Application of RF Technology to Solve Traffic Signal Scheduling by Monitaring the Vehicle Intensity in the Perticular Road

Lavanya R
M.Tech, Dept Of Ece
Btl Institute Of Technology
Bangalore

Prof. Rukmini D
Prof. Of Ece Dept
Btl Institute Of Technology
Bangalore

***Abstract*—Traffic congestion is one of the major problems in most of the cities. Emergency vehicles Such as ambulance cannot reach hospitals in time due to traffic problems. Other problem is traffic density and accidents which are frequently occurring in highways which will be heavy loss to victim and his family. This Project is mainly concerned about these three problems, main objective of the Project is to overcome the problem. Here we are using IR sensors to optimize traffic density and RF Tx-Rx module to detect emergency vehicle and to avoid accidents we can use this RF sensors to display sign board images on android phones via Bluetooth**

***Keywords*-ARM cortex micro-controller, IRsensors, RF sensors, Bluetooth, android phone**

I.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, present in the highways such as steep curve, bends, Bridges, temporary works on progress etc to avoid mishaps.

II.BLOCK DIAGRAM

Figure shows the basic block diagram of the project which has divided in to three parts. The first part describes the detection of emergency vehicle using RF sensors and second part of the diagram shows how IR sensors are mounted on either sides.DIP switch condition represents code for different vehicles. Code which is unique as mentioned above.

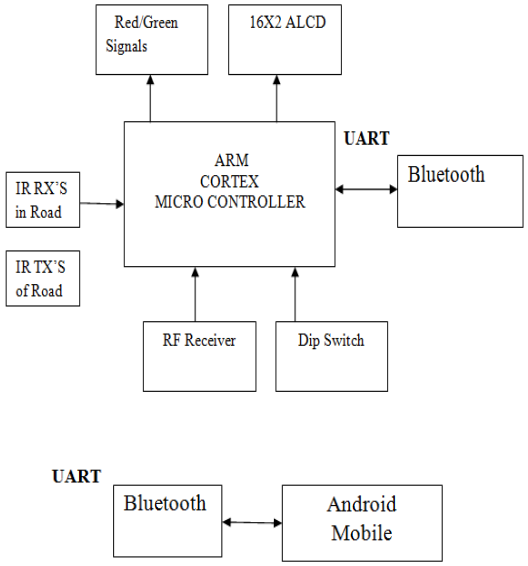

Fig1.1 Basic block diagram of the system

III.PROJECT DESCRIPTION

The entire project can be divided into 3 functions:

Traffic Density Monitoring and Signaling:

To monitor the density of the traffic, we will be keeping the few IR Sensors in the besides the road and depends upon the signals from the sensors the timing of the traffic signals will be changed. The sensors output is given to a comparator to digitize the output. In this project all the IR receivers placed near the roads are connected to the controller. Based on the IR receivers signal information will be send to the signal Lamp Post showing RED/GREEN Lights. If the 1st IR is blocked means that particular road signal will be switched to green light for 5sec, if the vehicles blocked till 2nd IR means that

particular signal will be switched to 10sec & next set of IR blocking is set to 15secs. The signal time will be displayed on the LCD. If IR's are not blocked means by default 10 seconds traffic signal delay will be there. When the ambulance comes in emergency then a RF message is sent for example 1000 is sent for ambulance setting in a DIP Switch connected to the controller and priority is given to ROAD and its signal will be switched on to green for 20 seconds. This project is based on ARM Cortex microprocessor which is a 32-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 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. When the ambulance comes in emergency then a RF message is sent for example 1000 is sent for ambulance setting in a DIP Switch connected to the controller and priority is given to ROAD and its signal will be switched on to green for 20 seconds.

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.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. Demo purpose a dip switch is used and a binary code is set in the dip switch. Each switch pattern is assigned with a specific function for example 1000 is assigned for ambulance similarly 0101 for hump, etc.

IV.COMPONENTS USED

- Microcontroller - ARM Cortex
- IR sensors
- Comparator LM358
- Red and Green LEDs
- 16X2 LCD
- Bluetooth
- RF Transmitter and Receiver

V.SOFTWARES *USED*

- Coocox IDE
- Flash magic
- OrCAD
- DotNet

VI.APPLICATIONS

- This project can be used in high peaks, hills for detection of sharp curves and automatic speed limit.
- It is used to detect the emergency vehicle such as ambulances.
- The project is used to secure and avoid the road accidents.
- We can control the speed of car on particular zones such as school zones, hospital zones
- We can avoid traffic problem by calculating traffic density by IR sensors

VII.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.

VIII.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.

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