

Ahsanullah University of Science and Technology

Department of Computer Science and Engineering

Assignment

CSE3117 Microprocessor and Microcontroller

Year: 3rd, Semester:1st, Spring 2023



Team Vigilantes

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Objective

We have came up with a marvelous idea of reducing sound pollution on the busy roads and that is the implementation of radio frequency receivers and transmitters in vehicles and motor bike helmets to create an internal horn system instead of the load one. Which means only the people inside vehicles and bikers themselves can get notify if another vehicle is alerting them with horns for any emergency or needs.

Social and Economical Impacts

Sound pollution have been a big issue in the big cities since a very long time. In fact in peripheral small states people know the big cities as the most crowded places in a country. The aggressive honking of the horn from the vehicles on a road is a major source of noise pollution. Elon Musk has added engines in "Tesla" cars that car be driven without making any noise. We came up with the idea of project **SilentSignal: Noiseless Vehicle horn system** to add more silence in his bucket and promote a quieter environment.

Also our system is capable of contributing in alerting drivers of other vehicles at turning points of random roads, specially on mountainside roads.

Our **External Stakeholders** are general people and government whereas **Internal Stakeholders** are investors and engineers who will contribute in the whole implementation session which will increase employment oppurtunities among engineers and help us collaborate with automobile companies contributing in economical field.

Required Components

These following parts and tools are required for building this project:

1. Arduino Boards
2. 16x2 Serial LCD Modules
3. NRF24L01+ 2.4GHz Wireless Transceiver Modules
4. IR Sensors
5. Serial mp3 Module
6. Bluetooth Module
7. Batteries
8. Jumper Wires

Working Procedure

Basic components that react to the input are

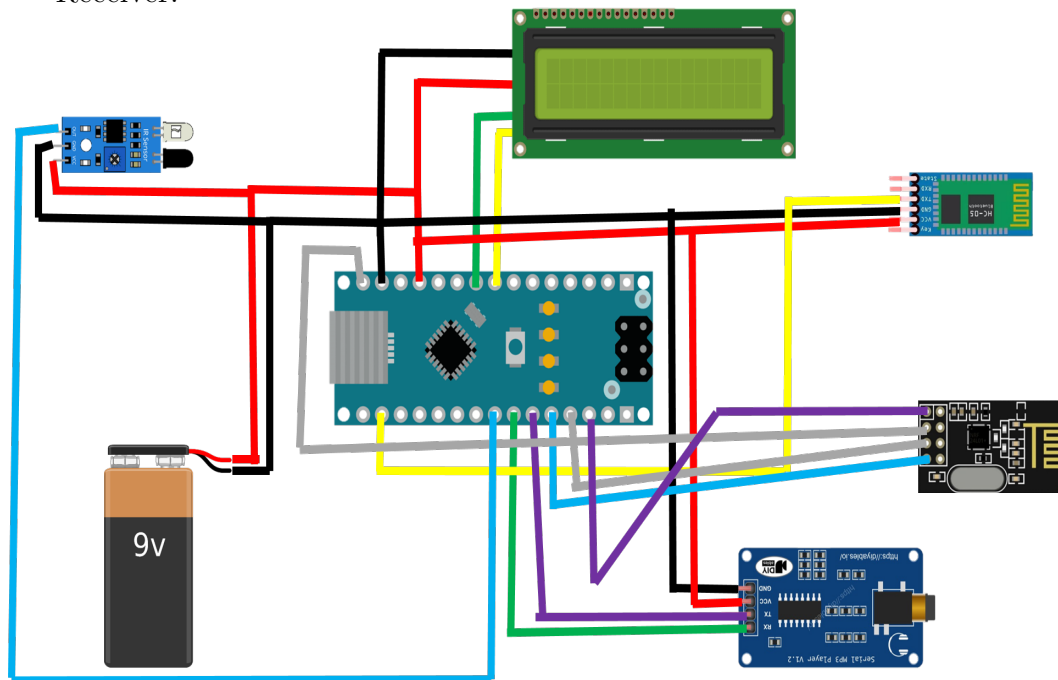
- 16x2 Serial LCD Modules
- NRF24L01+ 2.4GHz Wireless Transceiver Modules (Transmitter Mode)
- Serial mp3 Modules

