IoT based Safe Distance Protection Badge

Devanshi Pandey[1]*, Rutuja Pawar[2], Jyoti Sharma[3], Manish Bhelande[4]
[1,2,3]Student, [4]Assistant Professor
IT Department, Shah & Anchor Kutchhi Engineering College, Mumbai, Maharashtra, India.

Corresponding Author
E-mail Id:-*devanshi.pandey@sakec.ac.in*

ABSTRACT

A crucial safe distance (CSD) model in V2V(vehicle-to-vehicle) communication systems was projected to primarily enhance driving safety by scattering warning notifications to vehicles after they approach calculated CSD. By intricately analyzing the conveyance movement options particularly once braking, our CSD definition was introduced and its configuration methodology was given through dividing radio vary into totally different communication zones. Supported our definition, the required message propagation delay was conjointly derived that can be wont to management the beacon frequency or period. Next, the elaborate CSD expressions were projected in numerous quality situations by absolutely considering the relative movement standing between the front and rear vehicles. Numerical results show that our projected model may give affordable CSD below totally different movement situations that eliminates the superfluous reserved inter-vehicle distance and guarantee the security at a similar time. The compared time-headway model invariably shows a smaller CSD thanks to specializing in traffic potency whereas the normal braking model usually outputs a bigger CSD as a result of it assumes that the subsequent automotive drives with a continuing speed and failed to discuss the situation once the leading automotive suddenly stops. totally different from these 2 models, our projected model may well balances the wants between driving safety and traffic outturn potency by generating a CSD in between the values of the 2 models in most cases.

Keywords*:-People-to-people communication systems; collision avoidance; safety distance*

INTRODUCTION

This project is supposed to assist individuals maintain social distance to avoid spreading COVID19. In some settings and surroundings its simple for individuals to forget to stay a secure distance, and then this device may facilitate prompt them. For instance, for younger youngsters this device makes it clear what's safe distance and what's not. In things like public events wherever strangers ought to maintain a distance the device will give consistent steering while not individuals having to police themselves or one another. This might be helpful in colleges, museums, recreational facilities, or workplaces.

The device doesn't need wireless fidelity and desires solely borderline infrastructure to charge the device (USB 5v). It uses basic technology and may be place along mistreatment low value without delay out there parts. There area unit 2 styles for flexibility- a straightforward one which will be created with off the shelf boards and modules during a couple hours and another that uses a custom board for a full product.

LITERATURE REVIEW

The HC-SR04 uses sonar to determine the distance to an object. The transmitter (trig pin) sends a signal: a high frequency

sound, when the signal finds an object, it is reflected and the transmitter (echo pin) receives it.[1] The Nordic nRF24L01+ is a low power RF transceiver IC for the 2.4GHz ISM (Industrial, Scientific and Medical) band with transmission speed of 2Mbps.The peak Rx/Tx currents is lower than 14mA and has a 1.9 to 3.6V supply range.[2] Series of hardware components were configured and integrated together in Arduino board to achieve the desired goal. [3] To make this measurement, we need to quickly and accurately synchronize between the devices, and that's where we use radio waves, traveling at the speed of light. We use an nrf24l01+ transceiver module to send a communication between the devices. This communication occurs very quickly (under 1 ms) so can be thought of as nearly instantaneous.[4]

ARCHITECTURE

You will want to build at least two prototypes so that you can see how they work together. The prototypes can be wired using jumpers with Dupont connectors.

During this pandemic where the whole world is suffering, there are some basic safety protocols that we have to follow to stay safe and maintaining social distance is one of those safety measures. In some settings and surroundings its easy for people to forget to keep a safe distance, especially, younger children. This device reminds people about the safe distance.

