

Design and Implementation of Vehicle Tracking System Using GSM/GPS Technology and Smartphone Application

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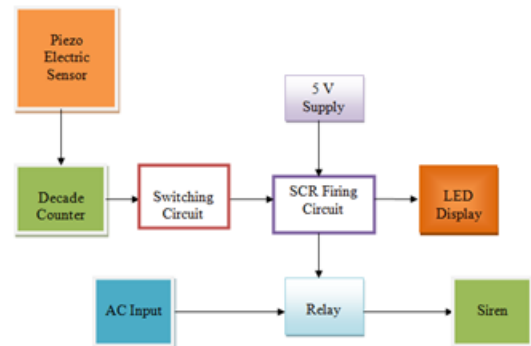
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ABSTRACT:

This Project presents an automotive localization system using GPS and GSM-SMS services. The system permits localization of the automobile and transmitting the position to the owner on his mobile phone as a short message (SMS) at his request. The system can be interconnected with the car alarm system and alert the owner on his mobile phone. This tracking system is composed of a GPS receiver, Microcontroller and a GSM Modem. GPS Receiver gets the location information from satellites in the form of latitude and longitude. The Microcontroller processes this information and this processed information is sent to the user/owner using GSM modem. Microcontroller also gets the speed of the vehicle and sends it to user/owner.

Existing System:

This project describes a accident alert system that can monitor a car/vehicle. This is a simple and useful security system and easy to install. This vibration detector is realized using readily available, low cost components. One of its many applications is accident alert. This system can be fixed to a vehicle. The detector will sense vibration caused by accident and alerts surrounding people using siren.



Drawback:

There is no remote alert system using GSM

Proposed System:

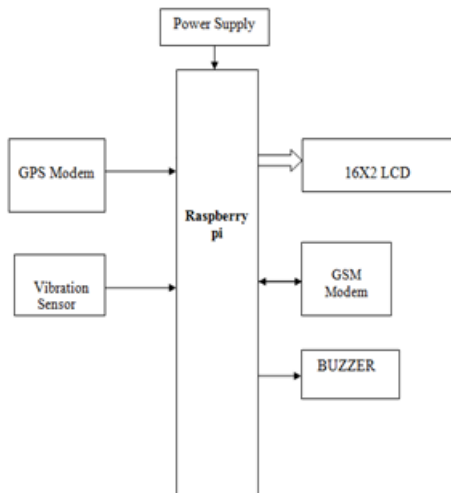
The presented application is a low cost solution for automobile position and status, very useful in case of car theft situations, for monitoring adolescent drivers by their parents as well as in car tracking system applications. The proposed solution can be used in other types of application, where the information needed is requested rarely and at irregular period of time (when requested). This system is also can be interfaced with Vehicle airbag system. This enable it to monitor the accident situations and it can immediately alerts the police/ambulance service with the location of accident.

The Major Building blocks of this project are:

- Microcontroller based motherboard with regulated power supply.
- GPS Receiver for Location Information.
- GSM Modem/Mobile phone for remote communication.
- LED Indicators

- Local alarm/alert system in case of accident situations.

This project uses regulated 5V, 750mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.



RASPBERRY-PI:



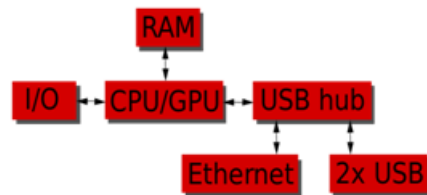
The **Raspberry Pi** has a Broadcom system on a chip (SoC).

