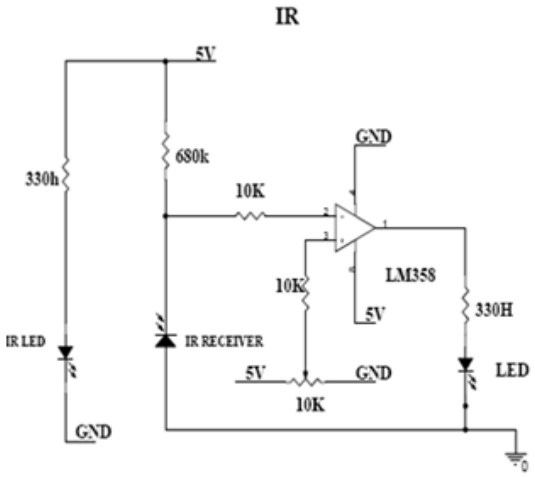

Fig 6: IR Sensing Circuit

3.7 Gas Sensor

The system has two modules namely the Gas sensing module and the Obstacle detection module and they are interfaced with the microcontroller.

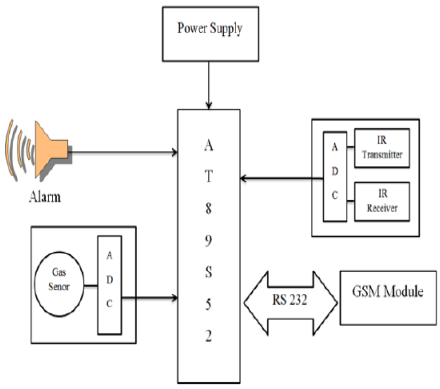

Fig 9: Gas Sensor Module

3.7.1 Obstacle Sensing Module

The obstacle sensing module is used to sense such that, accidents due to unwanted parking of the vehicles and collision with trees and other objects especially during the night time could be avoided. These obstacles could be detected using various methods such as ultrasonic sensors.

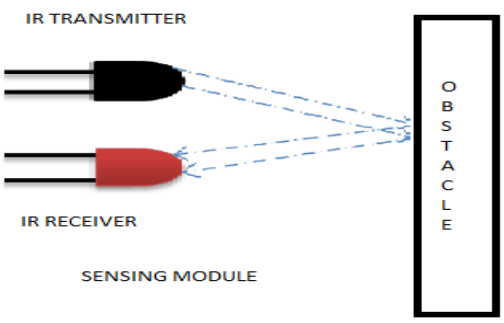

Fig 7: obstacle sensing module

3.7.2 Gas sensing module

The gas sensing module is used to sense the presence of toxic gases such as CO, LPG, Alcohol and other toxic gases inside the vehicle. If critical levels of gases were found, the CO exceeds 20ppm and the level of LPG exceeds 10,000ppm and

the presence of alcohol is detected then the digital data from the gas sensing module is sent to the microcontroller which displays the information about the gas leakage inside the vehicle and produces an alarm to alert the persons inside the vehicle. It also sends a text message to the authorised person through GSM modem connected to the microcontroller such that remedy measures could be taken by the authorised person and to give proper medical treatment to them if required

3.8 BUZZER

A **buzzer** or **beeper** is a signalling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise).

Often these units were anchored to a wall or ceiling and used the ceiling or wall as a sounding board. Another implementation with some AC-connected devices was to implement a circuit to make the AC current into a noise loud enough to drive a loudspeaker and hook this circuit up to a cheap 8-ohm speaker. Nowadays, it is more popular to use a ceramic-based piezoelectric sounder like a Sonalert which makes a high-pitched tone. Usually these were hooked up to "driver" circuits which varied the pitch of the sound or pulsed the sound on and off.

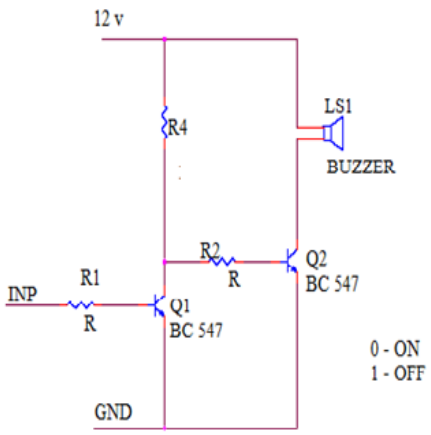

Fig10: Alarm Circuit

3.8.1 Circuit description:

The circuit is designed to control the buzzer. The buzzer ON and OFF is controlled by the pair of switching transistors (BC 547). The buzzer is connected in the Q2 transistor collector terminal.