Basic components that receive commands

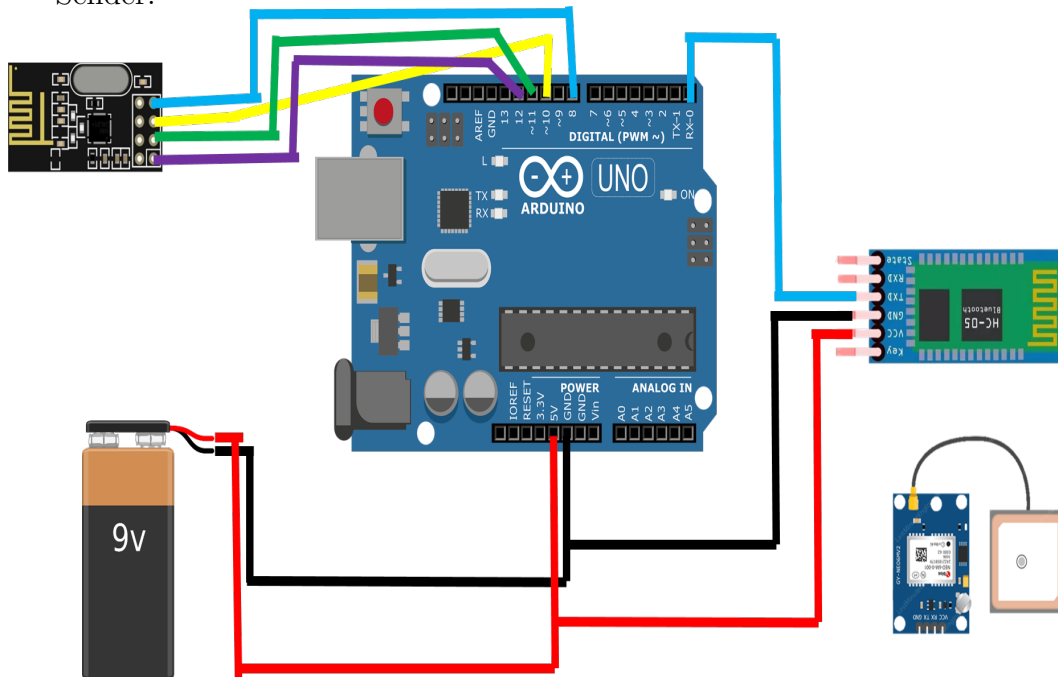
- NRF24L01+ 2.4GHz Wireless Transceiver Modules (Receiver Mode)
- IR sensors

Implementation Design Sheet

Receiver:



Sender:



Performance

Our embedded system will mainly create a wireless network of horn system inside the vehicles internally. Each car will have one Transceiver. A driver can honk whenever needed via the system while the transmitter module set in the transceiver will send signal to the near by cars in range to alert them of the presence or future act of the senders vehicle as the receiver module will receive the signals and deliver senders honk through car speakers which will cooperate in locating the senders position as we are using radio frequency.

We have used an self made software application that detects the latitude and longitude through Google map API instead of Neo-6M GPS module which is generally used to locate positions on earth. We needed to do so to calculate the distance between two vehicles.

Multidisciplinary Contributions

Electrical and Electronic Concepts

- We have made sure of the maintenance of voltage and current flow
- We have used compatible and safe electronics like arduino, NRF24L01+ transceiver module etc.

Software

- Use of Arduino IDE for prime purpose
- Use of Android Studio, VS Studio for handling corner cases
- Programming languages: Arduino language, Flutter, C++

Mathematical Concepts

- Distance calculation using longitude and latitude parameter
- Use of Google Map API

Limitations

1. We could not implement Neo-6M GPS module as it fused every time we uploaded our thoroughly verified code in arduino. We used an API application instead designed using Flutter Language on Android Studio.
2. We could not implement the project on any of the circuit implementing software as NRF24L01+ transceiver were not available on any of them.

Estimated budget

- **Arduino UNO:** BDT 840
- **Arduino NANO:** BDT 600
- **16x2 Serial LCD Module (x2):** BDT 220 each
- **NRF24L01+ 2.4GHz Wireless Transceiver Module (x6):** BDT 199 each
- **IR Sensors (as required):** BDT 90
- **Serial mp3 Module (x2):** BDT 199
- **Batteries (as required):** BDT 1000
- **Jumper Wires (as required):** BDT 100

Total Budget: BDT 4676 (approximately)

The costing can be minimized in practical field as the hosting body of the system as in vehicles already have a lot of components in them and we would not have to purchase those items again. For an example LCD display, speakers etc.

Conclusion

Our foremost motive is to build a **peaceful and quieter habitat**. The biggest reason of noise pollution is Vehicle honks. And the easiest solution to it is to vanish vehicle horn system which is not possible. But we can possibly make things a little private and just between the vehicle drivers.

In case of **multidisciplinary context**, we have implemented the safe and precise concepts of electrical and electronics in our project. All the components in our system are environmental friendly and will not cause harm to any living beings. Besides, the coding and command sections are handled by **C++ programming language** and **Arduino IDE**. Software implementation will be conducted using **Proteus 8 Professional** software. beforehand

Just like we human beings communicate these days with one another creating a virtual network amongst us over our smart devices, we have came up with this idea that our Arduino based embedded project **SilentSignal: Noiseless Vehicle horn system** can create a network of horn systems just amongst the vehicle drivers and passengers.

Our team has high hopes that our tiny project might help in this big world one day by building up a more calm and peaceful society.