



An arduino based embedded system in car for road safety

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ABSTRACT: Road safety accidents are one of the world's major public health and injury prevention problems. According to the World Health Organisation (WHO), more than a million children are killed in road accidents each year, all over the world. The motivation behind this work is an attempt to make an arduino based embedded system which makes the passenger's journey even safer and more secure. This paper handles the road discipline such as speed control in different areas and horn control in horn prohibited zones. The features included in this work are vehicle speed control in school zone and also controlling the speed of the vehicle in different zones such as bridges, highways, cities and suburbs. It also includes horn control of vehicle in No honking zone-control horn disturbances in horn prohibited zones such as hospitals, public libraries, courts and schools.

Keywords: Road safety, An arduino embedded system, speed control, horn control.

I. INTRODUCTION

Road traffic crashes are one of the world's largest public health and injury prevention problem. According to the World Health Organisation (WHO), more people die on road in India than anywhere else in the world. At least 13 people die every hour in road accidents in our country; the latest report of the national crime record Bureau reveals. In 2007, 1.14 lakhs people in India lost their lives in road mishaps improper road infrastructure failure to follow the speed limit, and increase in drinking and driving habits are among the major factors contributing to deaths from road crashes, WHO said in its report on 'Decade of Action for Road Safety 2011-2010'. Currently road safety systems are available in high end luxury cars such as Audi, Mercedes, Benz, etc., to name a few. Example: On star Corporation provides subscription based communications, in-vehicle security, hand free calling, turn-by-turn navigation, and remote diagnostics systems throughout the united states, Canada and China turn-by-turn navigation and road side assistance. The motivation behind the work revolution is an attempt to make an embedded system to bring a positive difference in the field of road safety and road discipline. The work tackles some major causes of road accidents such as breaking traffic signal and honking in No honking zone. It

also has a major objective of exercising road discipline such as speed control in different areas and horn control in horn prohibited zones. This paper presents vehicle speed control in variable zone in this feature; speed of the vehicle is controlled in different areas such as flyovers, bridges, highways, schools, hospitals, cities and suburbs. Horn control of vehicle. Horn control of vehicles in no honking zone –controlling unwanted disturbances in horn prohibited zone such as hospitals, public libraries, courts, schools, etc.,

II. LITERATURE SURVEY

Pramodshelke et al., had proposed that a review on Arduino Based embedded System in Car for Road Safety using RFID. In this work when the RFID tag is detected by the RFID reader the speed of the motor reduces in specified areas and it avoids accidents. Ch. Sonali Shankar et al., had proposed that a review on Arduino based Embedded System In Passenger Car For Road Safety. In this work the sound of the horn stops and speed is also reduced when the RFID tag is detected by the RFID reader. Deepa et al., had proposed that a review on Embedded System In Passenger Car For Road Safety. In this work the proposed features are automatic collision notification that gives notification to the victim's relative, red light traffic control makes sure the vehicle doesn't break signal, speed control alters speed in different zones, horn control prevents honking in horn prohibited zone, alcohol detection detects drunk driving and vehicle security is used to prevent theft. SuhasKatkar et al., had proposed that a review on An Embedded System In Passenger Car For Road Safety. This project is designed to inform about an accident or theft that has occurred to the vehicle, to the family members of the travelling persons and concerned authorities. Anto bennet et al., had proposed that a review on An Embedded System in Passenger Car for Road Safety using GPS and GSM. This work is designed to inform about an accident that is occurred to a vehicle to the family members of the travelling persons. Anto bennet et al., had proposed that a review on an Embedded System in Passenger Car for Road Safety using GPS and GSM. GPS Receiver gets the location information from satellite in the form of latitude and longitude. The system can be interconnected with the

alcohol detection and alert the owner on his mobile phone. Anto bennet et al., had proposed that a review on Alcohol Detection and Accident Avoidance Using locking With Tracking. This system will detect drunker driver by alcohol sensor through driver breathe fitted on steering in front of driver ,the message is sent to the police through GSM system and provides GPS base system to track those cars.