When high pulse signal is given to base of the Q1 transistors, the transistor is conducting and close the collector and emitter terminal so zero signals is given to base of the Q2 transistor. Hence Q2 transistor and buzzer is turned OFF state.

When low pulse is given to base of transistor Q1 transistor, the transistor is turned OFF. Now 12v is given to base of Q2 transistor so the transistor is conducting and buzzer is energized and produces the sound signal.

Voltage from MC or PC	Transistor O1	Transistor Q2
1	ON	OFF
0	OFF	ON

Table 1

3.9 DRIVER – RELAY DRIVER

The driver circuit is enabled certain time duration only, such enable pulse is depended by delay programming of microcontroller, here darling circuit has been two transistors made connection of cascade network, if input is set to base of the first transistor, then that is turn on and emitter current of that turn the another one. Hereby the circuit is closed through the driven device and second transistor, now the energized driven device. The enabled signal is not essential after energized that driven device because transistor collector current maintains the transistors in saturation state continuously. The induction effect may be affect the indication components and another thing, so diode is connected across the coil which can prevents the chopping effect the inverse magnitude of magnetic field shorted across from driven device.

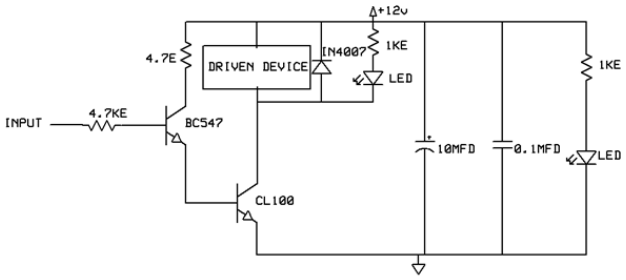

Fig 11: Driver

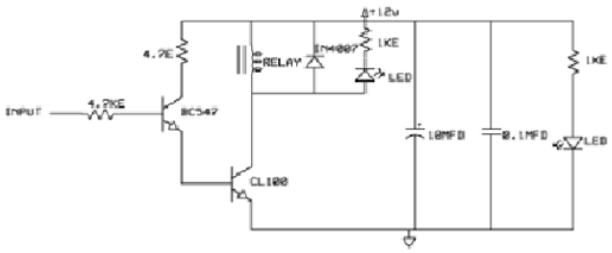

Fig 12: Relay Driver

3.10 FLOAT LEVEL SENSOR

Level sensors detect the level of substances that flow, including liquids, slurries, granular and materials. Fluids and fluidized solids flow to become essentially level in their containers (or other physical boundaries) because of gravity whereas most bulk solids pile at an angle of repose to a peak. The substance to be measured can be inside a container or can be in its natural form (e.g., a river or a lake). The level measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place, while point-level sensors only indicate whether the substance is above or below the sensing point. Generally the latter detect levels that are excessively high or low. There are many physical and application variables that affect the selection of the optimal level monitoring method for industrial and commercial processes. The selection criteria include the physical: phase (liquid, solid or slurry), temperature, pressure or vacuum, chemistry, dielectric constant of medium, density (specific gravity) of medium, agitation (action), acoustical or electrical noise, vibration, mechanical shock, tank or bin size and shape. Also important are the application constraints: price, accuracy, appearance, response rate, ease of calibration or programming, physical size and mounting of the instrument, monitoring or control of continuous or discrete (point) levels.

3.11 LIQUID CRYSTAL DISPLAY (LCD)

An LCD consists of two glass panels, with the liquid crystal material sand witched in between them. The inner surface of the glass plates are coated with transparent electrodes which define the character, symbols or patterns to be displayed polymeric layers are present in between the electrodes and the liquid crystal, which makes the liquid crystal molecules to maintain a defined orientation angle. One each polarisers are pasted outside the two glass panels. These polarisers would rotate the light rays passing through them to a definite angle, in a particular direction.

When the LCD is in the off state, light rays are rotated by the two polarisers and the liquid crystal, such that the light rays come out of the LCD without any orientation, and hence the LCD appears transparent.

