SIGNAL DETECTION AND ANTI-COLLISION SYSTEM USING ARM 7

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Abstract

The wireless communication technologies enabled vehicles on a highway to communicate, in order to share state information and information to avoid potential collision. This paper discusses a protocol which avoids vehicle accidents. The vehicle state information is being obtained using ultrasonic sensors, to predict potential accident and accordingly the speed of the vehicle is reduced using ARM processor (Advanced RISC Machines). This protocol provides warning message when the safety distance is reduces than the safety limit. Here, the car will be equipped with an ultrasonic sensor which will continuously track for any obstacles from the front side. If the obstacle is detected then the µC will continuously compare the distance given by the ultrasonic sensor. If distance goes on reducing indicating that the front car is coming closer to the current car then the microcontroller will start applying brakes until the distance is within safe limit.

System Schematic

A system consists of an ultrasonic sensor that detects the distance to the target vehicle. For this we are making two car models as CAR 1 and CAR 2.

Figure 1. Communication between two cars

Anti-collision System:

If the obstacle is detected then the µC will continuously compare the distance given by the ultrasonic sensor. If the distance keeps reducing indicating that the front car is coming closer then the µC will start applying breaks until the distance is within safe parameters.

Breaking System:

Cars are equipped with DC motors. The µC will change DC speed control via PWM. The µC will change the ON time and OFF time of the entire pulse time. If we decrease the ON time then the voltage applied to the DC motor will reduce and the speed of the DC motor will be reduced.

Block Diagrams

Signaling Unit:

The car is able to communicate with the signaling unit which will provide the status of the signal to the CAR.

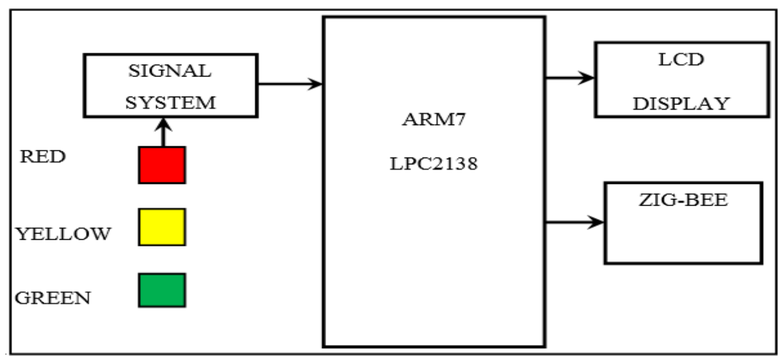

Figure 2 Block Diagram of Signalling Unit.

CAR 1 :

This car is equipped a ZigBee which will receive the signalling unit's signal status and will decrease its speed if red light is on. Also, the car is designed with a system in which the cars that are close by can communicate with each other on a RF link.

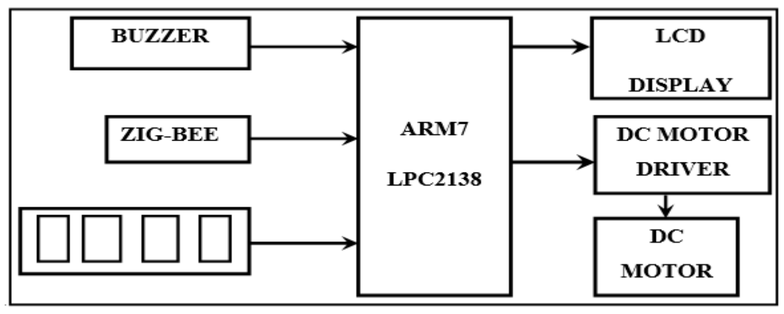

Figure 3. Block Diagram of CAR 1.

CAR 2:

This is equipped with an ultrasonic sensor which will continuously compare the distance given by the ultrasonic sensor. . If the next car is a safe distance then car will keep going at the same speed.

