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# Approaches to Control Excessive Honking in Residential areas with Smart sensors

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## ABSTRACT

**Excessive honking is a major source of noise pollution in urban and in residential areas. It can have a negative impact on the environment and the health of people who live inthese areas. There are a number of solutions that have been proposed to reduce excessive honking, including the use of smart sensors. Smart sensors can be used to detect and monitor excessive honking, and they can be used to generate alerts or take other actionsto reduce the noise. With the help of different sensors, this paper discusses some approaches for reducing excessive honking in residential areas. It is very helpful to use these three approaches in order to deal with honking noise pollution. The system is designed to be scalable and to be able to adapt to changes in traffic conditions. The system is a promising new technology for reducing excessive honking noise pollution. It has the potential to improve the quality of life for people wholive in urban and in residential areas.**

***Keywords***:- *Smart Sensor, Excessive Honking, Residential Area, Noise Pollution, Urban Areas, Environmental Impact, Health Impact.*

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# CHAPTER ONE
# INTRODUCTION

➢ *Noise Pollution:-*

Noise is one of the environmental pollutants that are encountered by residents in day to day life. Noise pollution generates many health hazards and hampers the process of communication. The major noise is generated by the traffic.The ever-increasing noise pollution affects both physical and mental ability and presents the significant need for a sustainable and an economically viable solution.It is highly unpleasant and irritating to hear aggressive horn honking from vehicles traveling on a road, which contributes to noise pollution.

Fig 1 Noise Pollution

➢ *Effects of Noise Pollution on Humans:-*

The main causes of noise pollution are man-made and environmental noise. How- ever, long exposure to noise pollution could lead to dire health consequences like cardiovascular diseases, hearing impairment, sleep disturbances, and adverse social behavior etc. [1] Noise pollution is unwanted or excessive sound that can have negative effects on human health and the environment. It can be caused by a variety of sources, in- cluding traffic, construction, industry, and recreational activities.

➢ *The Effects of Noise Pollution on Human Health can be Both Short-Term and Long-Term:-*

- *Short-term effects can include*
- *Annoyance*
- *Irritability*
- *Difficulty concentrating*
- *Sleep disturbance*
- *Increased heart rate and blood pressure*
- *Muscle tension*

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➢ *Long-Term Effects of Noise Pollution can Include:-*

- *Hearing Loss*
- *High Blood Pressure*
- *Heart Disease*
- *Stroke*
- *Mental Health Problems Such as Anxiety and Depression*
- *Reduced Cognitive Function*
- *Sleep Disturbance*
- *Increased Risk of Accidents*

➢ *Especially Vulnerable to the Effects of Noise Pollution are Children Exposureto Noise Pollution During Childhood can Lead to:-*

- *Learning and Behavioral Problemsreduced Academic Achievement*
- *Increased Risk of Attention Deficit Hyperactivity Disorder (ADHD)*
- *Increased Risk of High Blood Pressure*
- *Increased Risk of Heart Disease*

➢ *Excessive Honking:*

Fig 2 Excessive Honking

Excessive honking is a major source of noise pollution in many cities. It can be annoying, disruptive, and even dangerous

➢ *Here Are Some of The Problems Caused By Excessive Honking:-*

- Annoyance: Excessive honking can be very annoying, especially for people who live or work in areas with a lot of traffic. It can be disruptive to sleep, work, and leisure activities.
- Disruption: Excessive honking can disrupt traffic flow and make it difficult for people to cross the street safely. It can also lead to road rage and other aggressivedriving behaviors.
- Health problems: Excessive honking can cause hearing loss, stress, and other
- health problems. It can also be a problem for people with autism or other sensory sensitivities.

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➢ *There are a Number of Things that can be done to Reduce Excessive Honk- Ing, Including:-*

- *Education: Educating Drivers About the Dangers of Excessive Honking and the Im-*
- *Portance of using their Horns only when Necessary can help to Reduce the Problem.*
- *Enforcement: cities can Enforce Laws Against Excessive Honking with Fines or otherPenalties.*
- *Engineering: Cities can Design Streets and Intersections In Ways that Make it Eas-Ier for Drivers to Communicate With Each other without Honking.*

➢ *Smart Sensors*

Smart sensors are highly used in home automation, medical sensing, and so many other applications nowadays. In a smart sensor deployment, various techniques have to be combined in the overall design. The operations like sensing, analog- to-digital, and digital-to-analog conversion, signal sampling and quantization, and data processing are some of them [2] smart sensors are devices that can collect and process data from the physical worldand then transmit that data to a computer or other device for further analysis. Smart sensors are often used in Internet of Things (IoT) applications, where they can be used to monitor and control devices and systems remotely.

➢ *Smart Sensors have a Number of Advantages over Traditional Sensors, Including:*

- *Improved Accuracy: Mart Sensors can often Provide more Accurate Data than*
- *Traditional Sensors, as they can use Digital Signal Processing (DSP) To Filter out Noise and Other Interference.*
- *Improved Efficiency: Smart Sensors can Often Be More Efficient Than Traditional*
- *Sensors, As They Can use Less Power and Generate Less Heat.*
- *Improved Flexibility: Smart Sensors Can Often Be More Flexible Than Traditional Sensors, As They Can Be Programmed To Collect Different Types of Data And To Trans-Mit That Data In Different Ways.*

➢ *Smart Sensors can be used in a Wide Variety of Applications, Including:-*

- *Industrial automation: Smart sensors can be used to monitor and control indus-trial processes, such as manufacturing, transportation, and energy production.*
- *Environmental monitoring: Smart sensors can be used to monitor and controlenvironmental conditions, such as air quality, water quality, and noise levels.*
- *Healthcare: Smart sensors can be used to monitor and control patient health,such as heart rate, blood pressure, and temperature.*
- *Security: Smart sensors can be used to monitor and control security systems,such as intrusion detection, fire detection, and access control.*
- *Smart sensors are a key technology for the IoT, and they are being used to createa wide range of new and innovative applications. As the IoT continues to grow, smart sensors will become even more important, and they will play a key role in the future of our world.*

➢ *Here Are Some Examples of Smart Sensors in use Today:-*

- *Temperature sensors: These sensors can be used to monitor the temperature of food, beverages, and other products. They can also be used to monitor the tem- perature of industrial processes and to ensure that they are running safely.*
- *Pressure sensors: These sensors can be used to monitor the pressure of fluids,such as water, oil, and gas. They can also be used to monitor the pressure of tiresand other pneumatic devices.*
- *Motion sensors: These sensors can be used to detect movement, such as themovement of people, animals, and vehicles. They can also be used to detect the movement of objects, such as the movement of goods on a conveyor belt.*
- *Light sensors: These sensors can be used to measure the amount of light in a given area.They can also be used to detect the presence of light, such as the presence ofsunlight or artificial light.*
- *Sound sensors: These sensors can be used to measure the level of sound in a given area. They can also be used to detect the presence of sound, such as the presenceof music or speech.*

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Fig 3 Smart Sensor

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# CHAPTER TWO
# LITERATURE REVIEW

*A. Intelligent Horn: - an Elegant Solution to NoisePollution:-*

Name of Conference and Publisher: Proceedings of the Second International Conference on Information Management and Machine Intelligence (ICIMMI)in Springer (2021)

Author: M. G. Ramanath Kini , N. E. Amulya , G. U. Shreelatha , and B. M. Muralidhar [3]

- *Objective:-*

The main cause of major health problems in metropolitan areas is noise pollution. There is growing evidence that honking is one of the major causes of noise pollution in a variety of fields. Therefore, honking has to be handled efficiently to reduce noise pollution. This project proposes a technique to reduce noise pollution from honking without sacrificing honking's primary purpose.

