Data Visualization for Noise Cancellation Devices Using R

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Abstract: Sound is essential to our daily lives, but noise is not Noise is generally an unwanted sound. In country like India along with diversity, also different occasions are celebrated, with occasions comes all that unwanted noise which affect the daily lives of the people. In this research proposal we are proposing a Noise Cancellation device which will be connected and controlled by an app in a mobile, for the need of this system in the market a survey has been conducted using Google form, for visualizing this data we are using R programming language.

Index Terms **– Noise Cancellation Device, R Programming Language, Data Visualization**

I. INTRODUCTION

In this project we are focusing on solving the problem of civilians regarding the noise pollution by creating a device which can control noise. Sound travels in the wave form .But in between there are addition of many disturbances which are unwanted in nature sometime. So our idea is to create a device which can first analyze the sound then isolate it in the different parts and let the user select which sound amongst those user wants to listen. For this we are planning to use Noise suppression algorithm which reduces the noise in the sound and helps to differentiate the sound.

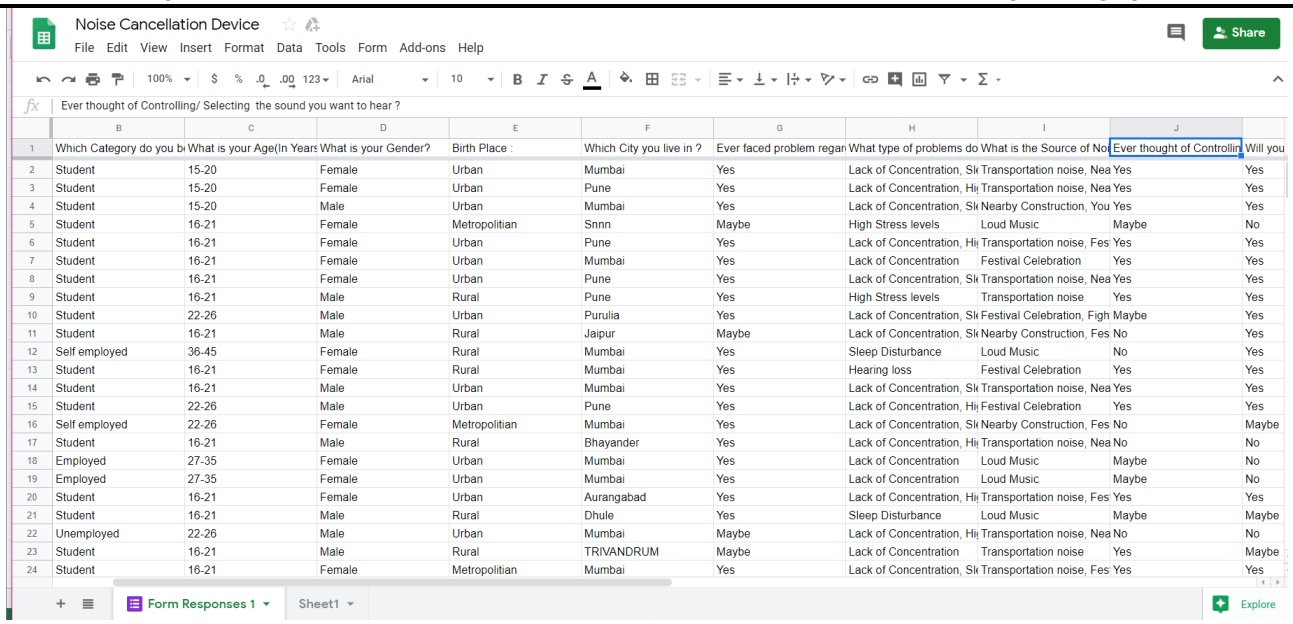
Literature Survey

C.-Y. Chang and K.-K. Shyu [1] In their paper Active Noise Cancellation with a Fuzzy adaptive filtered-X algorithm the author have presented an algorithm named fuzzy adaptive algorithm which cancels active noise in ducts, it uses fuzzy rules to build an anti-noise filter which cancel out the undesired noise. Complex acoustic plant models used in conventional ANC (Active Noise Cancellation) systems can be replaced by fuzzy technique. This new method for ANC automatically tunes the free parameters and changes IF-THEN rules adaptively which minimizes the residual noise. An enhanced ANC system can be built as Fuzzy adaptive filtered-X algorithm cancels both broadband as well as narrowband noise shown by numerical simulation

