Abstract
This paper mainly deals with concept of Vehicle tracking, monitoring and providing security by theft as well as it also work on anticorruption with the help of NFC. This system is based on ARM7, NFC, GSM, ACCELEROMETER and GPS. MEMS Accelerometer is used to detect inclination, acceleration and GSM is used to send message to the predefined numbers. GPS receiver gives the information about location, status of vehicle and the monitoring system can lock the vehicle engine by using relays in case of theft using android phone. In case of accident emergency message will be sent to the nearest hospital, police station, and owner of vehicle. This system also proposed for avoiding the corruption.
1. Introduction
As we know that we are surrounded by vehicle. And due to large number of vehicle we are facing the problem like stolen, accident, document verification. The result of this system saves death or reduces the death rates, by providing information about the accident to the Monitoring system immediately [1]. It provides security to personal vehicles by locking the vehicle engine from remote location through android phone using GSM in case of theft. In this project we are proposing a system that can monitor a vehicle condition whether the vehicle has faced the accident or not. If the accident is been occurred the system judges the accident and informs the server with the proper location of vehicle. And the server will sent emergency message to nearest hospital, police station. At the time of heavy traffic no. of vehicles are goes without showing documents of vehicle for verification and therefore they evade from the fine. To avoid this things our project will be helpful. Key feature of this design include:
  a) User can access the system at any time to get the information about vehicle.
  b) Vehicle system will send the vehicle information to Monitoring system which helps in case of accident and theft.
  c) In case of theft user can lock the vehicle engine through his android phone..

2. Problem Definition
Due to increase in globalization number of vehicles are increasing therefore everyday number of lives are lost in accident. Accidents which are occurs in public place those persons get help from the public but the accident which occurs in desert, mountain and forest in this region nobody to help those people who met an accident that time they lost the lives. When the vehicle is stolen then there is lots of time required to find the suspected vehicle and number of times the vehicle doesn’t found. At the time of heavy traffic number of vehicles is goes without showing documents of vehicle and therefore they do not pay fine. To avoid these aspects our project will be helpful.

3. Block Diagram
Different component are used for implementation. They are mentioned below.

1. ARM7 (LPC2148) microcontroller
2. MEMS-3 axis Accelerometer sensor
3. NFC card
4. 16X2 LCD display
5. GSM modem
6. GPS modem
7. Power supply unit
8. DC motor driver
Accelerometer sensor-

This small and highly sensitive accelerometer can detect acceleration, inclination and vibration by measuring the motion in the x-, y-, and z-axis simultaneously. By sensing the mounting angle, the sensor can assist in compensating for the devices mounting angle, and therefore makes it possible to use normal SMD technology in high density boards, and also to realise the precise detection of the inclination angle. An interface IC within the sensor package also has temperature sensing and self-diagnosis functions.[3]

Once the accident is detected, the GPS and GSM modems send the GPS data and the number of vehicle to a predefined mobile number. Here this system can detect the accident using the accelerometer.[9]

NFC Card-

Near Field Communication (NFC) is wireless/contactless communication between two devices. NFC is based on the technology used for RFID and is standardised in ISO/IEC 18092. It is limited to a distance between the two devices of up to 10 cm. NFC operates at 13.56 MHz and has been developed jointly between NXP Semiconductors (formerly Philips Semiconductors) and Sony Corporation. Because NFC has the ability to read and write to devices, it is believed that they will have a wider use in the future than standard smart cards. NFC involves an initiator and a target. The initiator, as follows from the name, initiates and actively generates an RF signal and controls the exchange of data (a payment device) where the request is answered by a passive target. The
range of NFC is only a few centimeters. This makes it inherently safer than longer range technologies but there are still security flaws that, if not addressed, can be exploited. According to the ISO standard, NFC is not encrypted.[10]

This is to make it backward compatible with RFID technologies. Radio-frequency identification (RFID) is the wireless non-contact use of radio-frequency electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information. Some tags are powered by and read at short ranges (a few meters) via magnetic fields (electromagnetic induction). Others use a local power source such as a battery, or else have no battery but collect energy from the interrogating EM field, and then act as a passive transponder to emit microwaves or UHF radio waves (i.e., electromagnetic radiation at high frequencies). Battery powered tags may operate at hundreds of meters. Unlike a bar code, the tag does not necessarily need to be within line of sight of the reader, and may be embedded in the tracked object.[2]