- *Research outcome:-*

The Intelligent Horn proposed in the Springer paper is a system that uses geofenc-ing and IR communication to reduce noise pollution from honking. The system works by creating a virtual boundary around areas where honking is unnecessary, such as near schools, hospitals, and pedestrian areas. When a vehicle enters one of these areas, the horn is automatically muted. The horn can only be unmuted if the

- driver specifically presses the horn button:-

The Intelligent Horn system has several advantages over traditional horns. First, it reduces noise pollution by eliminating unnecessary honking. Second, it can becustomized to meet the specific needs of a particular area. For example, a city could create a geofencing boundary around a downtown area that is closed to traf-fic during certain hours. This would allow drivers to honk when necessary without disturbing pedestrians and businesses. The Intelligent Horn system is still in the early stages of development, but it has the potential to significantly reduce noise pollution from honking. If the system is widely adopted, it could make a major contribution to improving the quality of lifein urban areas.

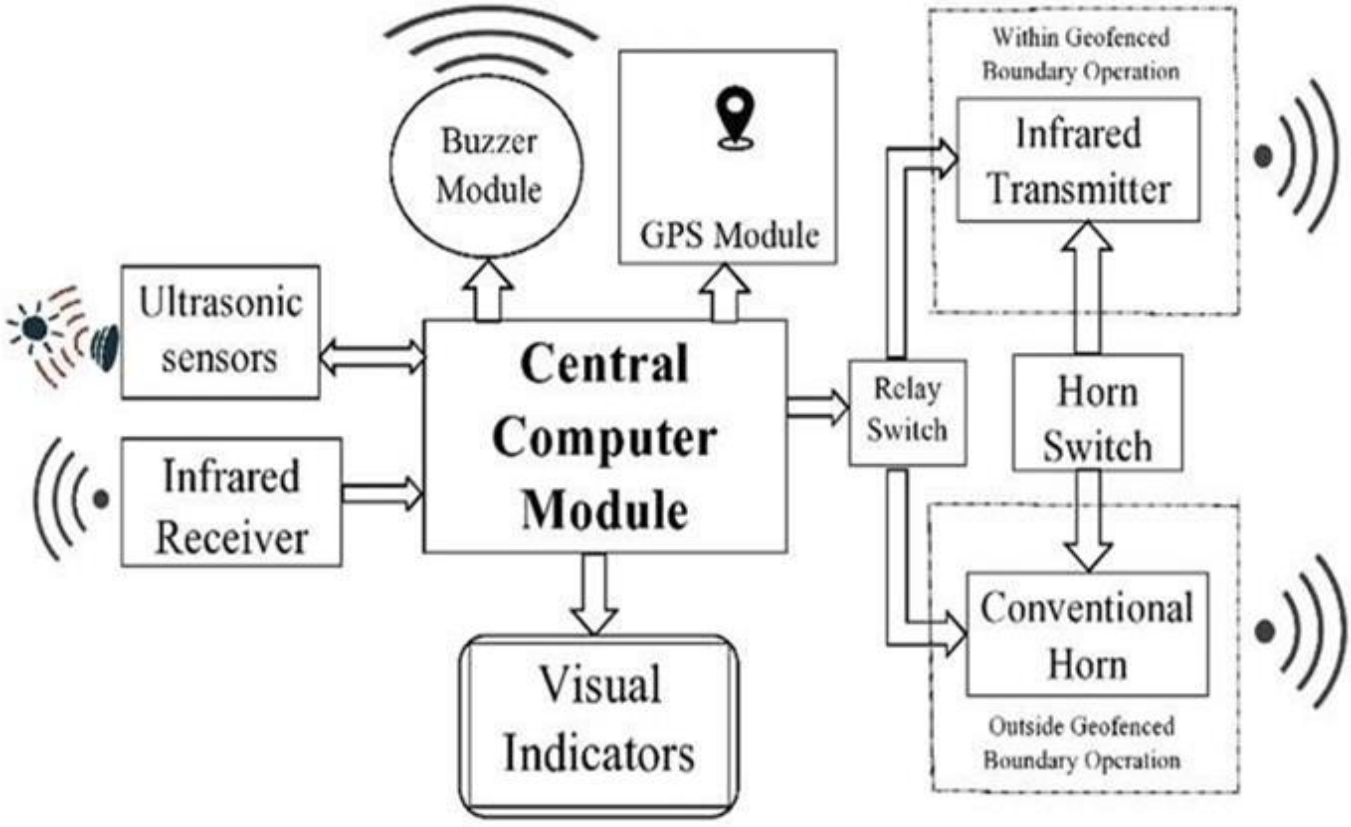


Fig 4 Framework of the Smart Horn System

- *Result:-*

The Intelligent Horn system is still in the early stages of development, but it has the potential to significantly reduce noise pollution from honking. If the system is widely adopted, it could make a major contribution to improving the quality of lifein urban areas.

*B. Noise Pollution And Violent Crime:-*

- Name Of Journal And Publisher: Journal Of Public Economics In Elsevier (2022)
- Author: Timo Hener [4]

➢ *Objective:-*

The objective of the paper is to investigate the relationship between noise pollution andviolent crime. The authors hypothesize that noise pollution can increase the risk of violent crime by increasing stress, anxiety, and aggression.

➢ *Research Outcome:-*

- The authors of the study propose a number of methods to reduce noise pollutionand its impact on violent crime. These methods include:
- Improving transportation infrastructure: This could include building more noisebarriers, using quieter vehicles, and reducing traffic congestion.
- Encouraging people to walk, bike, or take public transportation: This would re-duce the amount of time people spend exposed to noise pollution from vehicles.
- Creating quiet zones: These are areas where noise levels are kept below a certain
- threshold. Quiet zones could be created around schools, hospitals, and other sensi- tive areas.
- Educating the public about the dangers of noise pollution: This could help people
- to take steps to reduce their own exposure to noise pollution.

➢ *Result:*

The authors of the study conclude that noise pollution is a serious public healthproblem that can have a significant impact on the risk of violent crime. They call for more research to better understand the mechanisms by which noise pollution increases the risk of violent crime and to develop effective strategies for reducing noise pollution. Noise pollution and its control

*C. Noise Pollution And Its Control:-*

- Name Of Journal And Publisher: Environmental Management In Sciencedirect(2017)
- Authors: Iyyanki V. Muralikrishna, Valli Manickam [5]

➢ *Objective:*

An overview of noise pollution, its effects on human health and the environment, andmethods for controlling noise pollution.

➢ *Research Outcome:-*

- There are a number of proposed methods for controlling noise pollution from the transportation sector. These methods include:
- Source control: This involves reducing the amount of noise produced by vehicles.Some variety of ways are including:
- Designing quieter vehicles
- Installing noise-reducing features on vehicles, such as mufflers and soundproofing
- Increasing road safety by reducing vehicle traffic
- Transmission control: This involves preventing noise from traveling from its sourceto a receptor. Some variety of ways are including:
- Building noise barriers
- Using noise-absorbing materials
- Receiver protection: This involves reducing the impact of noise on people whoare exposed to it.

➢ *Result:*

There are a number of ways to control noise pollution, including setting noise stan- dards, using quieter technologies, and creating buffer zones between noise sources and sensitive areas. Design of a Smart Real-time Excessive Honking Control System

*D. Design Of A Smart Real-Time Excessive HonkingControl System:-*

- Name Of Journal And Publisher: IOSR Journal Of Electrical And Electronics Engineering (IOSR JEEE) (2019)
- Authors: Atmadip Dey, Arka Majumdar, Raktim Pratihar, And Bansari Deb Majumder [6]

➢ *Objective:*

To reduce noise pollution caused by excessive honking in urban areas. The proposed system uses a combination of sensors, a microcontroller, and a loudspeaker to detect and control excessive honking..

