

Reduction of Noise Pollution in Traffic Signals using ARDUINO and with MATLAB Analysis

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Abstract

Due to the increasing number of vehicles on road, the noise pollution levels have risen beyond the limits. No longer can a person travel from one place to another without being subjected to high intensity noise coming from vehicles at traffic junctions. The commuters try to persuade the honk even when the traffic light is red increases the undesired sound decibels to rise in the periphery of the junction this noise may have various effects on a person like hearing imparity, high blood pressure, stress, etc., at traffic signals people tend to blow horn restlessly adding nothing but noise to the environment. This paper tries to solve this problem by proposing an Arduino based solution. By using sound sensor and Arduino and with Matlab analysis the noise produced in the traffic can be reduced by cutting down on the unnecessary honking by drivers. Reduction in the level of noise pollution helps to increase productivity, stress reduce etc.

Keywords: Traffic, noise pollution, Arduino, Matlab software, Db

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I. Introduction

Today traffic noise is one of among biggest problem in many countries which makes more distortion in the wellbeing of human daily life. The decrepit state of public transport in our country is driving up sales of private vehicles at an alarming rate. This is reflected in the substantial increase in the traffic especially in the urban areas. In Order to control the traffic noise the government should make some tactics which cannot be negotiated by the society. As per recent Danish study indicated that approximately 5% strokes may be ascribe to the effects of traffic noise, which leads to the premature death. In Europe more than 100 million people are exposure to the traffic noise and causing health problems.

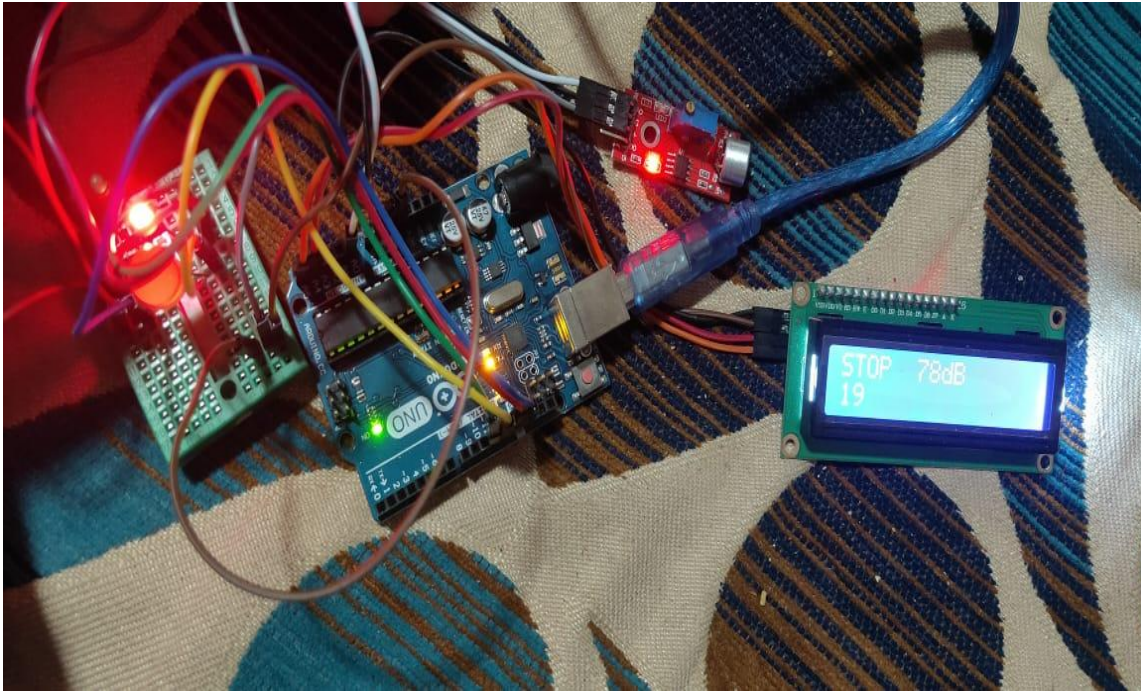
The main heart of this project is Arduino uno and methodology. Usually the red light on traffics which represents to stop will be turning on for 60 seconds so the commuters wait for respective time. While waiting time if any person honks then the sound sensor which is attached to the Arduino captures the honk and measures the horn decibel level if it is greater than the threshold level of 80 decibels then the timer adds on 10 seconds and respective decibel value sent to the things speak cloud, which helps in analysis of the traffic noise. Thus this penalty time will ensure that the expecting for the green light by impatient drivers by honking their horns leads to nothing but more waiting time. Thus, the public can be made aware of the harmful effects of noise pollution.