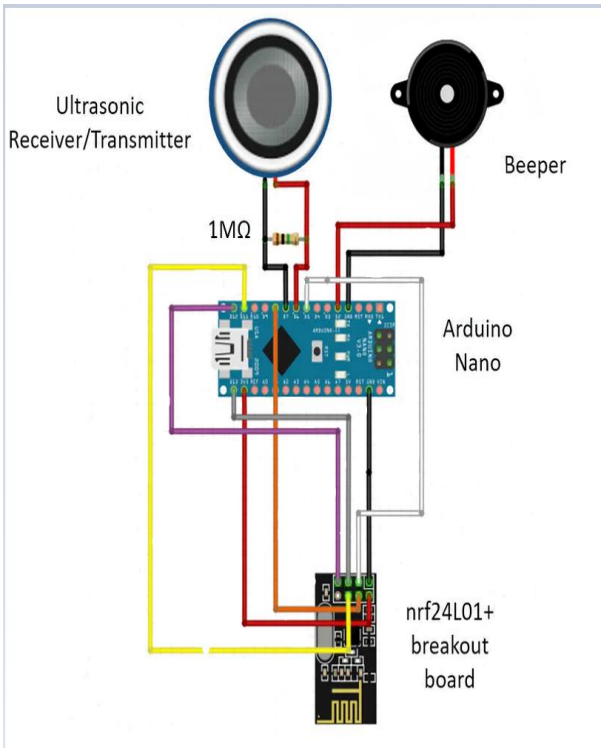

Fig.1:-*Circuit diagram of safe distance protection badge*

Ultrasonic Receiver/Transmitter: We began with utilizing the piezo transducers eliminated from the HC-SR04 ultrasonic/sonar separation sensor module. The beneficiary transducer on these modules functions admirably for this application. The transmitter transducer likewise works with marginally less affectability. We explored different avenues regarding different parts, similar to the Pui Audio UT-1640K-TT-2-T transmitter, however got more unfortunate execution than over A 1 mega-ohm resistor is put over the transducer to help predisposition the comparator. The worth isn't too basic and it will work with an incentive from a couple hundred K ohms to

a couple of M ohms. Beeper. The beeper should be a 5v constant tone beeper that contains its own tone oscillator. nRF24L01+ Breakout Board. These breakout sheets are accessible from an assortment of sources. The following is a table that shows the hookup. Ensure the associations are tight, since free wires will make the transmission fall flat.

WORKING

Everyone is given a tool to wear. The devices live the time it takes for a sound to travel from one person to a different. Sound travels about zero.340 meters per unit of time, therefore for a social distance of two meters, sound takes about 6ms to travel that distance. We are able to use high frequency sound, so it remains quiet to folks. To make this activity, we'd like to quickly and accurately synchronize between the devices, and that is wherever we tend to use radio waves, traveling at the speed of sunshine. We tend to use AN nrf24l01+ transceiver module to send a communication between the devices. This communication happens terribly quickly (under one ms) therefore may be thought of as nearly instant.

The communication has the subsequent steps:

1. One device (the 'sender') sends AN RF packet to any or all different devices in frequency vary. It then begins listening for AN inaudible ping.
2. Any gadget that gets the RF signal immediately reacts with a quiet ping.
3. The ping from the Highest gadget to the 'sender' shows up starting to the 'sender'. The 'sender' quantifies the period between RF send and indiscernible get. In the event that this period is a more modest sum than or so 6ms, we as a whole realize the users square measure excessively shut, and consequently the RF sender alarms to its users by means of the piezo buzzer.
4. Each gadget turns into a 'sender' on irregular events in order to ensure the RF channel is shared and every user has separation estimations.

OBJECTIVES

1. The primary objective of this project is to implement social distancing between people.
2. Another objective is to use basic technology that does not require Wi-Fi and only needs minimal infrastructure to charge the device (USB 5v).
3. This project also aims to use low cost readily available components.
4. Another aim is to make the device easy to use and very portable.
5. One of the objectives of the plan was to limit the segment tally and influence the Arduino Nano however much as could reasonably be expected for the ultrasonic send and receive. For sending, two output pins are utilized in push-pull style, providing 10v top to top output to the piezo ultrasonic transducer.
6. A clock driven hinder is utilized to create the 40kHz ping signal. For accepting, the Arduino Nano's differential comparator inputs are utilized to recognize zero intersection of the sign. A similar clock driven interfere with executes a coordinated channel that recognizes the ping.
7. It works surprisingly well at the distance ranges needed.

APPLICATIONS

1. This could be useful in schools, museums, recreational facilities or workplaces.
2. This could be used in factories and industries and can be worn by workers to ensure a safe distance.
3. This could be used in airports and other public transport facilities.
4. This would be helpful in all sorts of crowded places wherever a safe distance needs to be maintained including supermarkets and malls.

CONCLUSION

This IOT based Safe distance protection badge would help people maintain a cautious distance between each other(around 2m) by warning them about it, if it's any less, by making the buzzer go off immediately. The device would also turn out to be cost effective which would be affordable for most of the people. We would also learn and get a hands on experience on Arduino Nano R3, Ultrasonic Sensor-HC-SR04 (Generic), and other components used in detail.

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