

Road Sign Boards Information System

Halima Azeem¹, V. A. Darshan², G. S. Punith Kumar³, Sachin⁴, N. Manjula⁵

^{1,2,3,4}Student, Department of Electronics and Communications Engineering, DAIT, Bangalore, India

⁵Assistant Professor, D Department of Electronics and Communications Engineering, DAIT, Bangalore, India

Abstract—Very often we see many road accidents taking place, which could be due to many reasons like drivers ignorance of seeing the signboard, invisible sign board during bad weather conditions or even due to the damaged signboards. Road signboard information system is one such approach where the driver gets the information about the upcoming hurdles. At night time and even during fog and rainy season it is difficult for the driver to keep track of signboards. One such solution for these problem is the road signboard information system, where in image is displayed in the android app and voice alert system helps the driver to concentrate on the road without even worrying about the signboards.

Index Terms—Road sign boards

I. INTRODUCTION

Many a times the warning signboards are being missed by the drivers, these warning notes may be speed breaker ahead or narrow bridge or even accident zone. Sometimes the signboards are so dirty that the driver may not be able to see/read anything which in turn may cause the driver to lose his/her concentration on the road. In order to overcome all these problems we go for signboard information system. This project is based on Renesas micro-controller which is a 16 bit controller, an RFID reader is placed along with the micro-controller. The micro-controller receives information from the RFID tag which is been placed on the road and displays the information in the android app. Further the same is used to announce to the driver about the hurdles such as speed breakers. This voice alerting system helps the driver to concentrate on road. The information about the road signboard can be provided using RFID tags. The tags contain code numbers that indicate various signs like for example accident zone can be indicated using one RFID tag code. The code information is already pre-programmed in the micro-controller. The code numbers along with the respective link is transferred to the respective server using GPRS. Once the server receives the code number, it transmits the respective code information to the android app where the signboard is displayed and voice alert is activated.

A) Existing System:

In the existing system, different sign boards and information boards are placed on road sides before the hurdles or any danger. The drivers always have to keep looking at the road side's sign boards for ahead hurdle information and directions, this could distract the driver concentration in some scenarios.

1) Problems in the existing system:

- Some Sign boards will be damaged or broken and some boards will be scratched and some boards will be covered by dust so there will be no proper view for drivers.
- In some scenarios during monsoon times sign board will not be visible properly in bad weather conditions from this driver have no idea about ahead curves and turns.
- During night time also it's difficult to observe the warning boards on the roads.



Fig. 1. Sign board on a highway

2) Proposed System:

A proposed system for a Road sign board information system consists of a 3 parts

1. RFID tags (transmitter unit)
2. RFID reader module (receiver unit)
3. Android App

A portable unit consist of a RFID reader, renesas controller and a GPRS module is placed inside the vehicles, which detects the RFID tags of a sign boards. An android app is installed in a mobile in that image is displayed along with a voice notification for a driver.

II. METHODOLOGY

A) Hardware:

The main component which is been used in our project is the Renesas microcontroller, it has various built in features. Some of the features of renesas micro-controller (R5F100LE) are as listed below:

- It is a 16-bit microcontroller.
- It has 3 UART for serial interface.
- Its operating voltage is 5V.
- Oscillating frequency is 32MHz-1MHz and even a low speed oscillator of 15 KHz is present.

- Depending on the number of pins 16-512KB of RAM, 2 to 32KB of ROM and 4KB of data flash memory are available on this chip.
- Cost of this microcontroller is relatively less.
- 0-7 channels are available for timer which is of 16-bit and 1 channel is available for watch-dog timer with built in PWM features.
- Multi-tasking features are available with most of the pins.
- 6-25 channels are available for 8/10-bit resolution A/D converter.

Secondly we have used RFID technology where the RFID system consists of 3 components namely: an RFID tag, RFID reader (EM 18) whose frequency range is 125 KHz and an antenna. RFID reader will continuously be transmitting the radio waves with a particular frequency. RFID tag contain an integrated circuit and an antenna, which in turn transmit data to the RFID reader. The RFID tag will convert the received radio waves to a more suitable form of data.