When sufficient voltage is applied to the electrodes, the liquid crystal molecules would be aligned in a specific direction. The light rays passing through the LCD would be rotated by the polarisers, which would result in activating / highlighting the desired characters.

The LCD's are lightweight with only a few millimeters thickness. Since the LCD's consume less power, they are compatible with low power electronic circuits, and can be powered for long durations.

The LCD's don't generate light and so light is needed to read the display. By using backlighting, reading is possible in the dark. The LCD's have long life and a wide operating temperature range. Changing the display size or the layout size is relatively simple which makes the LCD's more customer friendly. Generate any desired character that can be formed using a dot matrix. To distinguish between these two data areas, the hex command byte 80 will be used to signify that the display RAM address 00h will be chosen Port1 is used to furnish the command or data type, and ports 3.2 to 3.4 furnish register select and read/write levels.

3.12 HEART BEAT SENSOR

The circuit is designed to measure the heart rate. IR transmitter and receiver measure the heart rate. Infrared transmitter is one type of LED, which emits infrared rays generally called as IR Transmitter. Similarly IR Receiver is used to receive the IR rays transmitted by the IR transmitter. One important point is both IR transmitter and receiver should be placed straight line to each other. The IR transmitter and receiver are placed in the pulse rate sensor. When you want measure the pulse rate, the pulse rate sensor has to be clipped in the finger. The IR receiver is connected to the Vcc through the resistor which acts as potential divider. The potential divider output is connected to amplifier section. When supply is ON the IR transmitter passes the rays to the receiver. Depending on the blood flow, the IR rays are interrupted. Due to that IR receiver conduction is interrupted so variable pulse signals are generated in the potential divider point which is given to A1 amplifier through the capacitor C1. The coupling capacitor C1 is used to block the DC component because the capacitor reactance is depends on the frequency. For DC component the frequency is zero so the reactance is infinity now capacitor acts as open circuit for DC component.

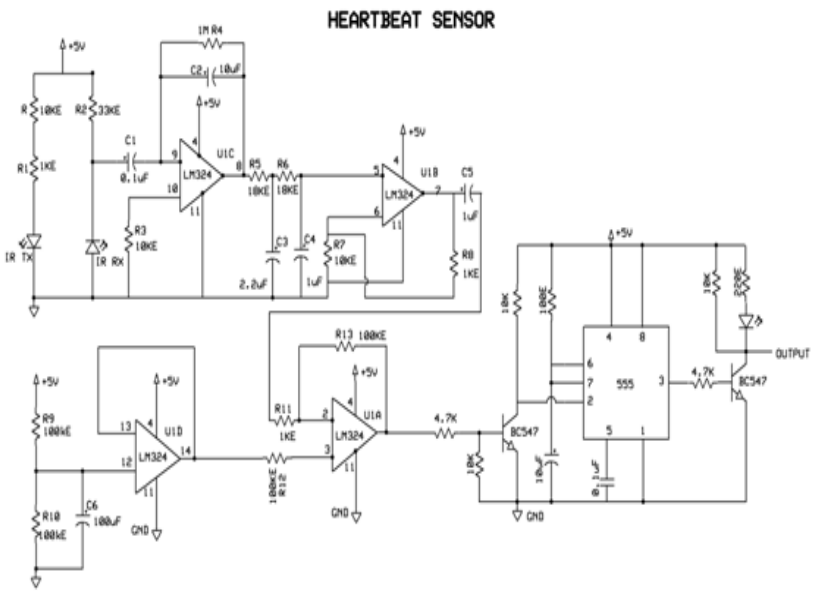

Fig 16: Circuit Diagram of Heartbeat Sensor

The LM 324 quad operational amplifier constructs the amplifier section. It consists of four independent, high gains and internally frequency compensated operational amplifiers named as A1, A2, A3 and A4 amplifiers. The A1 amplifier amplifies the varying pulse from the potential divider. In this amplifier the capacitor C2 is connected in parallel with feedback resistor to filter the any DC component in the amplified signal. If any spikes in the amplified signals, they are further filtered by the C3 and C4 capacitors. After filtration the A2 amplifier again amplifies the signal. Then amplified signal is given to inverting input terminal of comparator. The comparator is constructed by the A4 amplifier in which the reference voltage is given to non-

inverting input terminal. The A3 amplifier generates the reference voltage. Then the comparator compares the two signals and delivered the +5v to 0v square wave pulse at its output.

