HALEY – Sound Around the Clock

Alessandra Lucherelli
Isia Firenze
alessandra.lucherelli@isiaesi gn.fi.it
Corrado De Pinto
Isia Firenze
corrado.depinto@isiadesign.fi.it

Giulia Querci
Isia Firenze
giulia.querci@isiadesign.fi.it
Marta Balloni
Isia Firenze
marta.balloni@isiadesign.fi.it

Abstract
Haley is a digital clock with acoustic function. It notices sounds and transmits information to an app. The app creates a mapping area with different classes of sound level in different places, to have a complete panning shot of the noise in your life location.

You can use it like a simple time marker to take with you, on your jeans pocket or on your bag like an accessory, and when you press a button it can quantify the dB (decibell) around you. With this object you can control the noise pollution in your surrounding space and choose places on the basis of your acoustic needs.

An example: if you look for a quiet place for your lunch break, you can use It to find a silent place around you to stop and eat something.

Permission to make digital or hard copies of part or all of this work for personal classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. for all other used contact the Owner/Author.
Copyright is held by the authors.
ISWC'14 Adjunct, September 13 - 17, 2014, Seattle, WA, USA
ACM 978-1-4503-3048-0/14/09.
http://dx.doi.org/10.1145/2641248.2641272

Author Keywords
Awareness; noise pollution; kinetic watch technology; portable;

ACM Classification Keywords
H.5; J.7.

Introduction
We started our work with the purpose of using the human battery like clear energy for the construction of a functional and useful object. As a first step we found a theme around which we developed our work: SOUND. We searched for different kinds of sound and different technologies that could work with different systems. During our research we found out how the noise pollution is important in our society, and how people can be damaged by this kind of pollution.
Then, our attention focused on this problem and we asked ourselves how we could improve them, or find a possible solution. So many people do not know anything about it because today noise pollution and high sound is something usual; so, as a first step, a good solution could be becoming aware of the problem. The app that we propose is a map of the places we live

in and it tells to the users information about noise pollution of the area around them, pointing out the most polluted places.

Research

Noise is a human feeling and depends on the mechanical actions of air pressure on the tympanum of the ears, then the brain elaborates and evaluates the input. These sounds from 70 dB up can create fatigue and psychological damages, specifically for what concerns problems regarding hearing, the cardio-circulatory apparatus, the immune system and hormonal effects. Another effect is call "annoyance state". This is a sensory state that creates a modification of people relation with others and environment and causes stress. Other consequences of a large noise exposure are sleep problems and, in severe cases, the hearing loss.

Installation

Other interesting projects that we analyzed are some installations that underline the contrast between a polluted and a natural environment. These conceptual projects made us think about the importance of the people awareness on these issues. From this deepening we began to think of making a device that can help people to recognize the polluted environments to avoid them.

Adinamo Charging

We studied the Seiko Kinetic Watch Technology to enable our object to recharge through movements. This technology is an application of the concept of the manual winding clock to the digital one. Through a rotor and generating block coil, a circuit block, an oscillating weight and a capacitor the watch is able to recharge the battery. When the wearer makes a movement the generated and integrated power transforms the kinetic energy in electric energy that recharges the watch. That is possible because of the oscillating mass and its rotation. The "rotor" is composed of a hollow part and a full, the full part is heavier and therefore allows the rotation because every time it tends to return downwards. This system is innovative and ecologic because eliminates battery replacement.

Project values

The planning project started with some basic values concerning the final kind of product we wanted to obtain. The important point of our philosophy is the eco sustainability of the project, the low impact on the environment and making people aware of level of noise that surrounds them. For this reason the first important choice was to have a natural energy like human battery, which permits the object operate with renewable and natural energy. It is also important to give a real purpose and a "reason why" to the project, to make sense; to answer this necessity we decided to make the existing reason of the project correspond to a human need. It must be an improvement to human life style. To respect the sustainable valor of the planning object, it has to be built with light elements; it is important to limit the chosen materials and evaluate the possible material reuse. It can be used in different situations and with different supports. It is composed of two functions in a device and this double function avoids the purchase of another item.

