NOVATEUR PUBLICATIONS
INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY [IJIERT]
ISSN: 2394-3696
VOLUME 2, ISSUE 1 JAN-2015

Intelligent vehicle using embedded system

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Abstract

Unifying the Global Positioning system technology this article designs and realizes one kind of embedded wireless system named intelligent vehicle control for critical remote location application using microcontroller from the hardware and software. In terms of the hardware completed the design and connection of embedded system, GPS module, obstacle testing module, different parameter monitoring sensor modules and the GSM module. The system can achieve the purpose of long distance real time monitoring and control of vehicle. The executive results of laboratory tests show that the system fulfils real time control and functional parameter monitoring of vehicle. In our proposed security system we are adding new features in addition to engine immobilizer and alarm. One of the important features supported by our system is to alert the owner by sending an SMS about the theft attempt, using GSM Technology. The system is compatible with all brands of the vehicle. For the worst case scenario Redundancy is maintained to make the system reliable.

KEYWORDS:
Intelligent Vehicle, GPS & GSM, Compatibility, Secure

INTRODUCTION

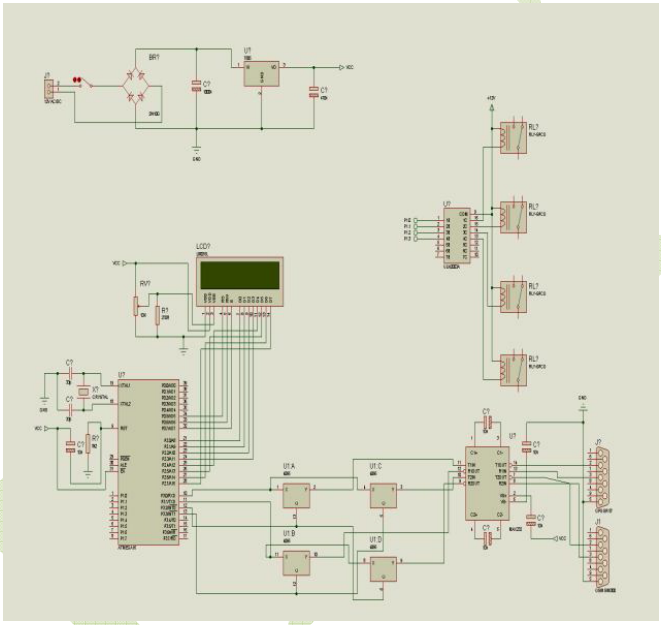
In this modern, fast moving and insecure world, it is become a basic necessity to be aware of one's safety. Maximum risks occur in situations where in an employee travels for money transactions. Also the Company to which he belongs should be aware if there is some problem. What if the person travelling can be tracked and also secured in the case of an emergency?! Here's a system that functions as a tracking and a security system. It's the intelligent vehicle control for critical remote location application. This system can deal with both pace and security. The Vehicle Monitoring and Security System is a GPS based vehicle tracking system that is used for security applications as well. According to the report published by National Crime Records Bureau (NCRB), in the year 2011 alone 122,367 two wheeler vehicles were stolen in India. Out of which only 32,826 vehicles were recovered [1]. Nowadays we have seen that two wheelers are stolen right from the streets and from apartment parking lots. Before the police come into an action, which could be a few hours since the theft, the two wheelers are made underground leaving almost no clue behind. Later the vehicles are sold in the neighbouring state or district at a very cheap price, leaving the owner and police helpless in bringing back the vehicle. The story remains the same for the rest of the vehicle. For solving this problem there is one possible way is to implement a security system in two wheelers. The security system should be capable of performing reasonably well even in unfavourable conditions to meet the desired level of security [2], [3]. The price of the security system should be kept reasonably low by the automation company otherwise the cost of the vehicle will be increased by a big

margin and it will become very difficult for the company to sell the vehicle.*The main concept in this design is introducing the mobile communication into an embedded system.* The designed unit is very simple & low cost. The entire designed unit is on a single chip.

RELATED WORK:

Indeed, we are not the first to observe the flaws and limitations of the present day vehicle security systems. Several researchers have described potential vulnerabilities in automotive security systems [1]. The traditional security systems as priced low, but they merely act as an alarm system and are no match to the well-equipped thief.

