

# Android based Sign Board Detection with Image & Voice Alert System

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## Introduction

Automatic road sign detection and tracking is an important task in a driver assistance system. Its importance lies mainly on the vast amount of car accidents that happen each year all over the world, caused by the driver's inability to process all the visual information they receive while driving. Road signs characterized by color and shape are primarily for guiding, warning, and regulating car drivers. Each color and shape of the road signs conveys a particular meaning.

Accidents occur frequently in highways, which will create a heavy loss for the victim's families as well as for the society. Mainly accidents occur due to the unawareness of the driver about the obstacles that may be present on the highway routes.

This project is developed in the vision of preventing accidents in the highways. A prior intimation is given to the driver about the obstacles present in the highways such as steep curve, bends, bridges, temporary work on progress etc. to avoid mishaps.

## Literature survey

Road facilities are a major concern in the developed world. Recent studies show that one third of the number of fatal or serious accidents are associated with excessive or inappropriate speed, as well as changes in the roadway (like the presence of road-work or unexpected obstacles). Reduction of the number of accidents and mitigation of their consequences are a big concern for traffic authorities, the automotive industry and transport research groups. One important line of action consists in the use of advanced driver assistance systems (ADAS), which are acoustic, haptic or visual signals produced by the vehicle itself to communicate to the driver the possibility of a collision. These systems are somewhat available in commercial vehicles today, and future trends indicate that higher safety will be achieved by automatic driving controls and a growing number of sensors both on the road infrastructure and the vehicle itself. A prime example of driver assistance systems is cruise control, which has the capability of maintaining a constant user preset speed and its evolution, the adaptive cruise control, which adds to cruise control the

capability of keeping a safe distance from the preceding vehicle .A drawback of these systems is that they are not independently capable of distinguishing between straight and curved parts of the road, where the speed has to be lowered to avoid accidents.

Many of the traffic communicators are present in the market that functions as initializing a vehicle wireless subsystem; broadcasting a query to request real-time traffic pattern data, where in the real-time traffic pattern data comprises traffic pattern data obtained from other vehicle wireless subsystems and highway wireless subsystems; and if a response to the query has been received, incorporating the real-time traffic pattern data in to a runtime database and creating a human-readable display for displaying on a navigation system. For all these process to be done the vehicle must have a GPRS & computer system or any real time operating system and to make that system run effectively another by another person rather than driver has to be ,which is not economical and difficult to implement on all the speed vehicles on highways.

## Description

This project is based on Renesas RL78 microcontroller which is a 16-bit controller. For attaining the task mentioned we choose RF based wireless transmission, which is a better and cheaper means for communicating between the vehicle and the transmitter. The transmitters will be placed in the signboards, which will be holding the code for the corresponding sign. The receivers will be placed in the vehicle and whenever the vehicle enters into the transmission area it will receive the corresponding control code and display the data in the LCD. This data is transferred to an android mobile, where images of respective sign board are displayed. As soon as the driver receives the signal a buzzer is activated to intimate the driver to view the images in display.

Drivers travelling on roadways in their vehicles are provided with many different control signs having control information, such as sign directed cautions, Speed Limit, level Crossing, Construction Sites, U turn, Accident spot, school zones ,dangerous intersections ,sharp turns and other sign related information. But these signs are usually overseen or they might not be placed properly. Instead if we send indications from the Hazard area itself, and make the vehicle receive this information wirelessly before the driver reaches that area then suitable action can be taken prior and can avoid mishaps. So basically it is an adjustable

traffic control system with a remotely controlled traffic control system having information of different signs.