Features:

- Storage – micro SD card slot (push release type)
- Video & Audio Output – HDMI and AV via 3.5mm jack.
- Connectivity – 10/100M Ethernet
- USB – 4x USB 2.0 ports, 1x micro USB for power

- Expansion
 - 2x20 pin header for GPIOs
 - Camera header
 - Display header
- Power – 5V via micro USB port.
- Dimensions – 85 x 56 mm

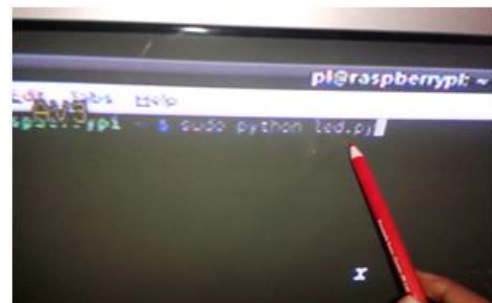
Basic Hardware of Raspberry-PI:



OS used in Raspberry pi is Linux



Coding will be done in python/C language

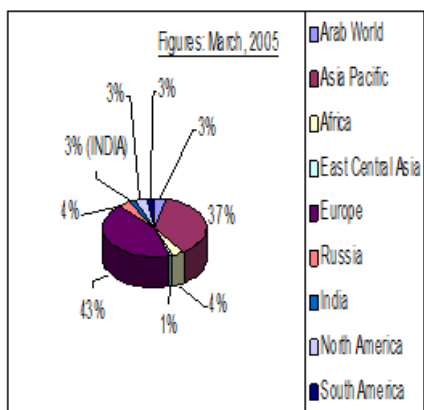


GLOBAL SYSTEM FOR MOBILE COMMUNICATION:

It is a globally accepted standard for digital cellular communication. GSM is the name of standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900MHZ.

Throughout the evolution of cellular telecommunications, various systems have been developed without the benefit of standardized specification. This presented many problems directly related to compatibility, especially with the development of digital radio technology. The GSM standard is intended to address these problems.

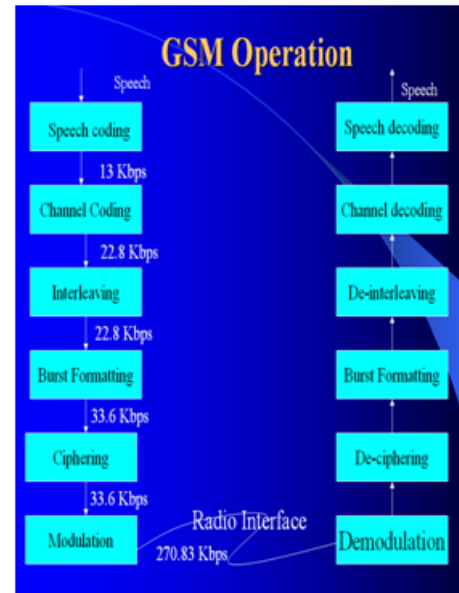
GSM IN WORLD:



Characteristics of GSM Standard:

- Fully digital system using 900,1800 MHz frequency band.
- TDMA over radio carriers(200 KHz carrier spacing).
- 8 full rate or 16 half rate TDMA channels per carrier.
- User/terminal authentication for fraud control.
- Encryption of speech and data transmission over the radio path.
- Full international roaming capability.
- Low speed data services (upto 9.6 Kb/s).
- Compatibility with ISDN.
- Support of Short Message Service (SMS).

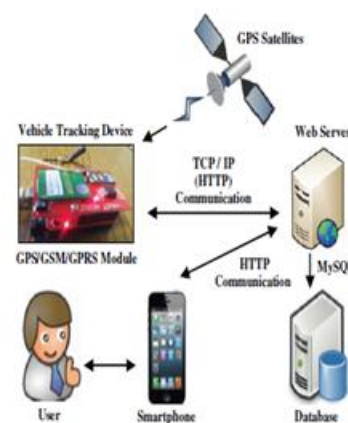
OPERATION OF GSM:



Basic concept of GPS:

A GPS receiver calculates its position by precisely timing the signals sent by the GPS satellites high above the Earth. Each satellite continually transmits messages which include

- the time the message was transmitted
- precise orbital information (the ephemeris)
- The general system health and rough orbits of all GPS satellites (the almanac).



The receiver utilizes the messages it receives to determine the transit time of each message and computes the distances to each satellite. These distances along with the satellites' locations are used with the possible aid of trilateration to compute the position of the receiver.