III. CIRCUIT DIAGRAM AND ITS DESCRIPTION.

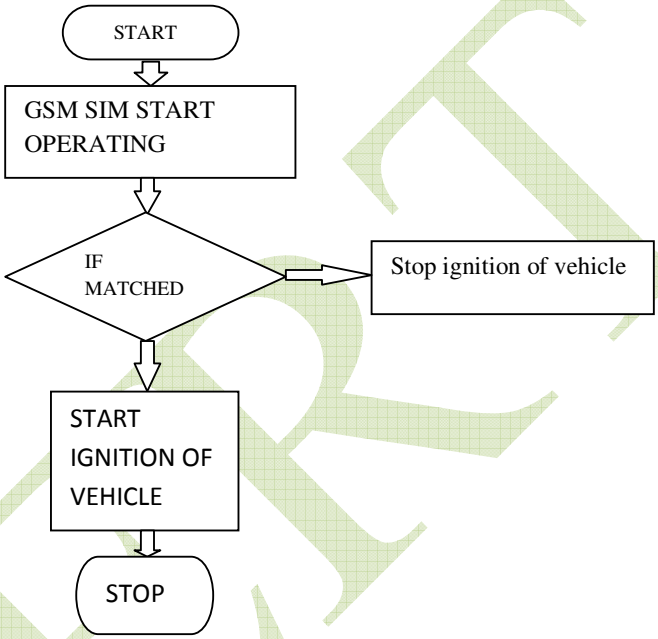


Description

i. Power supply – We need a 5V DC supply as the operating voltage for the microcontroller unit, GSM modem and GPS module. A 230V AC voltage from a transformer is converted into 12V DC voltage using a power regulator. A 7805 IC is used as a voltage regulator which gives 5V DC from 12V DC voltage.
ii. *LCD display* – LCD display device (LM016L) is interfaced with the microcontroller unit (ATMEGA16). The data pins (D0-D7) of LM016L are connected to PORT 2 of ATMEGA16. Data is written on PORT 2. Reset (RS), read/write (RW) and enable (E) pins are connected to PORT 0 pins for corresponding operations.
iii. *Serial communication* – Two serial ports are required for interfacing the GSM modem and GPS module. As ATMEGA16 has only one serial port, a switching IC 4066 is used to execute GSM/GPS operations whenever required. MAX232 chip connected to the AVR to enable UART transmissions between the AVR and the PC.
iv. *Relay* – We have used a relay for activation/deactivation of the vehicle ignition. Four relays i.e. RLY-SPCO is driven by the motor driver ULN2003A four wheelers) start with normal valid key. But there is wide scope to theft vehicle with duplicate keys. This system avoids thefting of vehicles.If he wants to starts the vehicle scan image and microcontroller (ATMEL) 89C51 detects and compare with database of enrolment area. After checking, it gives output pulse through relay for IC engine ignition. vehicle..Apart

from that, the remainder system is also provided such as etc. GSM MODEM is used to send SMS to the owner when his/her vehicle is in danger. LCD DISPLAY is connected to port0 of microcontroller which will continuously display the status and messages.

FLOWCHART



COMPONENTS USED:

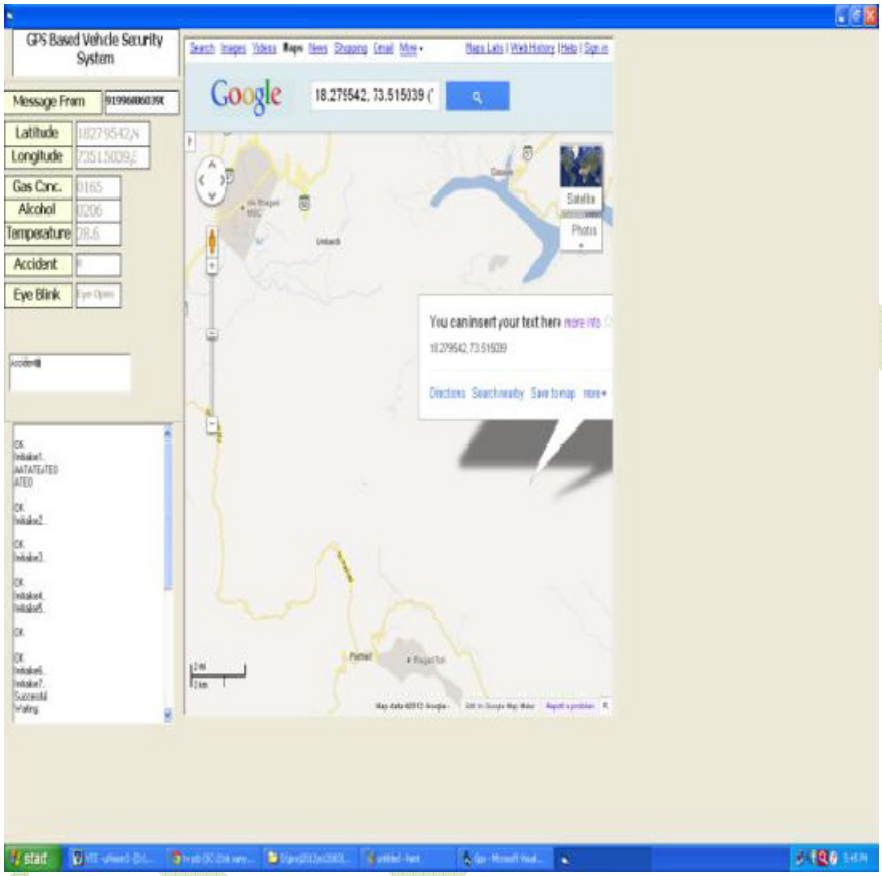
1. Microcontroller 89C51
2. LCD 16*2
3. MAX 232
4. GSM MODEM
5. TRANSISTOR BC 547
6. RESISTORS
7. CAPACITORS
8. CRYSTAL 12MHZ
9. RELAY
10. BUZZER

ADVANTAGES

1. Its main advantage is its anti-theft feature.
2. It is a compact circuit which makes it very easy to install in the two wheeler.
3. It can be used in moped as well as in gear bikes.

4. Good maintenance of vehicle due to its remainder system.
5. Easy to use.

Output Window



CONCLUSION

Our proposed Two Wheeler Vehicle Security System is the advanced, reliable and robust version of security mechanism for two wheeler vehicles. The proposed security system also gives space, in terms of hardware and software, to add up custom applications to make the product even more user-friendly. Proposed TWVSS can be installed on two wheeler vehicle of any class or company, thereby creating a huge market for the product. Stress was laid in designing a cost efficient system so that it could also be even bought by the owners of the low end bikes. Small size of the module allows it to be placed underthe seat of the vehicle, there by needing no physical changes to be done to the vehicle. We believe the frequency of the two wheeler vehicle thefts that are encountered these days could be highly suppressed by installing our proposed security system.

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