III. PROPOSED WORK

In this circuit, 433 Mega Hertz frequency transmitters are being used. (2)In this work, the chips and the Ic's used are encoded chip, decoded chip, transmitter-receiver module, ARDUINO controller [4], relay driver, relay contactor and LCD display. (3)RFID methods utilises radio waves to accomplish this. At a simple level, RFID system consists of three components: an RFID tag of smart label, an RFID reader and an antenna. RFID tags contain an integrated circuit and an antenna, which is used to transmit data to the RFID reader (also called an interrogator). A Liquid-Crystal Display is a flat-panel display or other electronically modulated optical device that uses the modulating properties of liquid crystals.

The power supply of (12-0-12)1 amp is given to the arduino UNO, the horn switch and the RF receiver is also connected to the arduino UNO.A crystal oscillator is connected to the arduino, where the arduino needs clock for its operation and crystal oscillator provide it. There are two sources of clock one is internal RC oscillator(1,2,4 and 8MHZ)and other through external crystal oscillator. When the RFID tag is detected, the motor speed reduces and hornking stops in hospital zones. Whereas in school zones only the speed of the motor reduces and there will be no change in the horn operation shown in fig 1.

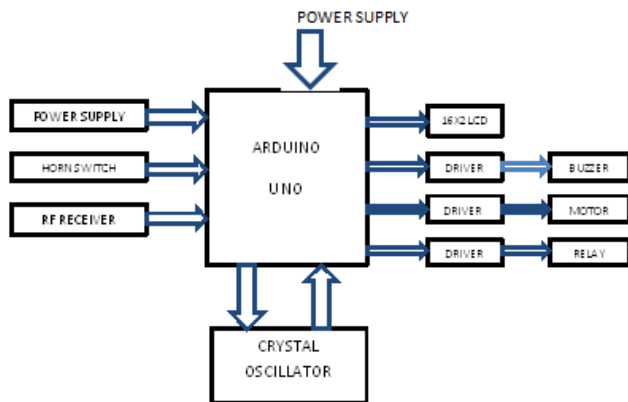


Fig.1.Block diagram of the system.

MAX232



Fig.2.Pin diagram of MAX232

MAX232 is a 16 pin IC .It converts signals from an RS-232 serial port to signals suitable for use in TTL compactable digital logic circuits .The MAX232 is a dual driver/receiver and typically converts the RX,TX,TTS and RTS signals shown in fig 2.

RFID TAG



Fig.3. RFID tag

RFID methods utilise radio waves to accomplish this. At a simple level, RFID systems consist of three components: an RFID tag or smart label, an RFID reader and an antenna. RFID tag contains an integrated circuit and an antenna, which are used to transmit data to the RFID reader (also called an interrogator) shown in fig 3.

LCD DISPLAY



Fig.4.LCD display

A Liquid-Crystal Display is a flat panel display or other electronically modulated optical device that uses the light modulating properties of liquid crystals shown in fig 4.

RF TX/RF MODULE



Fig.5. RF TX/RF Module

The transmitter/receiver (TX/RX) pair operates at a frequency of 433 MHz. The transmission occurs at the rate of 1KBPS to 10 KBPS. The transmitter data is received by an RF receiver operating at the same frequency as that of the transmitter shown in fig 5.

DC MOTOR



Fig.6. DC Motor

In this a DC motor is used where a shunt DC motors are very suitable for belt-driven applications. This constant speed motor is used in industrial and automotive applications such as machine tools and winding/unwinding machines where great amount of torque precision is required. Product name: DC Motor; Model: RF-500TB-12560; Working Voltage: DC 1.5-12V ... RF-500TB-12560 DC 6V 2700RPM 0.588N.M Torque 0.028A Brushed Motor... Used this motor, RF-500TB-12560 to replace a Mabuchi motor with the same number on it shown in fig 6.

