

A Noise Cancellation Device

Mariam Salcedo, Ann Tangsamphan, Afia Nawar Jenice

City College of New York

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Professor Barber

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Abstract

Technology has been beneficial for many of the problems in this case we are bringing the opportunity to solve one of the most common problems. Noise pollution is affecting with hearing

problems and now even with mental health. Noise distracts us from the things that we want to focus on or very loud noises can affect our hearing. We created a device using untested anti-magnetic waves to project a sound barrier field to cancel the noise around the field where the device was turned on. This device create a barrier than doesn't let the noise get in or out the area controlling the vacuum space around the device so it produces the wave that take and reflect sound waves.

Introduction

Whenever a problem appears, necessity is present and because of such necessity inventions arise. We are surrounded by countless problems for example, transportation in New York city with train and buses delays, the absence of medicaments to cure certain type of diseases that hasn't been discovered yet, people who has issues sleeping or oversleeping. All these problems have solutions or alternative ways to avoid them. For commuting problem, people may take an extra time to leave from their home earlier and utilize the time on the train or bus reading or doing something else. For uncured diseases, having precautions is the best way to avoid having them, there are ways of living a healthy life by having discipline and love for your body. For oversleeping, creating habits is very helpful after the 21st day of doing something repeatedly it becomes a habit. These examples show you how there are many problems but also solutions. Sound pollution is a problem that creates many other little problems like loud music from cars, loud talking from neighbors or just noises that you just want to avoid. If you tell your neighbor about his loud talking or request to the car-owner to reduce the sound you would probably end up quearrely with one another. Our solutions is of the type that not only solves your problem with unwanted noises but also solves all the little problems that come with noise. It's a solution for people who are looking for peace and because we all want that we invented ∞ Hz.

What is ∞ Hz?

This device works as a wifi router, it has a range that covers 1 meter or more from where it's placed. The device blocks the sound that is coming from outside of the range and the sound

that is produced inside the range is not able to go outside the range. People outside of the range are not going to be able to be disturbed by the noise produced from the users and vice versa. The device lowers the altitudes of sound below 20 Hz, when the altitudes go below 20 Hz the sound can not be heard (ScienceTrek, 2018) [1]. The device is not heavy and very easy to take everywhere. The batteries needed are two AA size, they are rechargeable so it can be used in a charging port that can be taken everywhere.

Figure 1- Noise Cancelling Device



Problems

1) Lack of privacy: It is a very significant problem. Some people are shy, introvert or they just do not want others to hear what they are saying. Just like some people whisper because they want to keep the content of their message a secret.

2) Noise pollution produced by cars: It is a very common problem in New York city. We have so many roads and cars. So, the problem of cars honking or playing loud music is very serious.

3) Improper studying area: We have the problem of privacy and when it comes to study time we have the necessity of a peaceful and calmed place where we can study, specially at CCNY. Sometimes there are many students located in one area and either they make noise or you just want completely silence or even study out loud on your own.

4) Study group area is too loud: Some students do not go to study area to really study at all and even if they do, they are just too loud.

5) Loud sounds from the subway: Trains above the ground are a distraction for the people that live near the subway..

6) Misophonia: It's a strong hatred of specific sounds, where patient hate sounds like sneezing and yawning. (WebMD, 2016) [2].

Existing Solution to Sound Pollution

*Headphones:*They are an easy way to solve the problem of unnecessary noise around, you just have to put your headphones on and relax while listening to your favorite playlist. The cons on this idea is that if you start listening to your favorite songs then you would lose track of your tasks and become counterproductive.

*Calling 311:*It's a temporary solution but it becomes in a waste of time when agents start asking a bunch of questions when you call them.

*Closing windows:*It's an easy solution but it doesn't solve the problem completely, it doesn't block the sound from entering and having no ventilation in closed spaces is very dangerous especially on the summer when temperatures are so high.

*Telling others to be quiet:*It might sound rude to tell people to be quiet, people don't have a good mood always. Sometimes it leads it quarrelling. We want peace, we don't want to start trouble.