➢ *Research Outcome:*

- Following is a list of components that comprise the system:
- A proximity sensor to detect vehicles in close proximity.
- A microcontroller to process the sensor data and control the loudspeaker.
- A loudspeaker to emit a warning signal when excessive honking is detected.The system works as follows:
- The proximity sensor detects vehicles in close proximity.
- The microcontroller receives the sensor data and determines if the honking isexcessive.
- If the honking is excessive, the microcontroller activates the loudspeaker to emita warning signal.
- Overall, the proposed system is a promising solution for reducing noise pollution caused by excessive honking in urban areas.
- Here are some additional details about the proposed method:
- The proximity sensor can be any type of sensor that can detect the presence of avehicle, such as an ultrasonic sensor or a radar sensor
- The microcontroller can be any type of microcontroller that can process sensordata and control a loudspeaker, such as an Arduino or a Raspberry Pi.
- The loudspeaker can be any type of loudspeaker that can emit a warning signal,such as a piezo buzzer or a speaker.

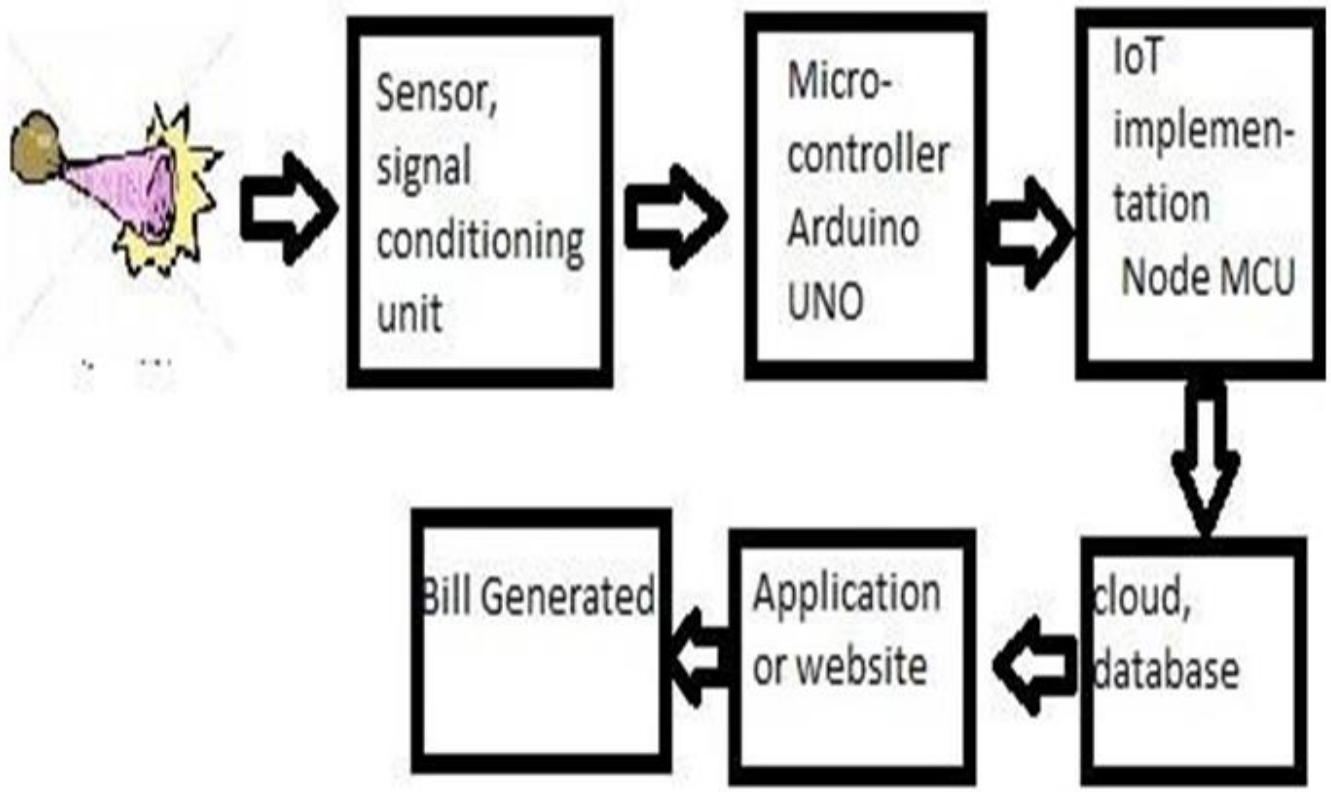


Fig 5 Block Diagram

➢ *Result:*

The system results in an embedded module which shall benefit the authority to provide a necessary check on unnecessary honking habit of people in India. This will definitely provide benefit to residents of societies located near the high trafficroads, students studying in schools located in the vicinity of busy roads, patients admitted in the hospitals located on the roadsides and people of various profession- s/occupations.

*E. Stop Noise Pollution From Honking:-*

- Name of Journal and Publisher: Journal of Advanced Research in Industrial Engineering (JARIIE) (2020)
- Authors: Viraj Deshmukh, Chinmay kothe, Rohan Kale, Devashish Ahuja,Hrushikesh Diwanji [7]

➢ *Objective:*

Develop a system for reducing noise pollution from honking in vehicles. The authors propose a system that uses a combination of sensors and a microcontroller to detect and prevent excessive honking.

➢ *Research Outcome:*

The sensors used in the system include a microphone, a GPS sensor, and a camera.The microphone is used to detect the sound of the horn, the GPS sensor is used todetermine the vehicle's location, and the camera is used to identify the vehicle. The microcontroller in the system uses the data from the sensors to determine if the vehicle is honking excessively. If the vehicle is honking excessively, the micro-controller will disable the horn. The system can be configured to allow for differentlevels of honking in different areas, such as in no-honking zones or near schools andhospitals.

➢ The proposed methods for achieving the objective of the paper are as follows:

- Use of sensors: The use of sensors allows the system to detect the sound of the horn and the vehicle's location. This information is used to determine if the vehicleis honking excessively.
- Use of a microcontroller: The use of a microcontroller allows the system to process the data from the sensors quickly enough to prevent excessive honking.
- Use of a database: The use of a database allows the system to be configured toallow for different levels of honking in different areas.
- Compatibility with a wide range of vehicles: The system is compatible with a
- wide range of vehicles, making it a more feasible solution than other systems thatare only compatible with specific types of vehicles.
- The authors of the paper believe that the proposed system has the potential tobe a valuable tool for reducing excessive honking in vehicles. The system is stillunder development, but it has the potential to improve road safety and reduce noise pollution.

