



## NON-INTRUSIVE PLANNING THE ROADSIDE INFRASTRUCTURE FOR VEHICULAR NETWORKS

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**Abstract:** A gps navigation device is a device that receives worldwide positioning gadget (gps) alerts to determine the tool's place on this planet. gps gadgets offer range and longitude facts, and a few may additionally calculate altitude, although this isn't considered sufficiently correct or continuously to be had sufficient (due to the opportunity of sign blockage and other elements) to depend upon solely to pilot plane. gps devices are used by the army, by using aircraft pilots, through sailors, and for recreational purposes by the public. The motive of this task is to discover the automobile wherein it is and additionally automatic identity of vehicle entering in to the parking region and on the tollgate and additionally display on vehicle lcd screen. most of the times we won't capable of locate accidents because we don't recognise where accident will manifest, in order to present treatment for injured people first we need to understand that in which

**Keywords:** *Roadside Infrastructure, Vehicles.*

### INTRODUCTION

Intelligent Transportation Systems are grounded on vehicular networks [1], i.e., sophisticated communication networks receiving data from several

entities composing the traffic system. In a vehicular network, the communication may happen in an ad hoc basis where vehicles exchange messages without any support infrastructure [2]. However, the ad hoc communication may become inefficient in sparse areas such as highways, rural zones, and low peak hours in the city due to the lack of communicating pairs and radio obstacles. The intense mobility of vehicles also makes routing far complicated as we lack reliable means to infer the future location of vehicles. Although the communication may take place in an ad hoc basis, several works [3], [4] demonstrate that a minimum support infrastructure may largely improve the overall efficiency of the network. The deployment of infrastructure for vehicular networks has gained a lot of attention over the past years. Some researchers have devoted their attention in elaborating analytical formulations. [7] discussed about a project, in this project an automatic meter reading system is designed using GSM Technology. The embedded micro controller is interfaced with the GSM Module. This setup is fitted in home. The energy meter is attached to the micro controller. This controller reads the data from the meter output and transfers that data to GSM Module

through the serial port. The embedded micro controller has the knowledge of sending message to the system through the GSM module. Another system is placed in EB office, which is the authority office. When they send “unit request” to the microcontroller which is placed in home. Then the unit value is sent to the EB office PC through GSM module. According to the readings, the authority officer will send the information about the bill to the customer. If the customer doesn’t pay bill on-time, the power supply to the corresponding home power unit is cut, by sending the command through to the microcontroller. Once the payment of bill is done the power supply is given to the customer. Power management concept is introduced, in which during the restriction mode only limited amount of power supply can be used by the customer. The work [8] proposes the definition of an infrastructure for vehicular networks based on the conventional definition of transport capacity. The authors develop a mathematical model where the destination nodes are chosen at random by the source nodes, and they study the effect of the infrastructure node deployment in the capacity of vehicular networks using analytical expressions. Alpha Coverage [9] provides worst-case guarantees on the interconnection gap while using fewer roadside units. A deployment of roadside units is considered  $\alpha$ -covered if any simple path of length  $\alpha$  on the road network meets at least one roadside unit. The authors compare the  $\alpha$ -coverage with a random deployment of roadside units.