Then the square wave signal is given to base of the BC547 switching transistors in order to convert the TTL voltage 0 to 5v level. Finally the TTL output is given to 555 Timer to obtain flawless square pulse. Then the final square wave signal is given to microcontroller or other interfacing circuit in order to monitor the heart rate.

3.13 ULTRASONIC SENSOR

Ultrasonic sensors (also known as **transceivers** when they both send and receive) work on a principle similar to radar or sonar which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object. This technology can be used for measuring: wind speed and direction (anemometer), fullness of a tank and speed through air or water. For measuring speed or direction a device uses multiple detectors and calculates the speed from the relative distances to particulates in the air or water. To measure the amount of liquid in a tank, the sensor measures the distance to the surface of the fluid. Further applications include: humidifiers, sonar, medical ultrasonography, burglar alarms and non-destructive testing. Systems typically use a transducer which generates sound waves in the ultrasonic range, above 18,000 hertz, by turning electrical energy into sound, then upon receiving the echo turn the sound waves into electrical energy which can be measured and displayed. The technology is limited by the shapes of surfaces and the density or consistency of the material.

3.14 LEVEL CONVERTER

The RS232 is not compatible with today's microprocessors and microcontrollers, we need a line driver(voltage convertor) to convert the RS232's signals to the TTL voltage levels that will be acceptable to the 8051's TxD and RxD pins. The MAX232 converts from RS232 voltage levels to TTL voltage levels, and vice versa. One advantage of the MAX232 chip is that it uses a +5 V power source which is the same as the source voltage for the 8051. In other words, with a single +5 V power supply we can power both the 8051 and MAX232, with no need for the dual power supplies that are common in many older systems.

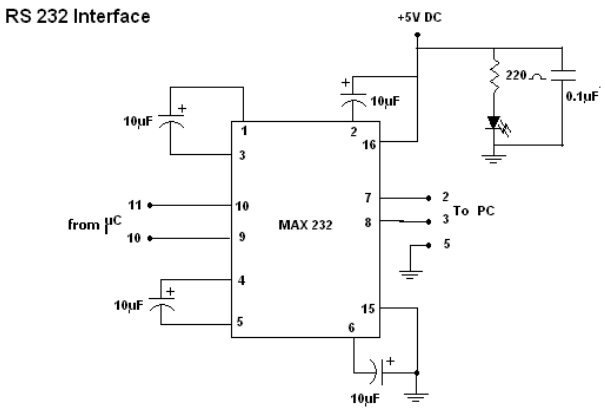

Fig 17: RS232 Level Converter

IV. Debugging and Testing Process

A microcontroller-based system is a complex activity that involves hardware and software interfacing with the external world. Doing well design of a microcontroller-based system requires skills to use the variety of debugging and testing tools available. The debugging and testing of microcontroller-based systems divided into two groups: software-only tools and software-hardware tools. Software-only tools come as monitors and simulators, which are independent of the hardware under development. Software-hardware tools are usually hardware dependent, more expensive and range from in-circuit emulators and in-circuit simulators to in-circuit debuggers. In general, the higher the level of integration with the target hardware, the greater the benefit of a tool, resulting in a shorter development time, but the greater the cost as well. The factors to consider when choosing a debugging tool are cost, ease of use and the features offered during the debugging process.

A software simulator is a computer program running on an independent hardware and it simulates the CPU, the instruction set and the I/O of the target microcontroller. Simulators offer the lowest-cost development tools for microcontroller-based systems and most companies offer their simulator programs free of charge.

The user program operated in a simulated environment where the user can insert breakpoints within the code to stop the code and then analyse the internal registers and memory, display and change the values of program variables and so on. Incorrect logic or errors in computations can analyse by stepping through the code in simulation. Simulators run at speeds 100 to 1000 times slower than the actual micro controller hardware and, thus, long time delays should avoid when simulating a program. Micro controller-based systems usually have interfaces to various external devices such as motors, I/O ports, timers, A/D converters, displays, push buttons, sensors and signal generators, which are usually difficult to simulate. Some advanced simulators, such as the Proteus from Lab centre.

Electronics allow the simulation of various peripheral devices such as motors, LCDs, 7-segment displays and keyboards, and users can create new peripheral devices. Inputs to the simulator can come from files that may store complex digital I/O signals and waveforms. Outputs can be as form of digital data or waveforms, usually stored in a file, or displayed on a screen. Some simulators accept only the assembly language of the target microcontroller. Most of the microcontroller software has written a high-level language such as C, Pascal or Basic, and it has become necessary to simulate a program has written in a high-level language.