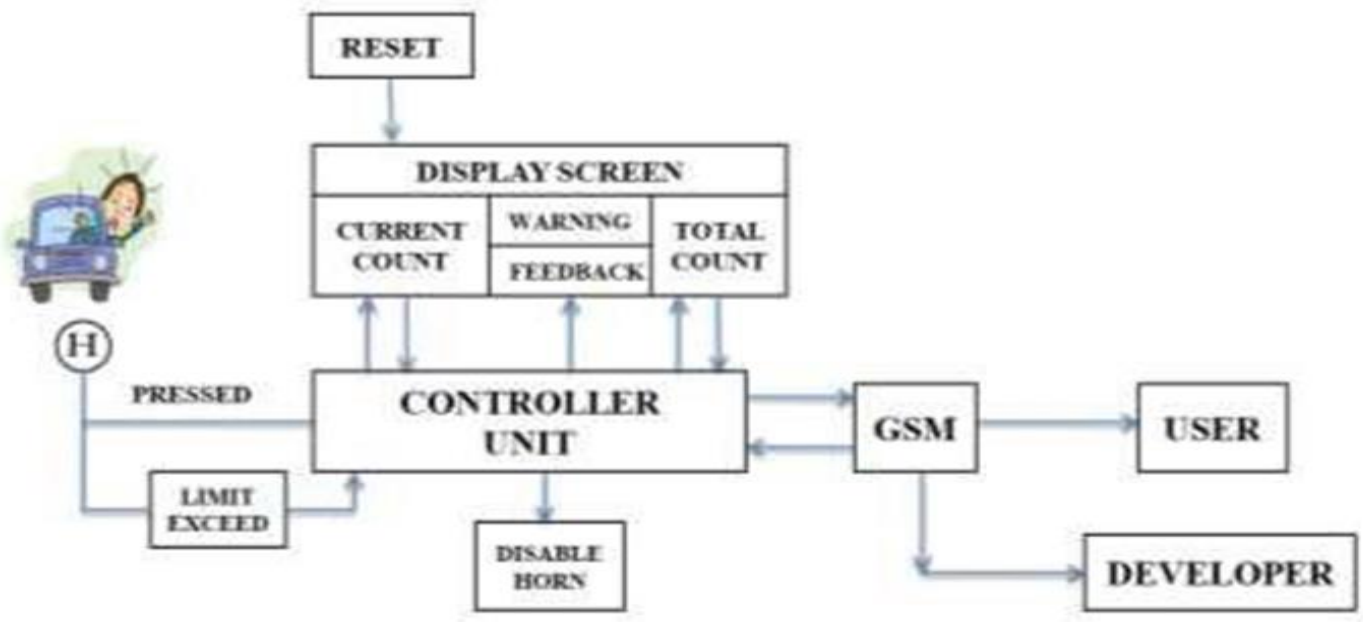


Fig 6 Block Diagram

➢ *Result:*

The system focuses on changing the human tendency, and will reduce human ten- dency of honking and ultimately reduce noise pollution from honking. The personor driver has limited number of horn counts in a day and thus works to control the unnecessary use of horn. Using GSM to record the number of times a horn is used and analyze the data on a monthly basis. The Technology aims to change human tendency of Honking.

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# CHAPTER THREE
# COMPARATIVE ANALYSIS

➢ *Comparative Analysis for research paper 1, 2 and 3:-*

| Sr No. | Paper Title | Findings | Statistical Parameter |
|---|---|---|---|
| 1. | Intelligent Horn: An Elegant Solution to Noise Pollution [3] | The intelligent horn can reduce noise pollution by up to 50 percent. The intelligent horn can still be effective in warning other drivers of danger. The intelligent horn is relatively easy to implement and cost-effective. | Noise level: The noise level is measured in decibels (dB). The lower the noise level, the quieter the sound. Loudness: The loudness is measured in sones. The higher the loudness, the louder the sound. |
| 2. | Noise pollution and violent crime [4] | The study's findings have implications for public policy. If noise pollution is a contributing factor to violent crime, then reducing noise pollution levels may help to reduce rates of violent crime | Sample Size Independent Variable Dependent Variable Statistical test Results |
| 3. | Noise Pollution and its control [5] | They suggest that noise pollution poses a significant public health problem, and that it can be controlled in several ways. A strategy to reduce noise pollution should also include education and awareness campaigns, according to the study. | The study used a linear regression model to estimate the dose-response relationship between noise and violence. |

➢ *Comparative Analysis For Research Paper 4 And 5:-*

| Sr No. | Paper Title | Findings | Statistical Parameter |
|---|---|---|---|
| 4. | Design of a Smart Real-time Excessive Honking Control System [6] | The study's findings suggest that the proposed system could be a valuable tool for reducing excessive honking and noise pollution. The system is relatively low-cost and easy to install, making it a feasible option for many cities and municipalities. | The average number of honks per vehicle per day. The number of honks in a specific time period. The time of day when honking occurs. |
| 5. | Stop Noise Pollution From Honking [7] | Increased stress levels. Sleep disturbances Hearing loss: Irritability and aggression | The type of vehicles in the area The traffic conditions in the area The cultural norms in the area |

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# CHAPTER FOUR
# IDENTIFIED RESEARCH GAP

- The intelligent horn is a promising technology, but it is not yet clear how effective it is in actually reducing noise pollution. More research is needed to evaluate the effectiveness of the intelligent horn in differ-ent settings.
- Noise pollution can disrupt sleep, which can lead to fatigue and im- paired judgment, both of which can increase the risk of violent be- havior.
- Noise pollution can also have a significant social impact, leading to stress, annoyance, and social isolation. More research is needed to better understand the social impact of noise pollution and to develop effective policies to mitigate its effects.
- The system must be able to accurately detect honking in order tobe effective. However, there are a number of challenges to accurately detecting honking, such as the different sounds that horns can make and the noise from other vehicles.
- The system uses a number of methods to reduce noise pollution from honking, such as limiting the number of times a horn can be used ina day and recording the number of times a horn is used. However, itis not yet clear how effective the system is in actually reducing noise pollution.

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# CHAPTER FIVE
# PROBLEM IDENTIFICATION

- *Here Are Some Of The Problems That Can Be Identified WhenDesigning Smart Sensors To Reduce Honk Noise Pollution: Sensitivity:*

- The sensors must be sensitive enough to detect honk- ing, but not so sensitive that they are triggered by other sounds, suchas traffic noise or construction noise.
- Accuracy:-The sensors must be accurate enough to identify the sourceof the honking, so that the appropriate action can be taken.
- Cost: The sensors must be affordable, so that they can be widelydeployed.
- Privacy:- The sensors must not collect any personal data about thedrivers, such as their identity or their location.
- Acceptance: The drivers must accept the use of the sensors, so thatthey are not ignored or tampered with.
- These are just some of the challenges that need to be addressed when designing smart sensors to reduce honk noise pollution. However, the potential benefits of this technology are significant, and it is worththe effort to overcome these challenges.

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# CHAPTER SIX
# IMPLEMENTATION OF WORK

➢ A smart sensor-based approach to controlling ex-cessive honking noise pollution:

- The first approach is based on the simple interval of time.
- The second approach is based on an ultrasonic sensor module.
- The third approach is based on an sound sensor module.

