Design & Prototype Of In Vehicle Road Sign Delivery System Using RF

Mr.V.K.Jadhav, Akshay Tiwari, Divya Shrama, Vishakha Nayak, Chaitanya Date

Electronics Department, University of Mumbai
Datta Meghe College Of Engineering, Airoli, Navi Mumbai
akshay.tiwari5@yahoo.com
divyasharma492@gmail.com
nayak.vishakha1892@gmail.com
chaitanyamdate@gmail.com

Abstract: In this project we are going to develop an RF module based system that alerts vehicle drivers about approaching road oddities at an optimum distance before encountering them. The objective is to design a wireless system that delivers road signs (and other road-related information) to the commuter inside his/her vehicle visually and aurally, at an appropriate distance before encountering the corresponding road aberrations. The final aim is to bring about a change in the current road safety paradigm by providing a more efficient and ergonomic electronic alternative to static road signs. In addition to reducing dependency on road signs, the device will also aid in averting accidents and traffic jams, and in better implementing traffic law and order.

Keywords: RF module, alert, road oddities, visually & aurally, wireless hardware

1. INTRODUCTION

The hassles of vehicular commuting in crowded metropolitans in developing countries are many & having to wait hours together in traffic jams, taking tortuous detours due to on-road constructions, trying to spot speed breakers, navigating blind turns, one-ways and so on. Forked roads, railway crossings, sudden reverse bends and steep ascents and descents are just few of the road oddities that one may encounter on the average drive. At times, such road oddities are accompanied by road-signs.

Mandatory road-signs enforce law, while Cautionary road-signs are installed in hazardous areas to avert accidents. Informative road-signs provide directions, Locations and other information that is potentially useful to drivers in that locality.

However, most vehicle drivers miss road signs more often than not. It is understandably difficult to keep an eye out for road signs when one should be focused on driving. The inconvenience is augmented by inadequate placement and poor noticeably of the signs. They are non-intelligent displays, and preventing traffic jams and providing personalized alerts are beyond their capacity.

Road signs are very important and vehicle driver must obey these signs. But sometimes we focus on driving so we don’t pay attention to these road signs. This may lead to accidents. Another case would be many times we are in very hurry that we don’t pay attention to these road sign boards and again this may cause traffic jams or accidents. Road transport is increasing rapidly in India. Therefore it is necessary to ensure driving safety.

Road Traffic Signs are not only important to new car drivers. It is also important at every citizen in the India to know the important of traffic signs. Over the years of statistics, more and more people both on the road and off-road find these signs very important. This is why the Department of Transport, Highway Administration is strictly implementing these rules and regulations to avoid accidents on the road.

The main reason why these signs are available on the road is because of safety. Traffic signs make sure that all drivers are aware of the rules and the dangers on the road. Without these signs, accidents may occur more often. These signs also warn the drivers of the potential dangers that can be encountered on the roads.
We can see from above images that there are some redundant and cluttered road signs. They are very confusing. While driving driver can’t pay attentions to all these road sign boards. Amongst all boards driver may not see some sign boards and this may lead to accidents. Thus to improve the driving safety we are doing this project. Our hardware will alert the vehicle driver visually as well as aurally so that further mishaps would be avoided and traffic rules would be properly implemented.

2. LITERATURE SURVEY

A. Existing Method
In this method RFIDs are used for in vehicle road sign delivery system. The objective was to replace road signs with RFID tags, and use in-vehicle RFID reader-enabled modules to sense them and provide tangible information to driver.

B. Drawbacks
- Range is small.
- Sometimes receiver may go undetected.

C. Proposed System
The proposed system will use RF modules instead of RFID tags. In this we will be using RF modules such as TWS-434 as transmitter module and RWS-434 as receiver module. These modules have range of 100fts and frequency of 434MHz.

D. Related work
The previously done work provided certain critical factors and information to start on. For example
- Ideal positioning of the modules
- Speed tests
- Time lag between reads

3. BLOCK DIAGRAM

4. EXPLANATION OF BLOCKS

A. Transmitter Section
The figure above shows the block diagram of transmitter unit. It consists of RF Encoder, RF Transmitter and an antenna along with battery for power supply. We are also using a switch which will give us 16 binary configurations. There is one LED also we are using as an indicator.
RF encoder which we have used is HT12E. HT12E is an encoder integrated circuit of $2^{12}$ series of encoders. They are paired with $2^{12}$ series of decoders for use in remote control system applications. It is mainly used in interfacing RF and infrared circuits. The chosen pair of encoder/decoder should have same number of addresses and data format. RF transmitter we are using is TWS-434. These wireless transmitters work with our 434MHz receivers. They can easily fit into a breadboard and work well with microcontrollers to create a very simple wireless data link.

B. Recording section

Recording circuitry is a part of receiver section only. It includes Voice IC APR6008, variable pot, LM386, speaker, microphone and LEDs. Voice IC has high quality of audio recording and playback capacity. There is a switch present in the receiver circuitry. So we can switch between two modes. A] Normal mode. B] Recording mode.

In recording mode, we record our voice such as “Left turn ahead” etc. For each binary configuration there will be one recorded voice. To record voice we have to turn on recording mode. Then there is a microphone where we have to talk eg: “Left turn ahead”. Then there is IC LM386 which acts as a speaker amplifier. By using pot we can control the volume of the speaker. To indicate the recording mode LEDs are used.

C. Receiver section

Receiver circuitry consists of 89S52 microcontroller, LCD display, buzzer, switch, antenna, RF decoder HT12D, RWS-434 RF module, Oscillator, voltage regulator IC47805, Filter capacitor, reset button and LEDs.

Once the voice is recorded we have to reset the system. Then we turn on the normal mode. Now when receiver comes in the range of transmitter, buzzer will buzz and LEDs start to blink. Then decoder will be paired with encoder provided both have same address and data format. Decoder will decode the information and pass it to microcontroller. Output of microcontroller is given to LCD display. On LCD display whatever voice is recorded will be displayed for instance “Left turn ahead”. Output of microcontroller is also given to voice IC which has playback capacity and recorded voice can be heard through speaker. We can adjust volume setting. As long as receiver is in transmitter’s range recorded voice will be displayed on LCD and same will be heard through speaker. In this way visual as well as oral alert can be given to driver.

5. Applications

- Accidents can be prevented.
- Traffic jams can be avoided.
- Traffic law and order will be properly maintained.
- It enhances driving safety.

6. Future scope

Along with the primary objective of road safety, a plethora of other information can be provided to the commuter. Modules could disseminate additional information such as locations of nearby hospitals, petrol stations and eateries, by serving as data pellets. If there is on-road work/construction in progress in a locality, a tag installment a few km before the affected area can be used to suggest suitable detours, thereby averting potential traffic jams and blockades. The possibilities are numerous. Care has been taken to provide the alerts on a priority basis.

7. Conclusion

In this synopsis we have demonstrated the full scale prototype design of a system that can deliver road signs and other road related mandates inside commuters’ vehicles. Rather than erecting more road signs continually, which only add to driver distraction, we introduce a possible shift in the way cautions and other information is provided to vehicle drivers. There is a plethora of prospective benefits it has for vehicle owners and public transport users alike, which have been documented in An RF-module Based in-Vehicle Alert system for Road oddities. Drivers can receive route suggestions and directions at regular intervals even if their vehicle is not equipped with a GPS module. Dependency on road signs will lessen.
8. REFERENCES