Cheng-Yuan Chang and Deng-Rui Chen [2] stated that filtered extended least mean square (FXLMS) algorithm is often implemented by conventional ANC (Active Noise Cancellation Systems) which is used to update the coefficient of the linear finite-impulse response (FIR) and nonlinear Volterra filters, owing to its simplicity; meanwhile, the FXLMS algorithm may converge to Local minima. This paper presents Adaptive genetic algorithm (AGA), by using this algorithm detection of secondary path for ANC is not required, its explains why plan measurement is not necessary in AGA based system. Effectiveness of AGA system is demonstrated by simulations. Nonlinear noise interference can be suppressed by AGA method, without clearly identifying the secondary path.

Dataset Description

Dataset is collected with the help of google form. Data was collected to show the need of noise cancellation device. It consist of at what time or date the data was inserted, category of the public whether the individual belongs to is a student, employed or unemployed person. Age of the individual, Gender, Their Place of Birth whether they belong to rural, urban or metropolitan region, then the city where they live in, Problem faced, do they face the problem of noise pollution, what are the source of the noise, and have they ever thought a solution for solving this problem of noise pollution. Would they prefer a device which would help in noise cancellation, Will they use such device if provided, what amount they are willing to pay for such device such questions where entertained in this survey.



Noise Cancellation Device

File Edit View Insert Format Data Tools Form Add-ons Help

Share

Ever thought of Controlling/ Selecting the sound you want to hear ?

	B	C	D	E	F	G	H	I	J	
1	Which Category do you b	What is your Age(In Years	What is your Gender?	Birth Place :	Which City you live in ?	Ever faced problem regar	What type of problems do	What is the Source of Noi	Ever thought of Controllin	Will you
2	Student	15-20	Female	Urban	Mumbai	Yes	Lack of Concentration, Sl	Transportation noise, Nea	Yes	Yes
3	Student	15-20	Female	Urban	Pune	Yes	Lack of Concentration, Hi	Transportation noise, Nea	Yes	Yes
4	Student	15-20	Male	Urban	Mumbai	Yes	Lack of Concentration, Sl	Nearby Construction, You	Yes	Yes
5	Student	16-21	Female	Metropolitian	Snnn	Maybe	High Stress levels	Loud Music	Maybe	No
6	Student	16-21	Female	Urban	Pune	Yes	Lack of Concentration, Hi	Transportation noise, Fes	Yes	Yes
7	Student	16-21	Female	Urban	Mumbai	Yes	Lack of Concentration	Festival Celebration	Yes	Yes
8	Student	16-21	Female	Urban	Pune	Yes	Lack of Concentration, Sl	Transportation noise, Nea	Yes	Yes
9	Student	16-21	Male	Rural	Pune	Yes	High Stress levels	Transportation noise	Yes	Yes
10	Student	22-26	Male	Urban	Purulia	Yes	Lack of Concentration, Sl	Festival Celebration, Figh	Maybe	Yes
11	Student	16-21	Male	Rural	Jaipur	Maybe	Lack of Concentration, Sl	Nearby Construction, Fes	No	Yes
12	Self employed	36-45	Female	Rural	Mumbai	Yes	Sleep Disturbance	Loud Music	No	Yes
13	Student	16-21	Female	Rural	Mumbai	Yes	Hearing loss	Festival Celebration	Yes	Yes
14	Student	16-21	Male	Urban	Mumbai	Yes	Lack of Concentration, Sl	Transportation noise, Nea	Yes	Yes
15	Student	22-26	Male	Urban	Pune	Yes	Lack of Concentration, Hi	Festival Celebration	Yes	Yes
16	Self employed	22-26	Female	Metropolitian	Mumbai	Yes	Lack of Concentration, Sl	Nearby Construction, Fes	No	Maybe
17	Student	16-21	Male	Rural	Bhayander	Yes	Lack of Concentration, Hi	Transportation noise, Nea	No	No
18	Employed	27-35	Female	Urban	Mumbai	Yes	Lack of Concentration	Loud Music	Maybe	No
19	Employed	27-35	Female	Urban	Mumbai	Yes	Lack of Concentration	Loud Music	Maybe	No
20	Student	16-21	Female	Urban	Aurangabad	Yes	Lack of Concentration, Hi	Transportation noise, Fes	Yes	Yes
21	Student	16-21	Male	Rural	Dhule	Yes	Sleep Disturbance	Loud Music	Maybe	Maybe
22	Unemployed	22-26	Male	Urban	Mumbai	Maybe	Lack of Concentration, Hi	Transportation noise, Nea	No	No
23	Student	16-21	Male	Rural	TRIVANDRUM	Maybe	Lack of Concentration	Transportation noise	Yes	Maybe
24	Student	16-21	Female	Metropolitian	Mumbai	Yes	Lack of Concentration, Sl	Transportation noise, Fes	Yes	Yes