- To Run The Code, First Download The Arduino Ide Software

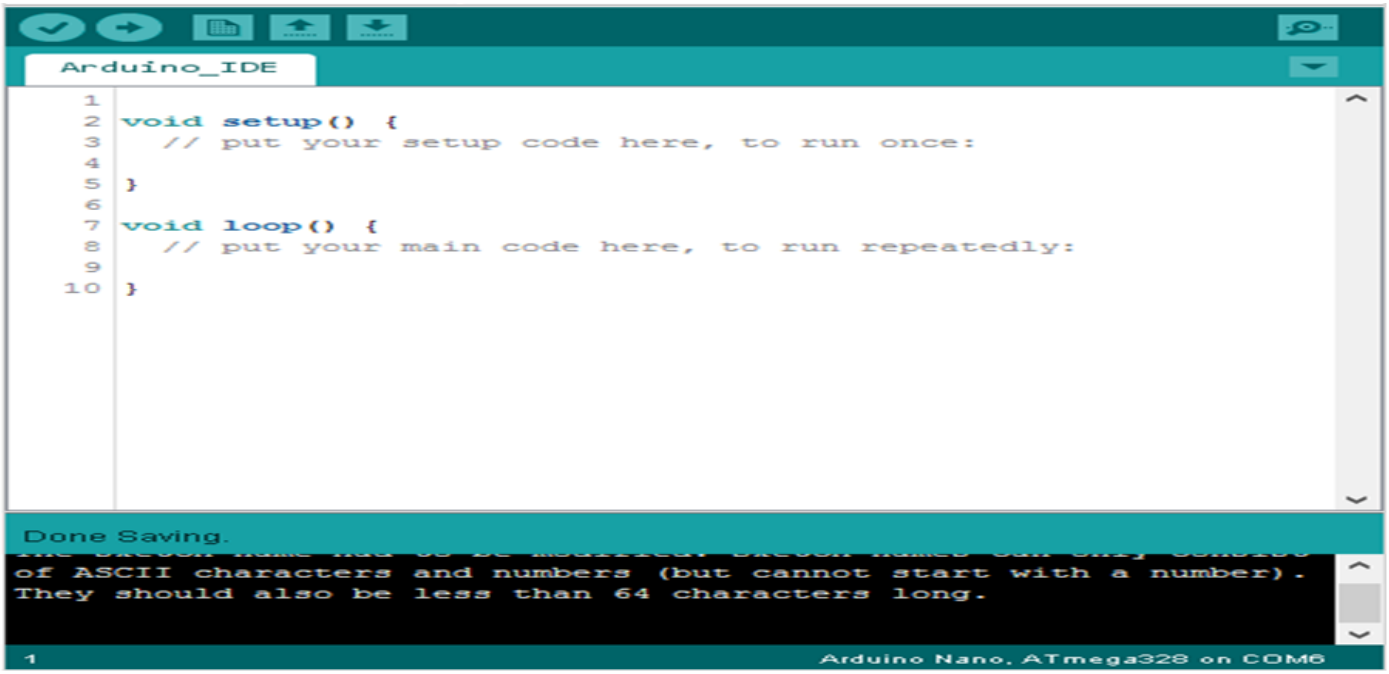

Fig 7 Download The Arduino IDE Software

## COMPONENTS REQUIRED

- Arduino Uno

Arduino Uno is a popular microcontroller board grounded on the ATmega328P microcontroller. It's extensively used in the field of electronics and programming for colorful operations, including prototyping, robotics, home robotization, and DIY systems. Then are some crucial features and information about the Arduino Uno:

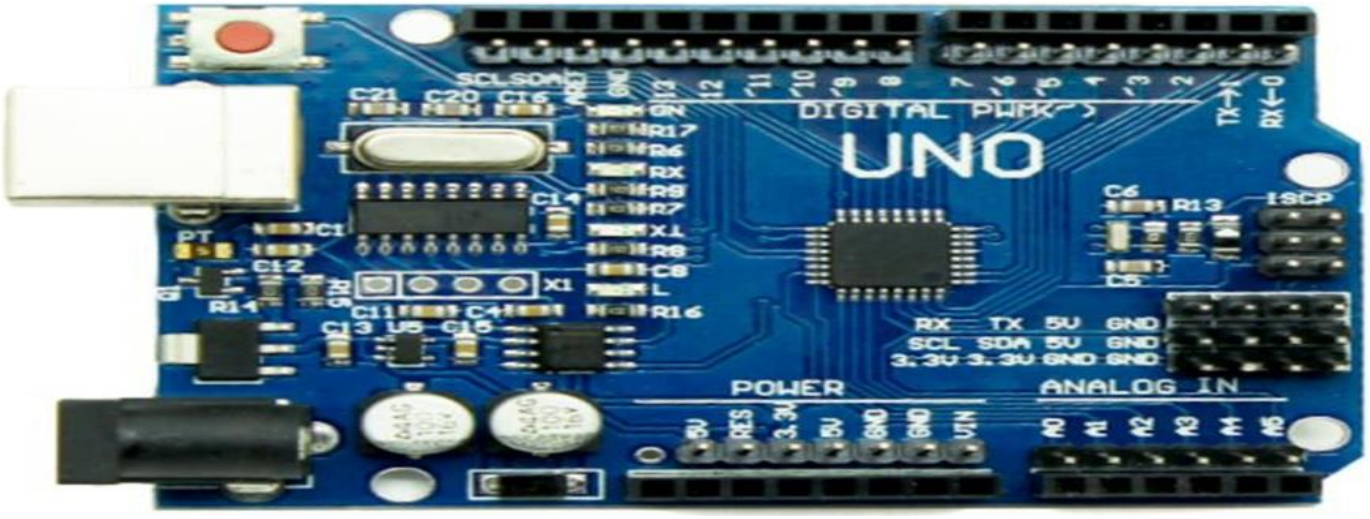

Fig 8 Arduino Uno Board

- Microcontroller:- The Arduino Uno is built around the ATmega328P microcontroller, which operates at a clock speed of 16 MHz. It has 32KB of flash memory for storing the program, 2KB of SRAM for variables and data storage, and 1KB of EEPROM for non-volatile data storage.
- Digital And Analog I/O**:-** The board features 14 digital input/ affair legs, among which 6 can be used as PWM( palpitation range Modulation) out- puts. It also has 6 analog input legs for reading analog signals.
- Interfaces:- The Uno comes with several erected- in interfaces, including USB( Universal periodical machine) for programming and periodical communication with a computer, UART( Universal Asynchronous Receiver-Transmitter) for se- rial communication with other bias, I2C(Inter-Integrated Circuit) and SPI( periodical supplemental Interface) for communication with detectors and other peripherals.
- Power Supply:- The Arduino Uno can be powered via a USB string con- nected to a computer or through an external power force. It supports a wide range of input voltages( 7- 12V), and it has an onboard voltage regu- lator that provides a stable 5V force to power the board and connected factors.

- Lcd (Liquid Crystal Display):

Liquid Crystal Display is a type of flat panel display which uses liquid chargers in its primary form of operation. LEDs have many applications that can be beneficial to both individuals and businesses. They can be installed in common devices such as smartphones, television boxes, computer monitors, and even instrument panels.

- Breadboard

The breadboard is a white blockish board with small bedded holes to fit electronic factors. It's generally used in electronics systems. Breadboard is a prototype that acts as a construction base of electronics.

- The breadboard image is shown below

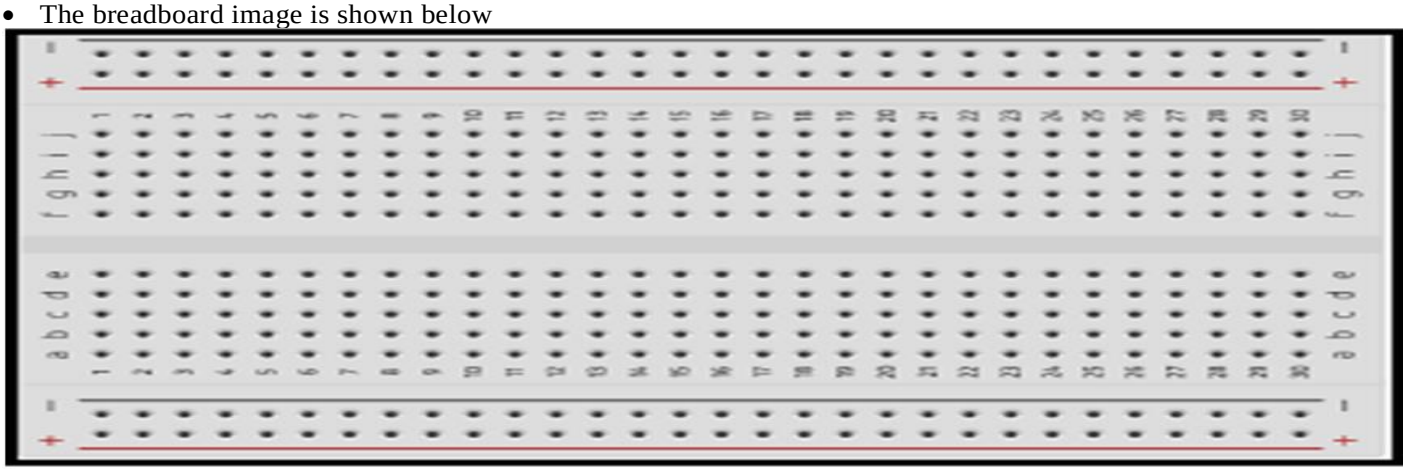

Fig 9 Breadboard

- Ultrasonic Sensor

Ultrasonic detectors are electronic bias that calculate the target's distance by emigration of ultrasonic sound swells and convert those swells into electrical signals. The speed of emitted ultrasonic swells traveling speed is faster than the audible sound.