COMPONENTS

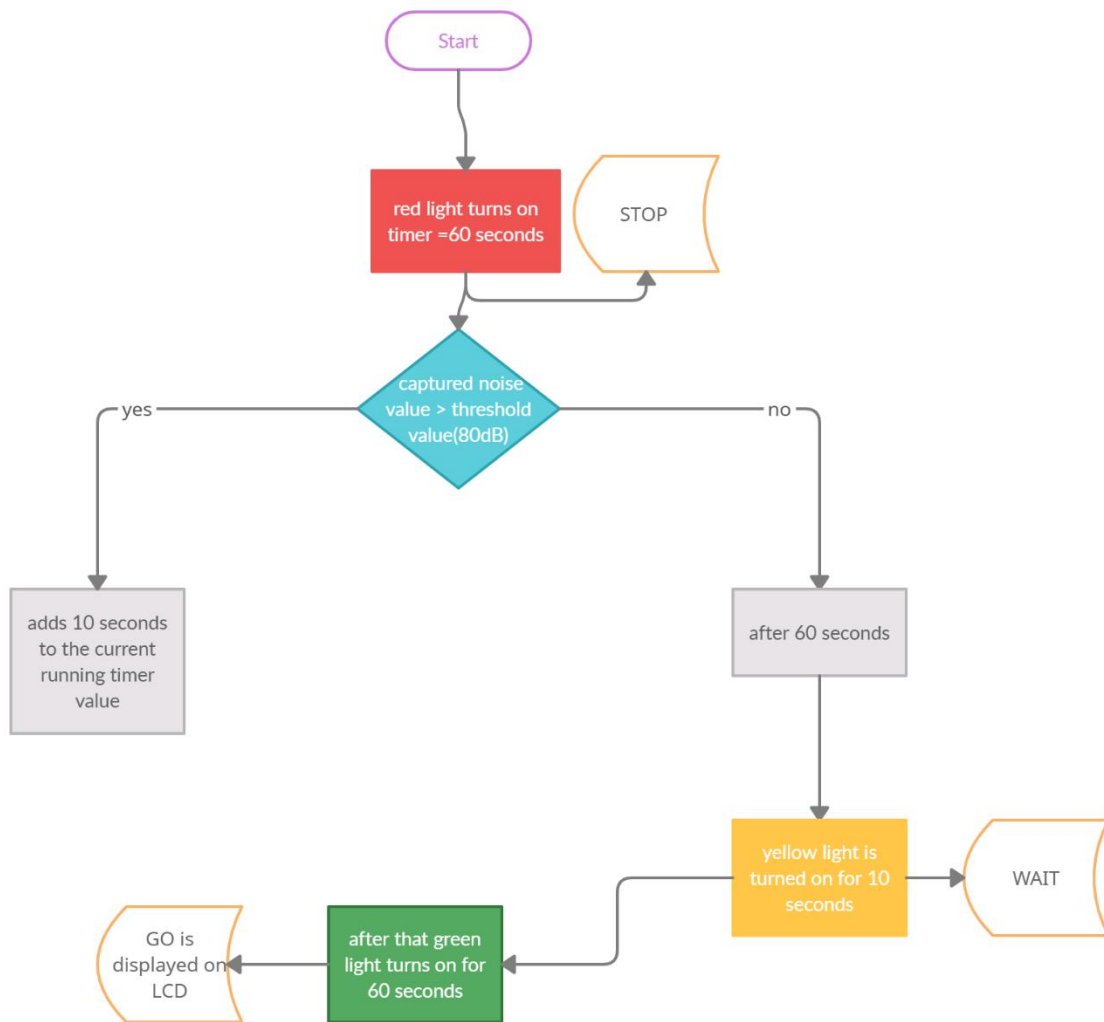
S.NO	NAME OF THE COMPONENT	VOLTAGE	QUANTITY
1	Arduino uno	7V-12V	1
2	Sound sensor	3.5V-5.5V	1
3	Yellow Led	2.10V-2.18V	1
4	Green Led	1.9V-4.0V	1
5	Red Led	1.63V-2.03	1
6	Bread Board	-	1
7	12c LCD	7V-12V	1
8	Jumper wires	-	30
9	Battery	9v	1

II. Methodology

When the red light turns on then the timer will be starts from 60 seconds down counting. From that time to the noise level is captured by the sound sensor. This values are sent to Arduino. If the dB level is more than the threshold value then timer adds up 10 seconds with respective to running time. When the red-light timer comes to zero then the yellow light is turned on for 10 seconds after that green light will be turn on for 60 seconds. This loops runs continually.