## PROPOSED SYSTEM

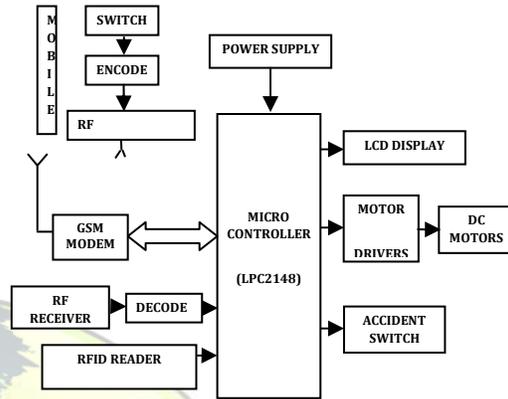


Fig: 1:Block Diagram

## METHODOLOGY

### Micro controller:

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

### ARM7TDMI:

ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

### Liquid-crystal display (LCD)

It is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

### RFID:

Radio Frequency Identification (RFID) is a silicon chip-based transponder that communicates via radio waves. Radio Frequency Identification is a technology which uses tags as a component in an integrated supply chain solution set that will evolve over the next several years. RFID tags contain a chip which holds an electronic product code (EPC) number that points to additional data detailing the contents of the package. Readers identify the EPC numbers at a distance, without line-of-sight scanning or involving physical contact. Middleware can perform initial filtering on data from the readers. Applications are evolving to comply with shipping products to automatically processing transactions based on RFID technology RFID Reader Module, are also called as interrogators. They convert radio waves returned from the RFID tag into a form that can be passed on to Controllers, which can make use of it. RFID tags and readers have to be tuned to the same frequency in order to Communicate. RFID systems use many different frequencies, but the most common and widely used & supported by our Reader is 125 KHz.

Tags are classified into two types based on operating power supply fed to it.

1. Active Tags
2. Passive Tags



Fig.2: RFID Reader

**Active Tags:** These tags have integrated batteries for powering the chip. Active Tags are powered by batteries and either have to be recharged, have their batteries replaced or be disposed of when the batteries fail.

**Passive Tags:** Passive tags are the tags that do not have batteries and have indefinite life expectancies.



Fig.3: Different types of tags

### GSM:

Global System for Mobile Communication (GSM) is a set of ETSI standards specifying the infrastructure for a digital cellular service.

The network is structured into a number of discrete sections:



- Base Station Subsystem – the base stations and their controllers explained
- Network and Switching Subsystem – the part of the network most similar to a fixed network, sometimes just called the "core network"
- GPRS Core Network – the optional part which allows packet-based Internet connections
- Operations support system (OSS) – network maintenance

SM was intended to be a secure wireless system. It has considered the user authentication using a pre-shared key and challenge-response, and over-the-air encryption. However, GSM is vulnerable to different class of attacks, each of them aiming a different part of the network.

**DC Motor:**

A DC motor relies on the fact that like magnet poles repels and unlike magnetic poles attracts each other. A coil of wire with a current running through it generates an electromagnetic field aligned with the center of the coil. By switching the current on or off in a coil its magnetic field can be switched on or off or by switching the direction of the current in the coil the direction of the generated magnetic field can be switched 180°.



Fig: DC Motor

**Motor driver:**

DC motors are typically controlled by using a transistor configuration called an "H-bridge". This consists of a minimum of four mechanical or solid-state switches, such as two NPN and two PNP transistors. One NPN and one PNP transistor are activated at a time. Both NPN and PNP transistors can be activated to cause a short across the motor terminals, which can be useful for slowing down the motor from the back EMF it creates. H-bridge. Sometimes called a "full bridge" the H-bridge is so named because it has four switching elements at the "corners" of the H and the motor forms the cross bar. The switches are turned on in pairs, either high left and lower right, or lower left and high right, but never both switches on the same "side" of the bridge. If both switches on one side of a bridge are turned on it creates a short circuit between the battery plus and battery minus terminals. If the bridge is sufficiently powerful it will absorb that load and your batteries will simply drain quickly. Usually however the switches in question melt.

High Side Left	High Side Right	Low Side Left	Low Side Right	Quadrant Description
On	Off	Off	On	Forward Running
Off	On	On	Off	Backward Running
On	On	Off	Off	Braking

Off	Off	On	On	Braking
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Table: operation of H-Bridge

**RF transmitter and Receiver:**

RF transmitters are electronic devices that create continuously varying electric current, encode sine waves, and broadcast radio waves. RF transmitters use oscillators to create sine waves, the simplest and smoothest form of continuously varying waves, which contain information such as audio and video. Modulators encode these sign wives and antennas broadcast them as radio signals. There are several ways to encode or modulate this information, including amplitude modulation (AM) and frequency modulation (FM). The ST-TX01-ASK is an ASK Hybrid transmitter module. The ST-TX01-ASK is designed by the Saw Resonator, with an effective low cost, small size, and simple-to-use for designing.