Fig 10 Ultrasonic Sensor

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- Buzzer:

An audio signaling device like a beeper or buzzer may be electromechanical or mechanical type. Buzzer main function is to converting the signal from audio to sound. Generally, it's powered through DC voltage and used in timekeepers, alarm bias, printers, admonitions, computers, etc. Grounded on the colorful designs, it can induce different sounds like alarm, music, and bell temptress.


Fig 11 Buzzer

- Soundsensor

The sound detector is one type of module used to notice the sound. Generally, this module is used to descry the intensity of sound. This detector employs a microphone to give input to buffer, peak sensor and an amplifier. This detector notices a sound, processes an o/ p voltage signal to a microcontroller. After that, it executes needed processing.


Fig 12 Sound Sensor

- Some Male And Female Jumper Wires
- These are manly to female wires cables used in connecting the female wires title leg of any development board to other development boards having a manly connector. They're
- simple cables that have connector legs at each end allowing them to be used to connect two points to each other. Jumper cables are generally

- used with breadboards and other prototyping tools in order to make it easy to change a circuit as demanded.

Fig 13 Jumper WIRES

➢ *First Approach Is Based On The Simple Interval OfTime:*

This approach involves the horn working for some time and then stopping for some moments, and when it is working properly, some valuable messageis displayed.

- *Coding:*

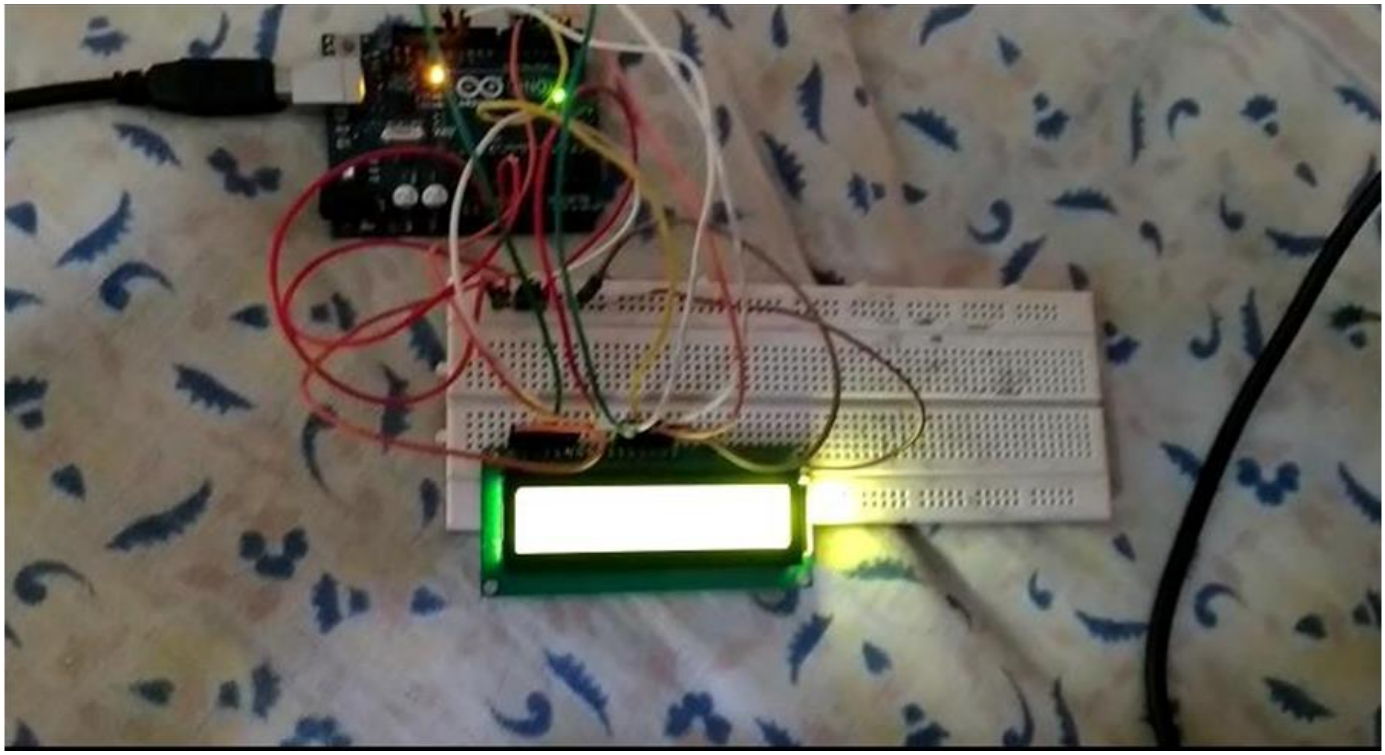
```
#include <LiquidCrystal.h>
int Contrast=0;
LiquidCrystal lcd(12,11,5,4,3,2);
void setup() {
  // set up the LCD's number of columns and rows:
  analogWrite(6,Contrast);
  lcd.begin(16, 2);
}
void loop() {
  for (int i=5;i>0;i--)
{
  if (i<=5){
  lcd.setCursor(0,0);
  lcd.print("Horn Stops in :-  ");
  }
  lcd.setCursor(0,1);
  lcd.print(i );
  lcd.print(" Seconds");
  delay(1000);
  lcd.clear();
}
  lcd.setCursor(0,0);
  lcd.print("Horn Pollution ");
  lcd.setCursor(0,1);
  lcd.print("causes deafness");
  delay(5000);
  lcd.clear();
```

```
  for (int i=5;i>0;i--)
{
  if (i<=5){
  lcd.setCursor(0,0);
  lcd.print("Horn Stops in :-   ");
  }
  lcd.setCursor(0,1);
  lcd.print(i);
  lcd.print(" Seconds");
  delay(1000);
  lcd.clear();
}
  lcd.setCursor(0,0);
  lcd.print("Do not blow horn ");
  lcd.setCursor(0,1);
  lcd.print("in traffic jams.");
  delay(5000);
  lcd.clear();
```

```
  for (int i=5;i>0;i--)
{
  if (i<=5){
  lcd.setCursor(0,0);
  lcd.print("Horn Stops in :-   ");
  }
  lcd.setCursor(0,1);
  lcd.print(i);
  lcd.print(" Seconds");
  delay(1000);
  lcd.clear();
}
  lcd.setCursor(0,0);
  lcd.print("Honking affects our ");
  lcd.setCursor(0,1);
  lcd.print("healthly life.");
  delay(5000);
  lcd.clear();
  }
```