**GSM Modem**—A GSM is Global Service for Mobile communication. A specialized type of modem i.e. AGSM modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection or it may be a mobile phone that provides GSM modem capabilities. A GSM modem could also be a standard GSM mobile phone the appropriate cable and software driver to connect to a serial port or USB port on our computer. A SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. A GSM modem could also be a standard GSM mobile phone the appropriate cable and software driver to connect to a serial port or USB port on our computer.[9]

![GSM Modem](image)

**Figure 3.2: GSM Modem**

This module is operates on AT command. AT command is an abbreviation for Attention command that is recognized by GSM Module. "AT command set for GSM Mobile Equipment” describes the Main AT commands to Communicate via a serial interface with the GSM subsystem of the phone. The GSM modem is interfaced to microcontroller through UART0 serial communication.[1]
Table 3.1. AT Commands

<table>
<thead>
<tr>
<th>Commands</th>
<th>Description</th>
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<tbody>
<tr>
<td>AT</td>
<td>Check if serial interface and GSM modem is working</td>
</tr>
<tr>
<td>ATA</td>
<td>Answer incoming call</td>
</tr>
<tr>
<td>ATD&gt;&lt;M</td>
<td>Originate call to phone no. in memory</td>
</tr>
<tr>
<td>EM&gt;&lt;N</td>
<td>Redial last telephone no. used</td>
</tr>
</tbody>
</table>

**GPS Modem**

Exact location on earth can be known GPS latitude, longitude information. Global Positioning System (GPS) is space based radio navigation System consisting of a constellation of Satellites and a network of stations used for monitoring and controlling. The GPS is operated and maintained by the Department of defence (DOD). The GPS is a constellation of satellites in orbit around the Earth which transmit their positions in space as well as the precise period. It is receiver that collects data from the satellites and computes its location anywhere in the world based on information it gets from the satellites. Develop new microprocessor-based products and applications. The ARM is one of the major options available for embedded system developer.[9]

**4. Software Requirement**

**Flash magic** - Flash magic is a PC tool for programming flash base microcontroller from NXP using a Ethernet protocol while in the target hardware. Flash Magic is Windows software from the Embedded Systems Academy that allows easy access to all the ISP features provided by the devices.[5]

These features include:
- Erasing the Flash memory (individual blocks or the whole device)
- Programming the Flash memory
- Modifying the Boot Vector and Status Byte
- Reading Flash memory
- Performing a blank check on a section of Flash

**KEIL** - KEIL is used to translate C source file into relocated object module which contain full symbolic information for debugging with the micro vision debugger or an in-circuit emulator. [4]

**Features**
- 1) Interrupt function may be written in C
- 2) Use of a AJMP and ACALL instruction
- 3) Bit addressable data object

**Proteus** - Proteus is a software for microprocessor simulation, schematic capture and printed circuit board design(PCB). This software is simple to design printed circuit board i.e. PCB. We can also take the PCB layout.[7]
5. Implementation

According to our proposed system when a vehicle has an accident anywhere (public place, desert, mountains etc.) then the message will be sent to the nearest hospital as well as police station and if a vehicle is stolen then the predefined message will be sent to the owner and police station using GSM module and location will be tracked by using GPS. At the time when owner lost his vehicle (or stolen) that time the owner can lock the vehicle engine using his android phone.

If a vehicle is caught by traffic police and check the documents for document verification, if he has documents then traffic police will release him and if he doesn’t have documents then message will send to the RTO office. This paper discusses working of the design with the help of block diagram and circuit diagram and explanation in detail. It explains the features, timer programming, serial communication, interrupts of LPC1768 microcontroller. It also explains the various modules used in this project.[6]

6. Conclusion

This project is useful for the tracking & monitoring of vehicles travelling in predetermined routes. Here, this computerized system automatically identifies to approaching vehicle and records the vehicle Number & Time. And it is also useful in case of an accident by sending message to emergency services which will result in decreasing the death proportion ratio.

References

[1] Gangadhar M1, Madhu M S2(M Tech) Dept. of Computer Network Engineering +VTU PG Studies, Visvesvaraya Technological University Belgaum, India Prof. Pushpalatha S3 Dept. of Computer Network Engineering VTU PG Studies, Visvesvaraya Technological University Belgaum, India. “Vehicle Tracking and Monitoring By ARM7”
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[10] International Journal of Electrical and Computer Engineering (IJECE) Kevin Curran, Amanda Millar, Conor Mc Garvey School of Computing and Intelligent Systems University of Ulster, Magee Campus, Northern Ireland, BT48 7JL, UK “Near Field Communication”