Form Responses 1 Sheet1 Explore

Fig.1

Data Visualizations

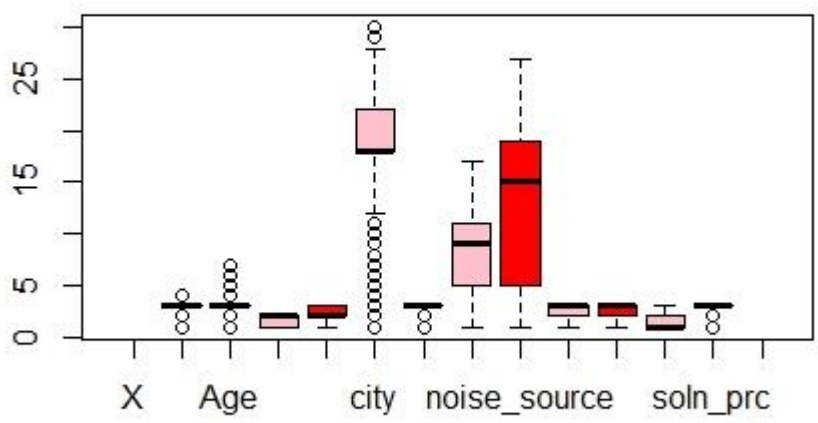


Fig .2

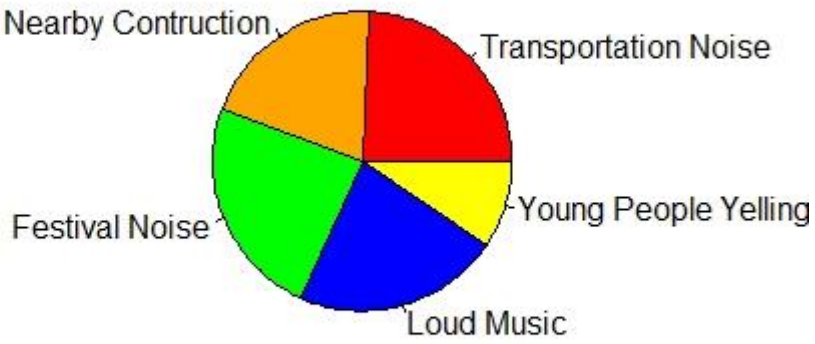


Fig.3

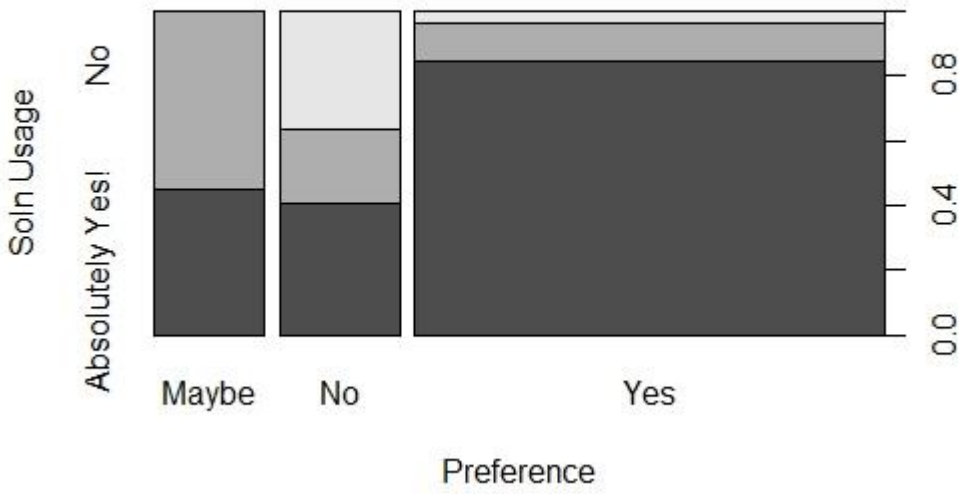