This position is then displayed, perhaps with a moving map display or latitude and longitude; elevation information may be included.



Vibration Sensor:

A vibration sensor is a device that recognizes the changes in pressure, acceleration, strain or force by converting them to an electrical charge..



Advantages:

- Sophisticated security
- Monitors all hazards and threats
- Alert message to mobile phone for remote information

Applications:

- Security, Remote monitoring, Transportation and logistics

CONCLUSION:

In this project work, we have studied and implemented a complete working model using a Raspberry pi. The programming and interfacing of microcontroller has been mastered during the implementation. This work includes the study of **GSM and GPS modems using sensors.**

The biggest advantage of using this project is, whenever the sensor is activated we will be getting the acknowledgement from GSM modem to our mobile.

REFERENCES:

- [1] Aaron Smith, "Nearly half of American adults are Smartphone", <http://pewinternet.org/~media/Files/Reports/2012/Smartphone%20ownership%202012.pdf> , 2012.
- [2] Jithin V mohan, Minu Balan, Sharoon Thomas, and Lynn Mariette Mendonza, "Fleet Mangement System", B.Tech Degree Thesis, College of Engineering, Munnar, Idukki, Kerala, India, 2009.
- [3] Mohammad A. Al-Khedher, "Hybrid GPS-GSM Localization of Automobile Tracking System", International Journal of Computer Science & Information Technology (IJCSIT) Vol 3, No 6, Dec 2011.
- [4] Saed Tarapiah, Shadi Atalla, and Rajaa AbuHania, "Smart On-Board Transportation Management System Using GPS/GSM/GPRS Technologies to Reduce Traffic Violation in Developing Countries", International Journal of Digital Information and Wireless Communications (IJDWC) 3(4): 96-105, The Society of Digital Information and Wireless Communications, 2013 (ISSN: 2225-658X).
- [5] Muruganandham, "Real Time Web based Vehicle Tracking using GPS", World Academy of Science, Engineering and Techonogy, 37, 2010.
- [6] R.Ramani, S.Valarmathy, N.SuthanthiraVanitha, S.Selvaraju, and M.Thiruppathi, "Vehicle Tracking and Locking Sytem Based on GSM and GPS", I.J. Intelligent Systems and Applications, 2013, 09, 86-93.
- [7] G. Kiran Kumar, A. Mallikarjuna Prasad, "Public Transportation Mangement Service using GPS-GSM", International Journal of Research in Computer and

Communication Technology, IJRCCT, ISSN-2278-5841, Vol-1, Issue -3, Aug - 2012.

[8] Ambade Shruti Dinker and S. A Shaikh, "Design and Implementation Of vehicle Tracking System Using GPS", Journal of Information Engineering and Applications, Vol 1, No.3, 2011.

[9] Eddie Chi-Wah Lau, "Simple Bus Tracking System", Journal of Advanced Computer Science and Technology Research, Vol3, No.1, 2013.

[10] Montaser N. Ramadan, Mohammad A. Al-Khedher, and Sharaf A. Al-Kheder, "Intelligent Anti-Theft and Tracking Sytem for Automobiles", International Journal of Machine Learning and Computing Vol.2 No. 1, February 2012.

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Is a proficient Ph.D person in the research area of Image Processing from Vel-Tech University, Chennai along with initial degrees of Bachelor of Technology in Electronics and Communication Engineering (ECE) from Dr. S G I E T, Markapur and Master of Technology in Embedded Systems from SRM University, Chennai. He has 13 years of teaching experience and has published 12 Papers in International Journals, 2 Papers in National Journals and has been noted under 4 International Conferences. He has a fellowship of The Institution of Electronics and Telecommunication Engineers (IETE) along with a Life time membership of Indian Society for Technical Education (ISTE). He is currently bounded as an Associate Professor and is being chaired as Head of the Department for Electronics and Communication Engineering discipline at Siddhartha Institute of Engineering and Technology.