- Frequency Range: 315 / 433.92 MHZ.
- Supply Voltage: 3~12V.
- Output Power: 4~16dBm
- Circuit Shape: Saw

RF receivers are electronic devices that separate radio signals from one another and convert specific signals into audio, video, or data formats. RF receivers use an antenna to receive transmitted radio signals and a tuner to separate a specific signal from all of the other signals that the antenna receives. Detectors or demodulators then extract information that was encoded before transmission. There are several ways to decode or modulate this information, including

amplitude modulation (AM) and frequency modulation (FM).

The RX04 is a low power ASK receiver IC which is fully compatible with the MitelKESRX01 IC and is suitable for use in a variety of low power radio applications including remote keyless entry. The RX04 is based on a single-Conversion, super-heterodyne receiver architecture and incorporates an entire phase-locked loop (PLL) for precise local oscillator generation.

**RESULT**



Fig: Kit overview

**CONCLUSION**

In this work we propose a deployment algorithm based on migration ratios between urban cells without relying on the individual vehicles trajectories. We have so many advantages by implementing this project, it gives complete solution for traffic and transport related problems such as



accident alert, tollgate control, parking management and special zone alert system. It is proposed as a low cost optimized solution using RFID and GSM modem.

#### REFERENCES

- [1] H. Hartenstein and K. Laberteaux, "A tutorial survey on vehicular ad hoc networks," *IEEE Commun. Mag.*, vol. 46, no. 6, pp. 164–171, Jun. 2008.
- [2] J. Blum, A. Eskandarian, and L. Hoffman, "Challenges of intervehicle ad hoc networks," *IEEE Trans. Intell. Transp. Syst.*, vol. 5, no. 4, pp. 347–351, Dec. 2004.
- [3] A. Reis, S. Sargento, and O. Tonguz, "On the performance of sparse vehicular networks with road side units," in *Proc. IEEE 73rd VTC—Spring*, May 2011, pp. 1–5.
- [4] K. Merhad, H. Artail, and M. Gerla, "Roamer: Roadside units as message routers in VANETs," *AdHocNetw.*, vol. 10, no. 3, pp. 479–496, May 2012.
- [5] R. H. Frenkiel, B. Badrinath, J. Borres, and R. D. Yates, "The infestations challenge: Balancing cost and ubiquity in delivering wireless data," *IEEE Pers. Commun.*, vol. 7, no. 2, pp. 66–71, Apr. 2000.
- [6] O. Trullols, M. Fiore, C. Casetti, C. Chiasserini, and J.B. Ordinas, "Planning roadside infrastructure for information dissemination in intelligent transportation systems," *Comput. Commun.*, vol. 33, no. 4, pp. 432–442, Mar. 2010.
- [7] Christo Ananth, Kanthimathi, Krishnammal, Jeyabala, Jothi Monika, Muthu Veni, "GSM Based Automatic Electricity Billing System", *International Journal Of Advanced Research Trends In*

*Engineering And Technology (IJARTET)*, Volume 2, Issue 7, July 2015, pp:16-21

- [8] M. Nekoui, A. Eslami, and H. Pishro-Nik, "The capacity of vehicular ad hoc networks with infrastructure," in *Proc. IEEE 6th Int. Symp. WiOPT*, Apr. 2008, pp. 267–272.
- [9] Z. Zheng, P. Sinha, and S. Kumar, "Alpha coverage: Bounding the interconnection gap for vehicular internet access," in *Proc. IEEE INFOCOM*, Apr. 2009, pp. 2831–2835.
- [10] P. Li, X. Huang, Y. Fang, and P. Lin, "Optimal placement of gateways in vehicular networks," *IEEE Trans. Veh. Technol.*, vol. 56, no. 6, pp. 3421–3430, Nov. 2007.