Fig. 4

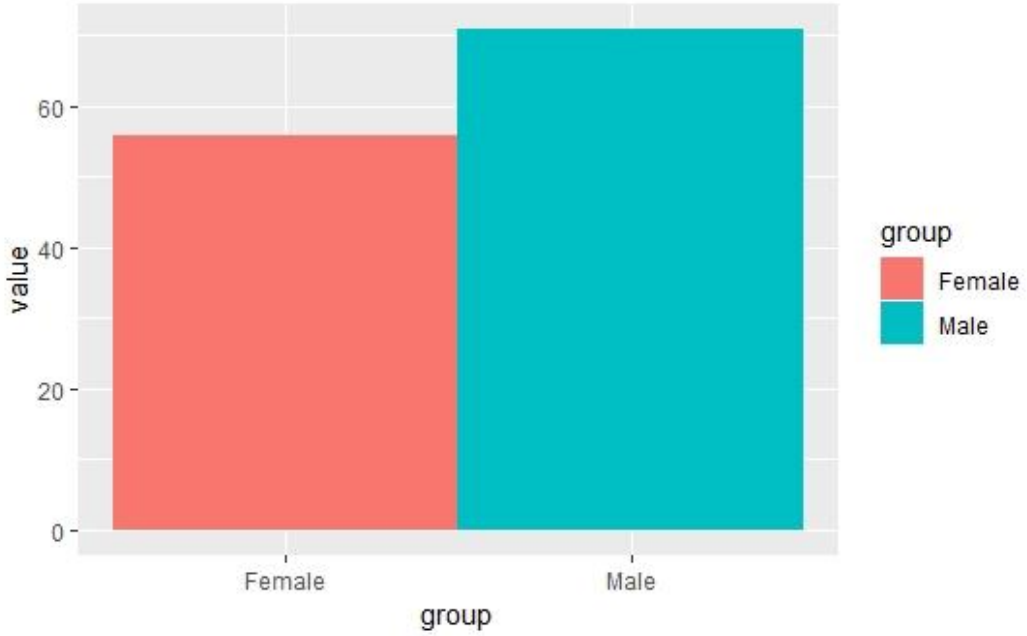


Fig. 5

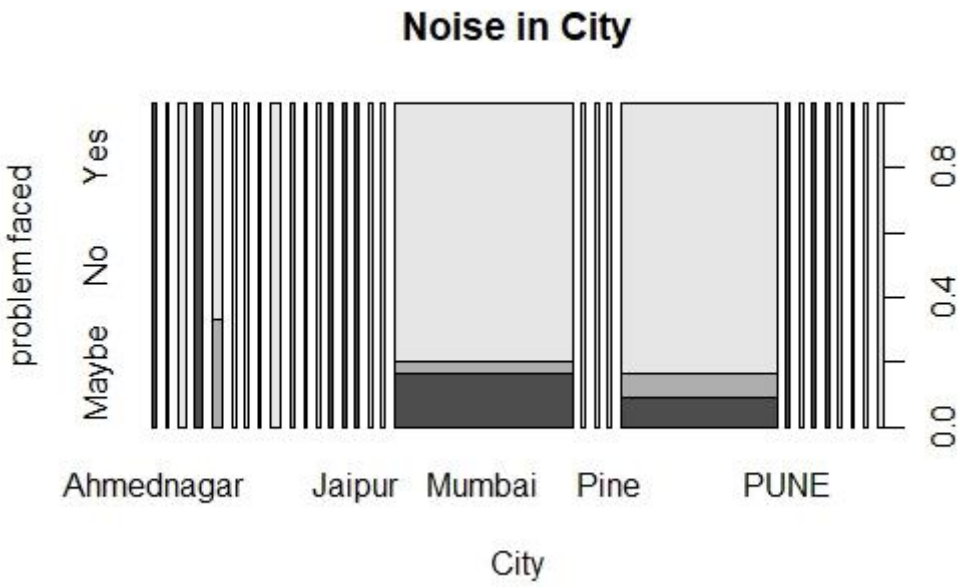

Noise in City
problem faced
Yes
No
Maybe
0.0
0.4
0.8
Ahmednagar
Jaipur
Mumbai
Pine
PUNE
City