Fig 14 Code

- *Implementation*



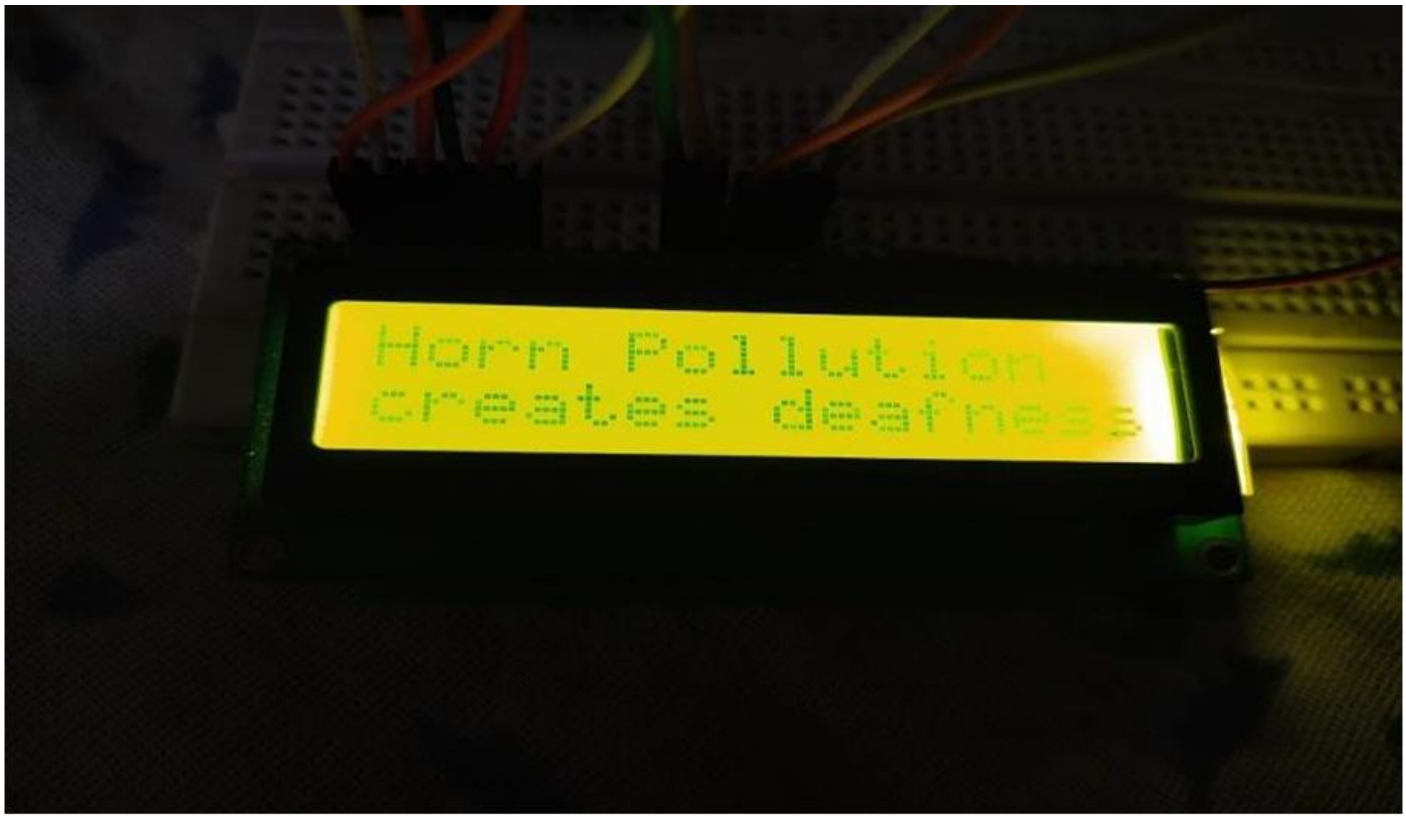



Fig 15 Implementation Of Approach 1

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➢ *Second Approach Is Based On An Ultrasonic SensorModule:*

Using this approach, an ultrasonic sensor detects the distance between twovehicles, and if it is less than what we specify, a buzzer or LED will auto- matically go on.

- *Coding:*

```
#include <NewPing.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27,20,4);

#define TRIGGER_PIN  12  // Arduino pin tied to trigger pin on the ultrasonic sensor.
#define ECHO_PIN     11  // Arduino pin tied to echo pin on the ultrasonic sensor.
#define MAX_DISTANCE 200 // Maximum distance we want to ping for (in centimeters). Maximum sensor distance is rated at 400-500cm.

NewPing sonar(TRIGGER_PIN, ECHO_PIN, MAX_DISTANCE); // NewPing setup of pins and maximum distance.

int pot = A0;
int alarmvalue;
int buzzer = 13;
int led = 10;
int distance;

void setup() {
  Serial.begin(115200); // Open serial monitor at 115200 baud to see ping results.
  pinMode(buzzer, OUTPUT), digitalWrite(buzzer, LOW);
  pinMode(led, OUTPUT), digitalWrite(led, LOW);
  lcd.init();                      // initialize the lcd
  lcd.backlight();

}
void loop() {
  delay(100);                     // Wait 100ms between pings (about 20 pings/sec). 29ms should be the shortest delay between pings.
  unsigned int uS = sonar.ping(); // Send ping, get ping time in microseconds (uS).
  Serial.print("Ping: ");
  distance = uS / US_ROUNDTRIP_CM;
  Serial.print(distance); // Convert ping time to distance in cm and print result (0 = outside set distance range)
  Serial.println("cm");
  alarmvalue = constrain(map(analogRead(pot),0,1023, 3, 22), 5, 20);

  // lcd.setCursor(0,0), lcd.print("Ultrasonic Distance");
  // lcd.setCursor(0,1), lcd.print("    with ALARM");
  lcd.setCursor(0,0), lcd.print("distance: "), lcd.print(distance), lcd.print("cm   ");
  lcd.setCursor(0,1), lcd.print("alarm: "), lcd.print(alarmvalue), lcd.print("cm   ");

  if(distance <= alarmvalue){
    digitalWrite(buzzer, !digitalRead(buzzer));
    digitalWrite(led, !digitalRead(led));
  }
  else{
    digitalWrite(buzzer, LOW);
    digitalWrite(led, LOW);
```

Fig 16 Code

- *Implementation:-*

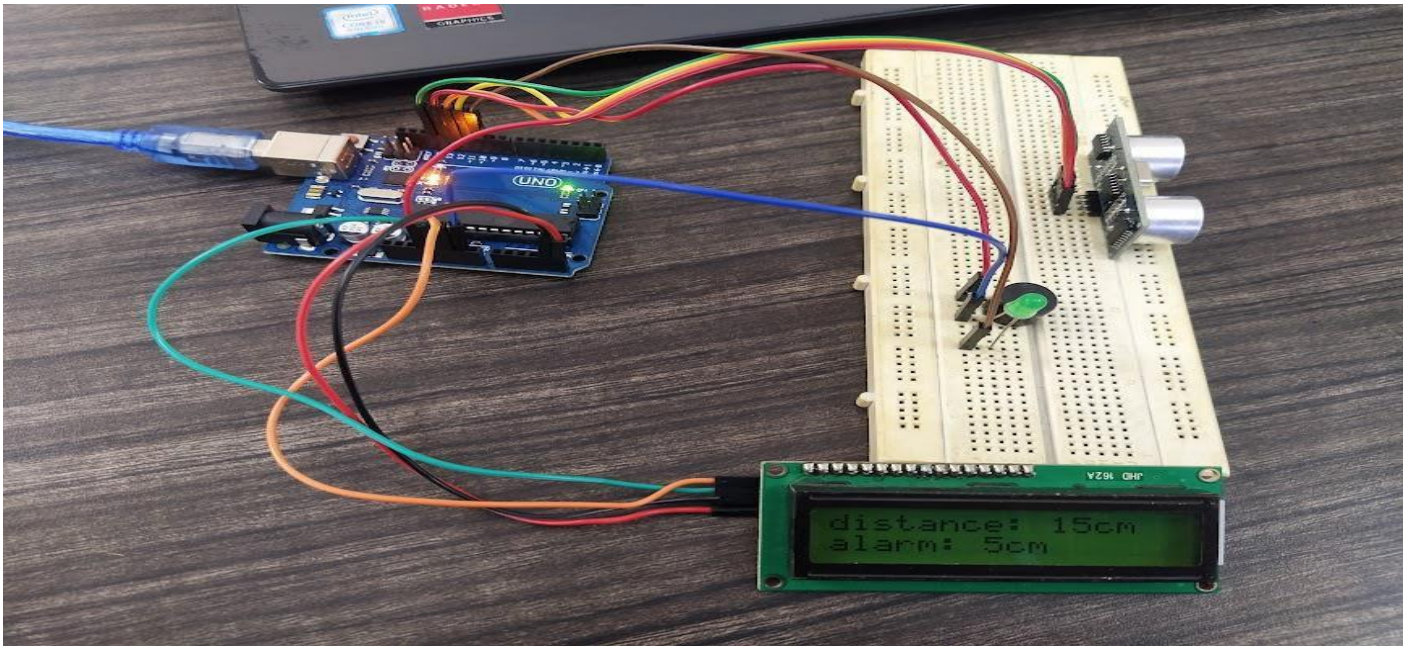


Fig 17 Implementation of Approach 2

➢ *Third Approach Is Based On An Sound Sensor Mod-Ule:*

- Using this approach, the sound sensor detects horn noise and displays itsdecibel level as quiet high or moderate. We can add approach 1 time interval if decibels are high or moderate.