*Living far from other humans:*Running away from others and noise pollution might be the best solution but to be realistic nobody would want that. So, we have to set ourselves to live with disturbs and unwanted noises.

Plan of Work

The product dimension is 4 x 3 x 2 inches and it is 1 pound. The feature of this device include the battery, vaccuX, WavePro, Antenna, a charger and a ranger. The batteries used are two AA size lithium ion battery, it supports both rechargeable and the non- rechargeable batteries. The rechargeable batteries will be charged when the charger is plugged. There are four antennas attached to WavePro, it is used to find direction to emit the VaccuX radiation. On the

left side of the device there is an on/off switch and under the switch, there is a ranger with - and + sign.

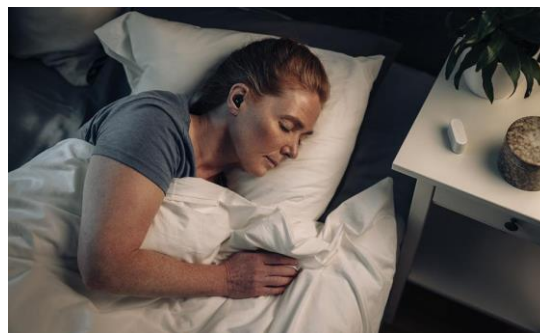
To use the device, first the switch on the left side should be turned on. Once the device is on the antennas begins to work. Then, the device will repulse the sound wave that surround the device. After a period of 5 seconds, the a type of radiation called vaccuX will be release and the vacuum is created. The vacuum is like a small bubble that will block all the sound that travels in and out the the vacuum. The sound outside the surrounding cannot come inside and the sound inside the surrounding cannot go outside because sound require medium to pass through the vacuum. The distance range can be control by increasing or decreasing the ranger locating on the left side of the device.

The material used in the device are carbon fiber, plastic, and aluminum. These materials are very durable but also lightweight. It also has an attachment on the back of the device which can be stick to any smooth surfaces such as the wall or window. This is useful when there is no space to place the device.

The device also has a timer setting which is very useful when a person just want a quiet place for them to fall asleep. The device will turn off itself once the time set is up, this will also save the batteries. For example if a person want to sleep at 8 pm and wake up at 6 pm. He/she can set the timer for 3 hours just for them to be able to fall asleep and after 3 hours, the device will turn itself off. It is a good option to have.

A noise cancelling headphones has a feature of electronics in the ear piece which cancel noise that is 180°out of phase with the ambient noise [5]. This device is similar, but instead of having to physically cover the ear to block out external noises, this device contains the electronic piece inside the device. It is very convenient and more comfortable.

Figure 2 - Sleeping with ear plugs



[6]

The device is a solution to many problems in New York City. This device is not like other sound cancelling device in the marketplace because it can do many things that others can't. For example, this device is waterproof and can be used underwater. It can also be used above and underground within 1,000,000 ft. It can be used anywhere and is easily portable because of its light weight. It is more comfortable to use because the device just have to be place anywhere in surrounding. An example shown in figure 2, some people have to sleep with ear plug in a loud environment. But if this device was to be used, they can sleep more comfortable without having anything on their ears.

The plan of work states the following:

1. First, we will convince the New York City community board for approval.
2. Next, we will consult all the expertes. Especially electrical engineering and Physician for their knowledge about sound waves and circuits.
3. The following step is to create the product. In this step, we should have all the materials needed already. We will ask Mechanical Engineering for them to build the device as lightweight as possible.
4. Then, we will have a sound test and the batteries life test.
5. After that, we will expand our ideas to the marketplace. This step also include advertising our product and give them the samples.
6. Once every step is done, we will get all the feedback from the people we gave the samples to and make a minimize change to improve the device.
7. Lastly, we will fix any problems, produce more device and sell the products in the marketplace.