IV. EXPERIMENTAL RESULTS

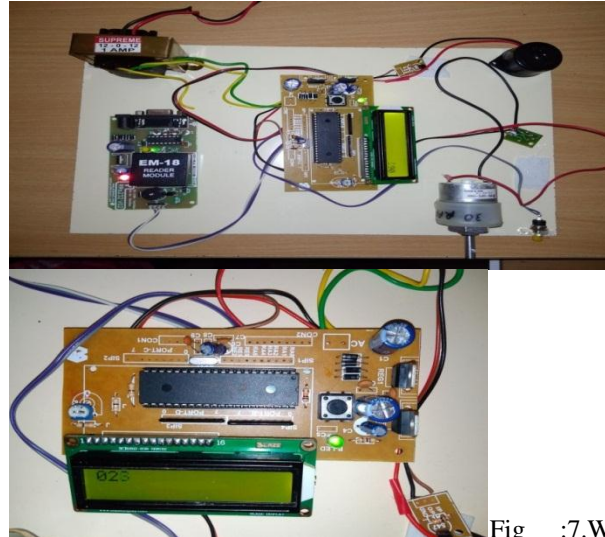


Fig :7. Waving

the RFID reader over the RFID detector

When the RFID tag is detected, the transmitter sends the signal alerting that the particular area's speed limit is 40 Kmph as example. The toy car initially runs in full speed. When this condition is transmitted, the receiver receives the signals, gives to microcontroller this then directs the relay to reduce the motor speed. Thereby the toy car runs at a visibly lesser speed as compared to the initial speed shown in fig 7.

Detection of school zone



Fig.8. LCD Display for school zone.

When the RFID tag is detected, the motor speed reduces and honking stops in hospital zones. Whereas in school zones only the speed of the motor reduces and there will be no change in the horn operation shown in fig 8.

Detection of hospital zone



Fig.9. LCD Display for hospital zone.

The encoder will be fed that it is a no honking zone, so the transmitter will be transmitting the RF signal with the no honking condition among others such as speed limit etc., RF receiver will receive signal which the decoder will decode and give to microcontroller. In the toy car a buzzer will be installed as a horn substitute. If the buzzer is on, and horn prohibition condition is being transmitted, the sound won't come shown in fig 9.

V. CONCLUSION

Since speed plays a crucial role while travelling, using the concept of TRAVOLUTION, which include the technology of arduino the passengers journey will become even more safe and secure. Future scope using radar vision fusion technology, the collision can be avoided using breaking functionality by identifying the distance between the car and the obstacle. Using the longitude and latitude values, the cars location can be tracked and alert messages can be sent to mobile phones regarding the remote information and the mobile number can be changed at any time.

REFERENCES

- [1] Prof. Pramodshelke, Ram Anjankar, Sakeshee Wanare, Ganesh Surve "A Review on Accident Avoidance by Eye Blink Sensor and Alcohol Sensor Using GSM" E-ISSN:2321-9637, 09th April 2017
- [2] Sonali Shankar Chalwad, SnehalBhimrao Gaikwad, Prashant A. Chougule "Accident Prevention Using Eye Blink Sensor" ISSN:2393-2835, Volume-4, Issue-1, January-2017
- [3] Suhas Katkar, Mahesh Manik Kumbhar, Priti Navanath Kadam "Accident Prevention System Using Eye Blink Sensor" Volume:03, Issue:05, May-2016
- [4] Pratik S. Danage, Ajay B. Dongare, Sangramsinh S. Dongare, Rahul B. Ghogare, Ganesh N. Khare "Automatic Breaking System Using Eye Blinking Sensor" Vol.2, Issue 2, pp(166-170), October 2015- March-2016
- [5] Deepa K. B, Chaitra M, Ankit Kumar Shirma Sreedar V. S, Prashant Kumar H. R. "Accident prevention by eye blinking sensor and alcohol detector" Volume-4, Issue-7, pp: 351-354, July-2015
- [6] Dr. Anto Bennet, M, Sankaranarayanan S, Ashokram S, Dinesh Kumar T R, "Testing of Error Containment Capability in can Network", International Journal of Applied Engineering Research, Volume 9, Number 19 (2014) pp. 6045-6054
- [7] Dr. Anto Bennet, M, Sankar Babu G, Natarajan S, "Reverse Room Techniques for Irreversible Data Hiding", Journal of Chemical and Pharmaceutical Sciences 08(03): 469-475, September 2015.
- [8] Dr. Anto Bennet, M, Sankaranarayanan S, Sankar Babu G, "Performance & Analysis of Effective Iris Recognition System Using Independent Component Analysis", Journal of Chemical and Pharmaceutical Sciences 08(03): 571-576, August 2015.