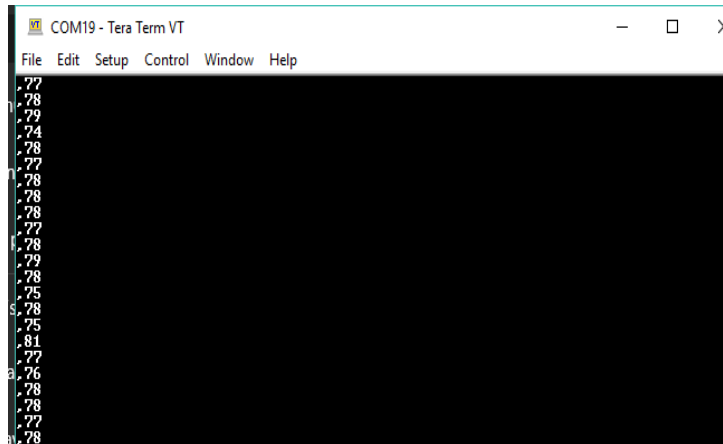


FLOW CHART OF WORKING

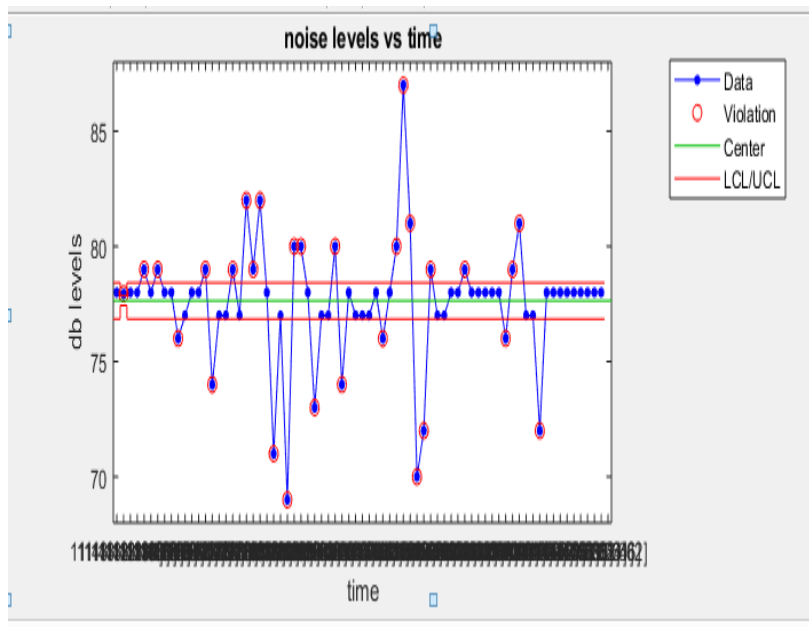


Sensor data collection and analysis

When the Arduino is turned on, through the usb port the dB value is collected into Tera Term which is third party software. After naming data collected file as .csv format. This file is imported into matlab Software for analysis of the noise levels at particular instant of time. This gives a clear picture of about traffic noise in particular area at particular time.

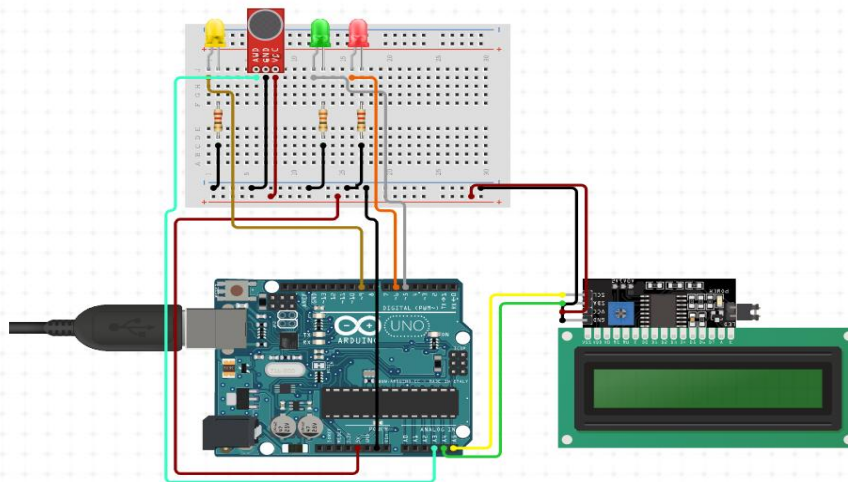


Collecting the data into Tera Term software



Plot analysis from matlab

CIRCUIT DIAGRAM



III. Result & Conclusion

In India, currently horn level for vehicles is about 95dB. The entire purpose of our paper is to reduce noise pollution caused by honking. So, for this sake we allotted threshold value to 80dB.

In India like many developing countries the residents of cities are now becoming aware of environment problems that results from the transportation facilities in general from road traffic and in particularly from automobiles. Traffic noise is a major factor of environmental pollution.

While this paper presents an honest attempt to reduce noise pollution and it also faces several obstacles or short comes as follows:

- The usage of the system is restricted to junctions and gridlocks or any such places where congestions are frequent.
- The system cannot tell the difference between noise from a horn or any other such as sirens or loudspeakers.
- Needed précised sound sensor calculate so that it measures accurate dB value.

FUTURE SCOPE

This project will help the future generations to change their way of behaving in traffic signals, also ensure to follow traffic rules, to maintain discipline and to reduce noise pollution up to some extent. In metropolitan cities like Hyderabad, Chennai, Delhi, Mumbai, Kolkata, Bangalore the traffic during peak hours is very high like in the morning and in the evening. During these times employees those who are going to work, school children, college students everyone are in rush which leads to traffic jam at some areas. Their hurry leads to blow horn many times when they stuck in traffic jam, which leads to lot of noise pollution. Our project will definitely work to reduce noise in traffic signals. Our project can be implemented in major like mentioned above and this will help to reduce noise and also waiting time in traffic signals.

The analysis of sensor data can also be used further decreasing of traffic by diverting into other routes or making Better plans of road maps.

References

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