- This sensor is capable of determining noise levels within 100 dB's or deci-bels at 3 kHz, 6 kHz frequencies range, approximately.

- *Coding:-*

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h> // Library for LCD

LiquidCrystal_I2C lcd(0x27,20,4);

const int sampleWindow = 50;                                    //
unsigned int sample;

#define SENSOR_PIN A0
#define PIN_QUIET 3
#define PIN_MODERATE 4
#define PIN_LOUD 5

void setup ()
{
  pinMode (SENSOR_PIN, INPUT); // Set the signal pin as input
  pinMode(PIN_QUIET, OUTPUT);
  pinMode(PIN_MODERATE, OUTPUT);
  pinMode(PIN_LOUD, OUTPUT);

  digitalWrite(PIN_QUIET, LOW);
  digitalWrite(PIN_MODERATE, LOW);
  digitalWrite(PIN_LOUD, LOW);

  Serial.begin(115200);
   lcd.init();                        // initialize the lcd
  lcd.backlight();
    lcd.clear();
}
```

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```
void loop ()
{
    unsigned long startMillis= millis();
    float peakToPeak = 0;
    unsigned int signalMax = 0;
    unsigned int signalMin = 1024;

    while (millis() - startMillis < sampleWindow)
    {
        sample = analogRead(SENSOR_PIN);
        if (sample < 1024)
        {
            if (sample > signalMax)
            {
                signalMax = sample;
            }
            else if (sample < signalMin)
            {
                signalMin = sample;
            }
        }
    }

    peakToPeak = signalMax - signalMin;
    int db = map(peakToPeak,20,900,49.5,90);

   lcd.setCursor(0, 0);
   lcd.print("Loudness: ");
   lcd.print(db);

lcd.print("dB");

if (db <= 60)
{
   lcd.setCursor(0, 1);
   lcd.print("Level: Quite");
   digitalWrite(PIN_QUIET, HIGH);
   digitalWrite(PIN_MODERATE, LOW);
   digitalWrite(PIN_LOUD, LOW);
}
else if (db > 60 && db<85)
{
   lcd.setCursor(0, 1);
   lcd.print("Level: Moderate");
   digitalWrite(PIN_QUIET, LOW);
   digitalWrite(PIN_MODERATE, HIGH);
   digitalWrite(PIN_LOUD, LOW);
}
else if (db>=85)
{
   lcd.setCursor(0, 1);
   lcd.print("Level: High");
   digitalWrite(PIN_QUIET, LOW);
   digitalWrite(PIN_MODERATE, LOW);
   digitalWrite(PIN_LOUD, HIGH);
}
  delay(200);
  lcd.clear();
```

Fig 18 Code

- *Implementation:-*

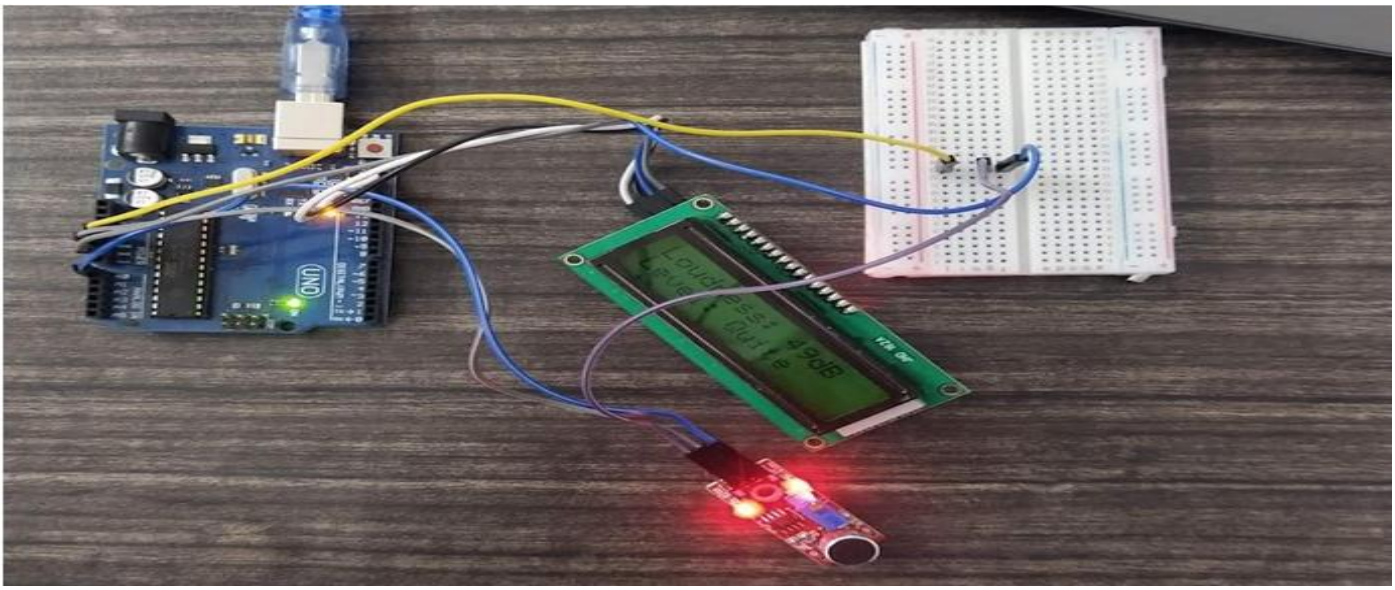


Fig 19 Implementation Of Approach 3

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# CHAPTER SEVEN
# CONCLUSION AND FUTURE WORK

Honking is often used as a way to express frustration or impatience, which can lead to traffic congestion. By reducing the need to honk, smart sensors can help to improve traffic flow and reduce congestion. Honking can be a distraction for drivers, which can lead to accidents. By reducing the need to honk, smart sensors can help to improve road safety. This project helps in to reduce the honking noise pollution. Main objective of this project is to make a smart sensor which is helpful to reduce the noise pollution. It is possible to reduce noise pollution and improve the environment by using these smart sensors. we can gain a better understanding of the problem of noise pollution from honking and develop more effective solutions.

➢ *Future Work:*

- We can use these approaches to overcome excessive honking in resi- dential areas such as schools and hospitals. Further, we can combine this approach with image recognition, making it work as a smart horn.

- As an alternative to excessive honking, we can use these approaches in residential areas like schools or hospitals or during traffic jams. Whenever there is a moderate or high horn noise for a given decibel,a warning message will be displayed on the LCD, and if the user continues to apply the horn, the horn will stop working for a short period of time.

- *Timeline Chart*

| No. | Task | March 2023 | April 2023 | May 2023 | June 2023 |
|---|---|---|---|---|---|
| 1 | Study of Domain | | | | |
| 2 | Problem Identification | | | | |
| 3 | Literature Review | | | | |
| 4 | Implementation | | | | |

Fig 20 Timeline Chart

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