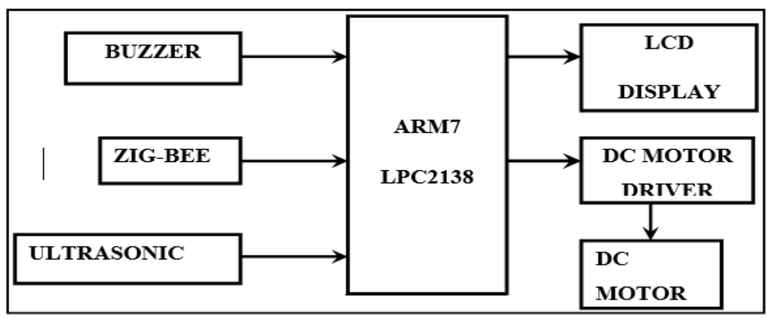

Figure 4. Block Diagram of CAR 2.

Advantages:

- Fully automate system
- Low cost
- Robust system, low power requirement
- Quick response time
- Real time system

Future Scope:

- Systems can be developed by which users can give audio commands.
- Sensors can also be implemented on all four sides of the car so that all the area around vehicle can be monitored.
- Vehicle tracking can be implemented by using GSM model.
- Touch screen systems can be developed.

Results

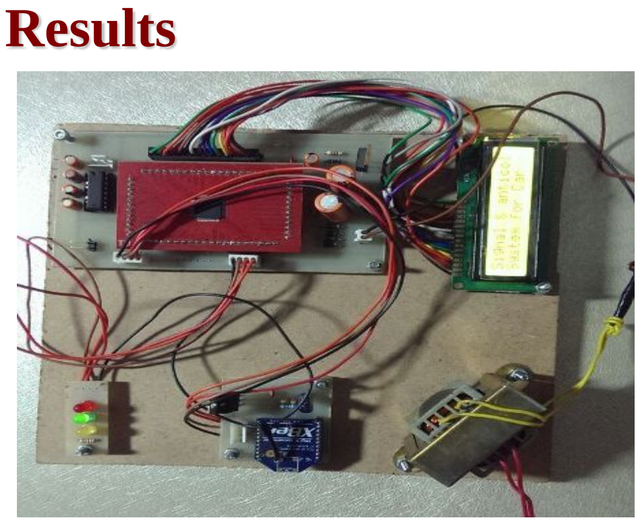

Figure 5. Photo of Signalling Unit

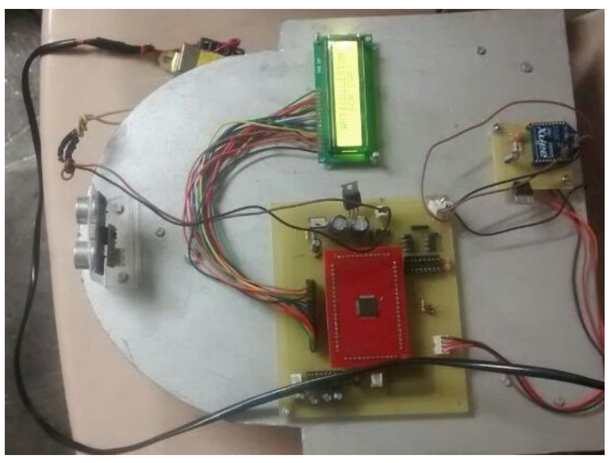

Figure 6. Photo of Car 1

Performance Evaluation

Applications:

- can be used to inter-communicate between vehicles.
- It is used in traffic control, thus avoiding congestion.
- Can be used to inform about weather condition, traffic between vehicles.

Conclusion

This experiment discusses many issues pertaining to the communication protocols that uses sensor information to avoid potential accidents. The is system also useful in giving warning signals with continues tracking of front-side obstacles. Also, it will have a proportionate increase in the level that avoids potential accidents and result in improved intercommunication using latest technologies.