The software program has written in c or assembly language and compiled using Keil software. After compiler operation, the hex code generated and stored in the computer. The hex code of the program should be loaded into the PIC 16F887 by using Top win Universal programmer.

4.1 Hardware Assembling and Testing:

First step, we need to make single side PCB layout for the given circuit diagram. After made the PCB the following process is required to complete the project.

1. Assemble all the components on the PCB based on circuit diagram. TX and RX pins of the GSM modem to pins 13 and 14 of MAX 232 and insert a valid SIM in the GSM modem.
2. Connect the GPS module according to circuit diagram.
3. This projects implemented and tested successfully by us.
4. This system is very useful and secure for car owners

4.2 Software:

MATLAB Simulink software is used for simulation.MATLAB solves faster technical computing problems when compared to traditional language such as C, C++ and FORTAN. MATLAB Simulink is a multidomain simulation. It supports system-level design, simulation, automatic code generation and continuous test and verification of embedded systems.MATLAB's support for object-oriented programming includes classes, inheritance, virtual dispatch, packages, pass-by-value semantics, and pass-by-reference semantics.

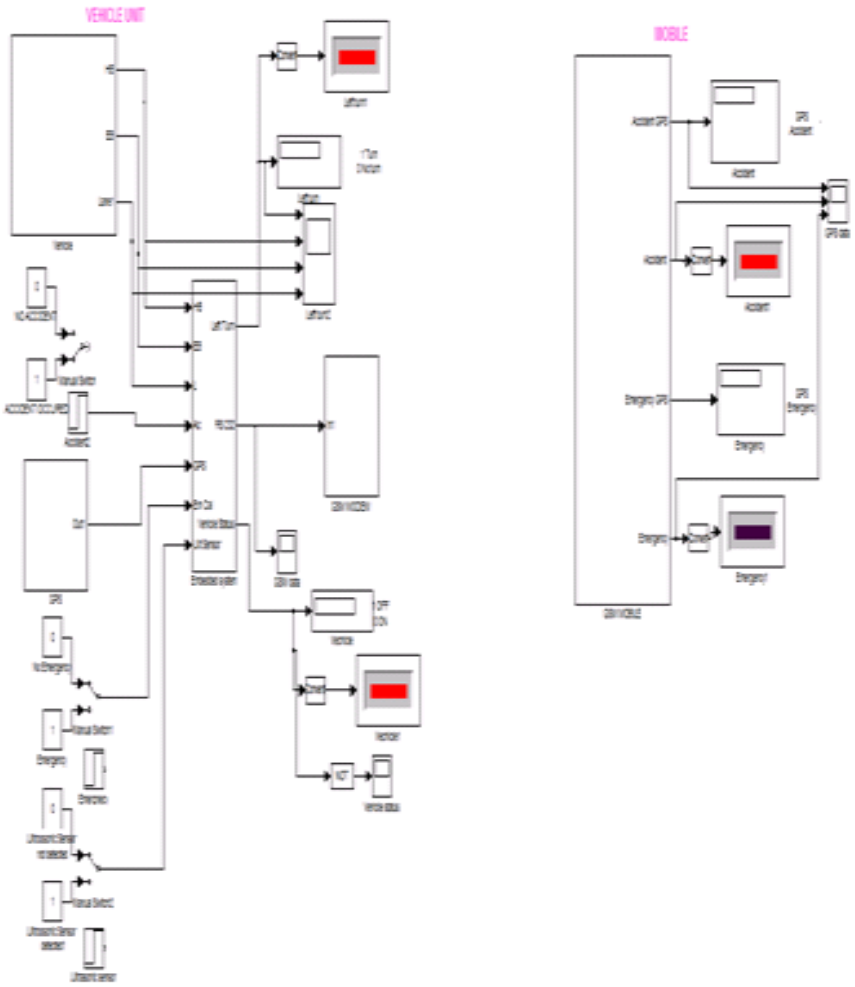

Fig 18: Simulation

V. Results

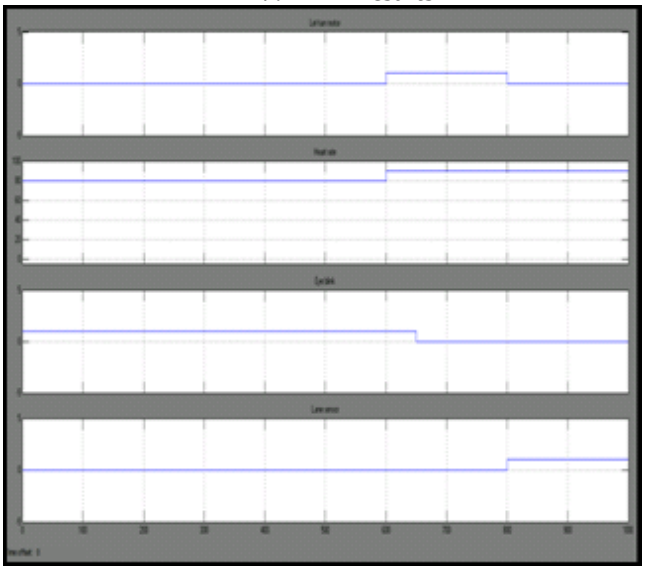

Fig 19: Scope output of Left turn

(Left turn motor, Heart rate, Eye blink, Lane detection)