Thirdly we have used GPRS (SIM800C). It features GPRS multi-slot class 12 and its uplink/downlink frequency is 85.6KBPS. It is a quad-band GPRS module that works on frequencies 850/900/1800/1900MHz. supply voltage ranges from 3.4-4.4V. It is available with one SIM slot and has a RAM of 32 bit, with a standard serial interface which is easy to use PC control or debugging. A USB interface is also available.

B) Software:

- Cube suite plus: the cube suite plus is known for its simplicity, usability and its security which is helpful for editing, building and debugging of codes. It is easy to operate and install. This software is user-friendly. It features shorter build time.
- Renesas flash program: this software creates the hex-file and dumps the code into the controller.
- Android studio: Used to develop the android app.

C) Experimental Setup:

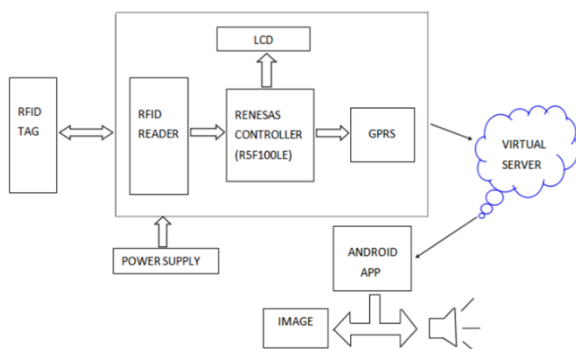


Fig. 2. System architecture

In our proposed road sign board information system the sign board information is displayed inside the vehicle in order to provide a better system. In addition, we have used an android app, display and an RFID tag that are user friendly. The architecture of the system is shown in Fig. 1. To test the

effectiveness of our proposed system, we collected data from the RFID tag with the help of RFID reader, which is programmed to read the code from the RFID tag and send it to the cloud using GPRS module. The stored data in the server is accessed using the android app. we have used many RFID tags where each tag contains a different sign board information and a single RFID reader which can read different RFID tag information.

III. RESULT ANALYSIS

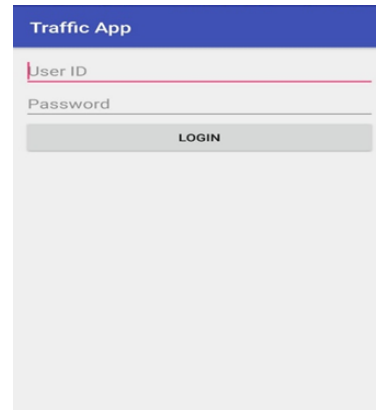


Fig. 3. Android app login page

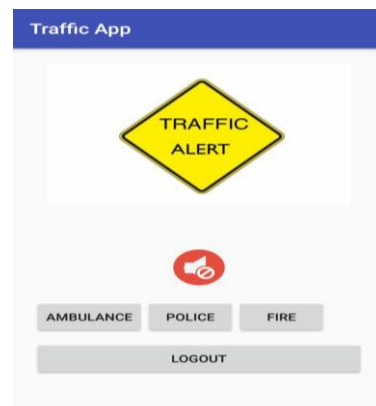


Fig. 4. Welcome page



Fig. 5. Sign board notification

For the data analysis, we have developed an android app. The screenshots of the sign board system with visualization of different sign boards is shown in Fig 2. The sign board information is displayed and voice alert system is activated. As soon as the RFID reader detects the RFID tag the respective code is sent the renesas micro controller which in turn sends the respective number associated with the RFID tag along with the website address of the cloud server to the GPRS. The GPRS then transmits the data to the respective cloud server. The recorded data is stored in the cloud and will accessed in the android app.

IV. CONCLUSION

This paper is designed using structured modelling and is able to provide the desired results. It can be successfully implemented as a real time system with certain slightly modifications. This model helps in getting information about the ahead hurdles on road and also helps in reducing the number of accidents.

Going further most of the units can be fabricated on a single along with microcontroller, thus making the system compact thereby making the existing system more effective.

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