Fig.6

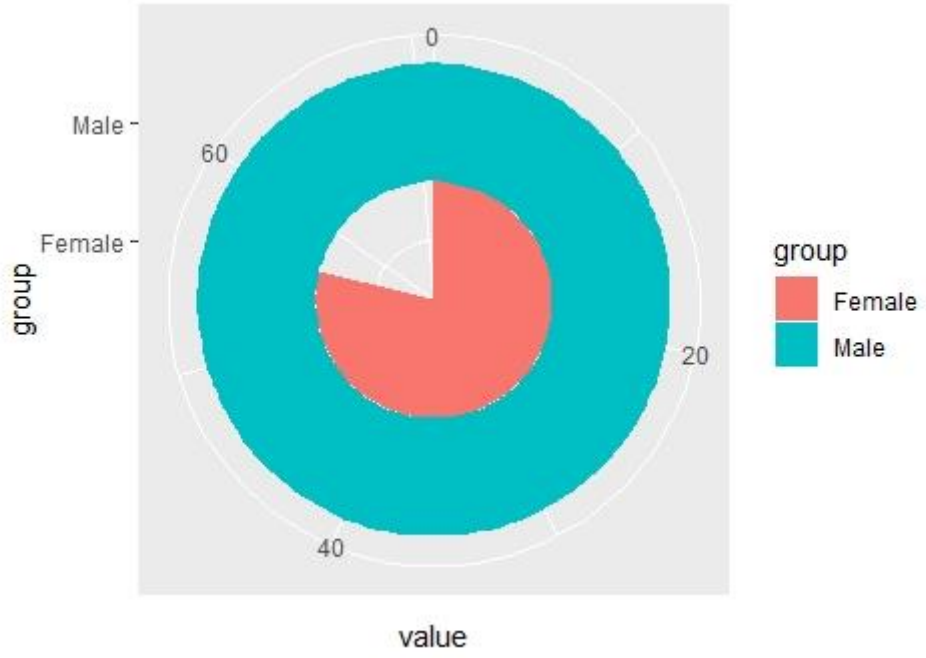

0
20
40
60
Male
Female
group
group
Female
Male
value

Fig.7

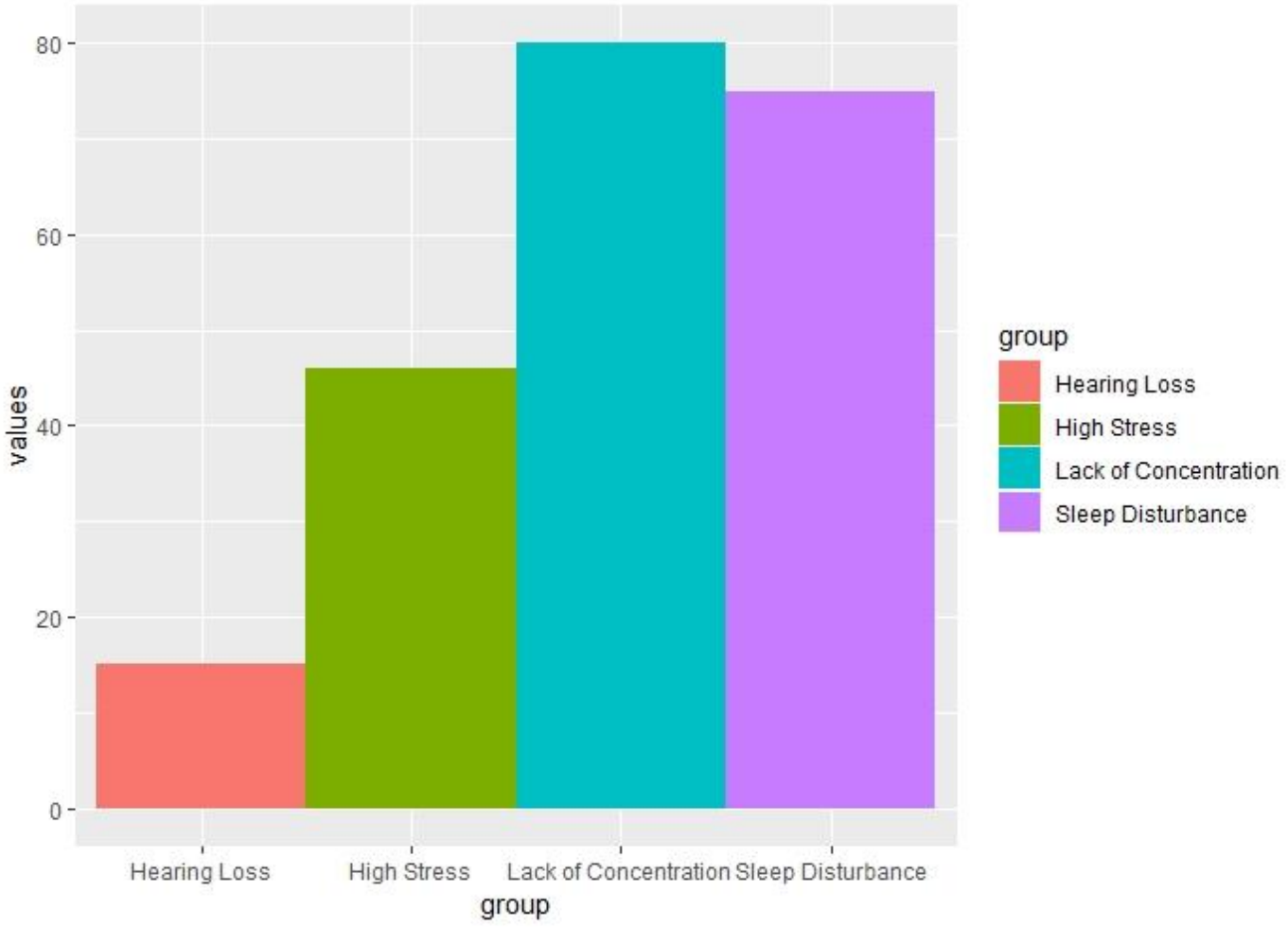


Fig.8

Observation

From the data collected we can observe that the 83.5% students answered the question in the survey that most of students face the problem of noise pollution due to so many festivals in India. 7.9 % employed people and 7.9% self-employed people and also 0.6% those who are unemployed face the same problem. 49.61% people from the urban area, 32.28% people from rural area, and 18.11% people from metropolitan area are prone to noise. The sources from where they experienced problem where 24.24% from Transportation noise, 23.86% from festival celebrations, 22.35% from loud music around, 20.08% from the nearby construction, and 9.47% from young people yelling at neighborhood. Most of the people find it hard to concentrate because of noise around 37.04%, 21.30% people experienced high stress levels due to unnecessary noise. Sleep disturbance is also the major issue amongst 34.72% of the people. 6.94% people also faced issue like hearing loss according to the survey. When question was asked to people in survey that whether they had an idea of controlling the noise 58.3% people had yes as an answer 18.9% people answered no. and 22.8% people answered maybe which can mean either yes or no. So through all this analysis we can state that almost 90% of the sample population face the noise pollution and aspect noise cancellation device as the solution. 90% of the sample population are willing to use this device as soon as possible

Proposed System

For solving this problem of noise pollution we can never eradicate the sources from where the noise is coming because we can't stop construction nor can we stop people from celebrating festivals, or listening to music but we can surely design and build a device which can control the noise in specific range around the targeted person

Conclusion

This paper presented the data visualizations that shows the need of such Noise Cancellation Device. The making and use of the Noise Cancellation Device will solve the problem of many people and also the solution need to be cost effective, so more no of people can use the device and solve their problem.

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