Timeline for the Instruction/ Implication Schedule

First, a draft of the plan for creating the device will be made. It will take around four weeks. Once the draft is made the prototype will be made in the lab. Different prototypes will be made and tested out in the lab. The trial and error will continue for three months to figure out the best prototype.

Once the satisfactory prototype is obtained, the company will go for a sample batch. 100 devices will be made and given to different people from different demographics to use the device

for one month. It is done to receive feedback about product usage. Once they have used the product the feedback is collected and the problems are addressed and rectified in the lab. This process is trial phase 1 will take a span of three months.

Once the problem of the device is rectified a larger batch of 1000 device is produced and this time-tested in a bigger sample population. This is called trial phase 2 and will be completed in three months.

After the two trial phases, the company will go for mass production. The first batch of 50000 devices is expected to be produced in three weeks. The product will reach the market in another two weeks. So the product is expected to be launched in one year time.

If the device gains popularity and is a success, our company will begin looking for partners to sell our device to. We would reach out to Amazon to buy and improve our device.

Budget

The materials to create the device including plastic covering, lithium battery, wires, and the circuit should cost no more than \$24 per device. Employees will be paid for an eight hour work day. Four sound technicians will be employed as well as five mechanical engineers and four IT technicians. Two sales marketers will be hired for eight months who will earn \$13 per hour. And eight more will be hired prior to launch the device into the market.

Cost of production of one device	
Material	Costing
Plastic covering	\$4
Lithium battery	\$7
Wires	\$3
circuit	\$9
packaging	\$1

Total production cost per piece	\$24
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Cost of raw materials in different phases of product development and product launch	
Phase	Costing
Trial 1	$(100 * 24) = 2400$
Trial 2	$(1000 * 24) = 24000$
Mass production (batch one)	$(50000 * 24) = 1200000$
Total cost	1226400

Employee Payment Budget			
Position	Number of Employees	Estimated payment	Total
Sound	3	\$25/hour for one year	$(\$25 * 8\text{hrs} * 5\text{days} * 52\text{weeks}) =$

Technician			$52000 * 4 \text{ person} = \208000
Mechanical Engineer	5	\$25/hour for one year	$(\$25 * 8 \text{ hrs} * 5 \text{ days} * 52 \text{ weeks}) = 52000 * 5 = 260000$
IT Technician	4	\$25/hour for one year	$(\$25 * 8 \text{ hrs} * 5 \text{ days} * 52 \text{ weeks}) = 52000 * 4 = 208000$
Sales Marketer	8 for one month distribution and 2 for 6 months of trials and distribution	\$13/hour for one year	$(\$13 * 8 \text{ hrs} * 5 \text{ days} * 4 \text{ weeks}) = 2080 * 08 = 20800$ $(\$13 * 8 \text{ hrs} * 5 \text{ days} * 32) = 16640 * 2 = 33280$
total	22		709280

Other expenses	
Research lab	75000
Fixed asset (Buildings)	350000
Distribution expenses	100000
Miscellaneous	20000
Total	545000

Total expenses for one year	
Expenses	amount
Production cost	1226400
Employee payment	709280

Other expenses (distribution etc)	545000
Total budget	\$ 2480680

Qualifications and Experience of Each Group Member

Our impressive team is highly qualified for the project:

1. Afia Jenice, **sound technician**. She finished her Bachelor in computer engineering at the City College of New York in 2018. She worked as an IT technician at the Apple Store in Huntington, New York. She is currently working as a technician in Best Buy.
2. Ann Tangsamphan, **sales expert**. She finished her Masters in marketing and management in 2016 from Fordham Business School. She interned at Orion Worldwide to persuade other company in buying Orion's television media spaces. She is currently working at Clean & Clear to create advertisements on social media to appeal to the youth to buy her company's product.
3. Mariem Salcedo, **financial analyst**. She finished her Master in finance from Baruch College. She worked as a financial aid officer at Columbia University. She is currently managing the sales department at IPG MediaBrands to keep track of the company's budget and spending.

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