The device has 2 parts

- a) Transmitter –RF Tx
- b) Vehicle – Controller with RF Rx

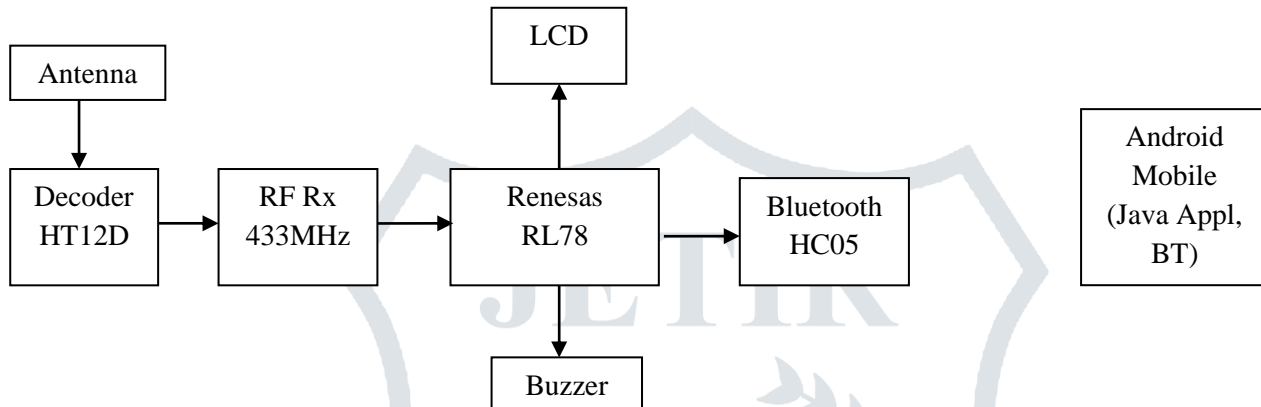
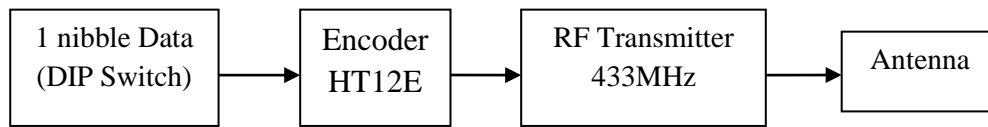
This is the primary part and this module has a controller which is fixed in the Vehicle itself. It receives information about the obstacles or any info in that surrounding area through RF Receiver-Antenna. It has RF decoder, Android application, buzzers etc.

### Demo Points

- LCD is used only for testing purpose.
- Bluetooth to transfer data to the android mobile.
- Only for demo concern, android mobile is used to display images. As a future product, the embedded unit and android application will be integrated in a single unit.
- Demo is shown with single transmitter unit. DIP switch is used to change the unique code for respective sign boards.

R5F100LEA microcontroller from Renesas is used to implement this project. Microcontroller acts as the heart of this project, which controls the whole system. It contains of Flash ROM 64KB, RAM 4KB and Data Flash 4KB, and it has High speed on-chip oscillator, Self-reprogrammable under software control, 58 GPIO's, 3 UART's, Simplified I2C, 10 bit resolution ADC, 28 Interrupt Sources, ISP programming support etc.

## Block Diagram



## Components List

1. Microcontroller –Renesas RL78 series.
2. RF Transmitter and Receiver module.
3. Buzzer
4. DIP switch
5. LCD
6. Bluetooth – HC05
7. Android Mobile

## Softwares Used

1. Embedded C
2. Cube Suite+
3. Renesas Flash Programmer

## Advantages

- This is economical to be used in all vehicles.
- Mishaps can be avoided.
- RF communication units cover meters max hence will be useful for school, hospital areas.
- Speed of the vehicles can be controlled in such areas.
- Traffic violations also can be avoided.

## Disadvantages

- The RF transmitters placed at the estimated hazard points need to check for its working constantly.
- During heavy rain and storm conditions units have to be more robust.

## Future Scope

- The vehicles can be made to communicate with highway command units for getting other useful information on the traffic density and weather conditions etc.
- A highway command unit – An interactive unit also can maintain a data base of vehicles which will help in vehicle tracking. It can also alert vehicles if it violates rules and regulations on highways.

## Conclusion

This device is acts as a friendly and economical device on the highway used to give the information about the spot and situation before hand and avert mishaps.

## References

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