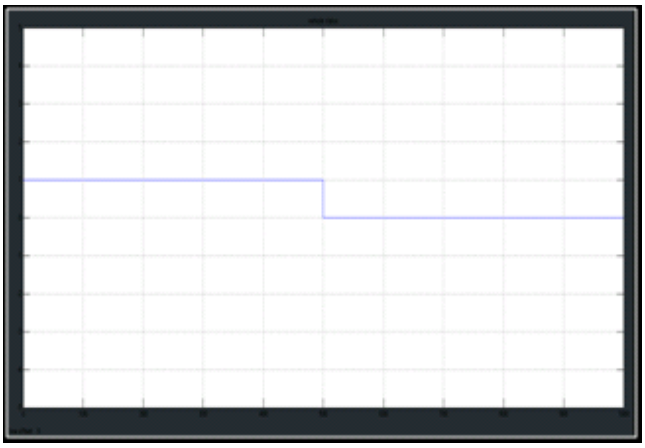

Fig 20: Scope Output for Vehicle Status

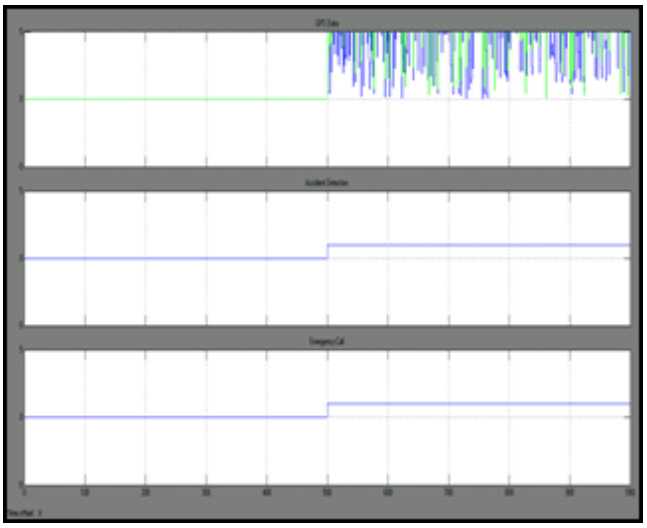

Fig 21: Scope Output of GPS Data
(GPS Data, Accident Detection, Emergency Call)

VI. Conclusion

In this paper, we have proposed a novel method of vehicle tracking and locking systems used to track the theft vehicle by using GPS and GSM technology. This system puts into the sleeping mode vehicle handled by the owner or authorized persons; otherwise goes to active mode. The mode of operations changed by persons or remotely. When the theft identified, the responsible people send SMS to the micro controller, then issue the control signals to stop the engine motor. After that all the doors locked. To open the doors or to restart the engine authorized person needs to enter the passwords. In this method, easily track the vehicle place and doors locked.

- Thus in this project we have provided the means of accident prevention using eye blink sensor, accident sensor wherein the vehicle is stopped immediately and intimated wherever needed.
- It involves automated security system that provides high security to driver through the use of GPS and GSM technologies.
- It involves obstacle detection with lane detection for efficient vehicle parking management at emergency situation.
- The GPS and GSM have been used for tracking the vehicles to identify the accident and theft location.
- This system has been incorporated as a single unit inside the vehicle.

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