Project description

Figure 1: Render of project

Haley is a portable device, small and light. It measures 85mm in length, 42mm in width, and 32mm in height. It senses the noise pollution of the surrounding space and transfers it to a smartphone or tablet. There, trough the GPS (Global Positioning System) and the timer, we can have a noise pollution map where the user can see the most and the least polluted cities and places. You can hook the device everywhere: clothes, accessories, cuffs, shoes, etc. It is portable and shows you time and noise pollution at the same time. The social aspect of the app is important for the people's sensitization on the subject. This can become a sort of game, if the app counts the number of data and reaches a big number, you can have a prize. This prize can be a download for a song.

Operation

You can use Haley in any place. If you don't press the button, it performs the function of a simple clock. When you push the button, the internal microphone detects the decibel of the surrounding environment and the monitor display shows you the exact number of these. Through the Bluetooth device it sends data to the application located on your phone or tablet and adds them to the map. In this way, the application will have a database summary of all the data sent which can be filtered in different modes:

- Geographically
- Noise pollution levels
- Last places visited
- Favorites

Figure 2: Different ways to wear Haley

Selected a place you can see the noise pollution of the same day, of the week before, of the month and of the year.

You have a profile on the app, linked with your Haley. After a given number of data submission from the same profile, on your application appears a link from where you can download a song. This is a sort of incentive

game to promote and advertise the object, but above all the concept behind it.

Technology

Haley is a simple aluminum device. It is composed by six different elements interacting with each other:

- Board Blend Micro: an Arduino Development Board with Bluetooth and usb output. It is the device processor. By the Bluetooth it allows to transfer the data to the smarthphone/tablet.

- Mems Microphone: notes the sound and their dB.

- Battery: 3v button battery with its support.

- 7 Displays: 2 larger (14x7,5 mm) for hours e 5 smaller (10x 7,5mm) for minutes and dB.

- Button: standard button to be pressed at the time of data transfer.

- Kinetic system: manual method of charge linked to the battery composed of an oscillating mass, rotor and capacitor.

All these elements are connected to each other and allow the work of the device. With the microphone Haley catches the environment sounds and transfers it to the phone by the Bluetooth. There the app organizes it in a map and allows you to find it through the different categories. The mapping of data is possible thanks to the integrated smartphone GPS. And with the Kinetic system you can charge your Haley with the movement.

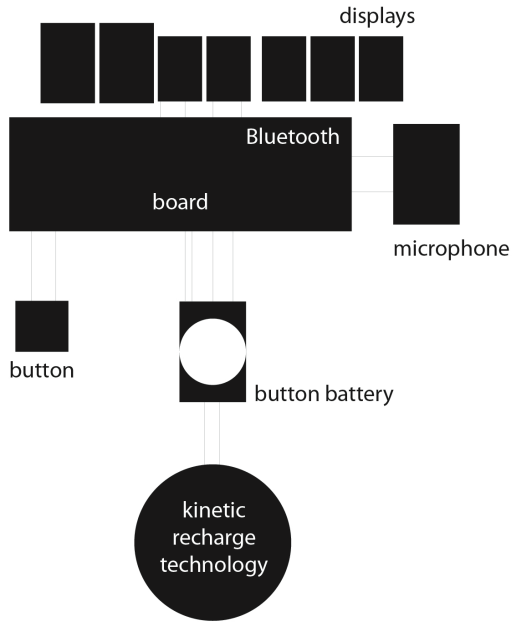

Figure 3: Schematic explanation of the technologies

Communication

In the event that the item should go on the market will be called HALEY and his payoff will be "Sound around the clock". This name originates from the 1956 Bill Haley song "Rock around the clock". The text of the song speak about two people that rock at all day long, there is a real scan time. So the concept of the clock and the scan time has been respected. Also "around the clock" can mean "in the surrounding space". So we replace the word "rock" with the word "sound" and we find a perfect payoff for our device.

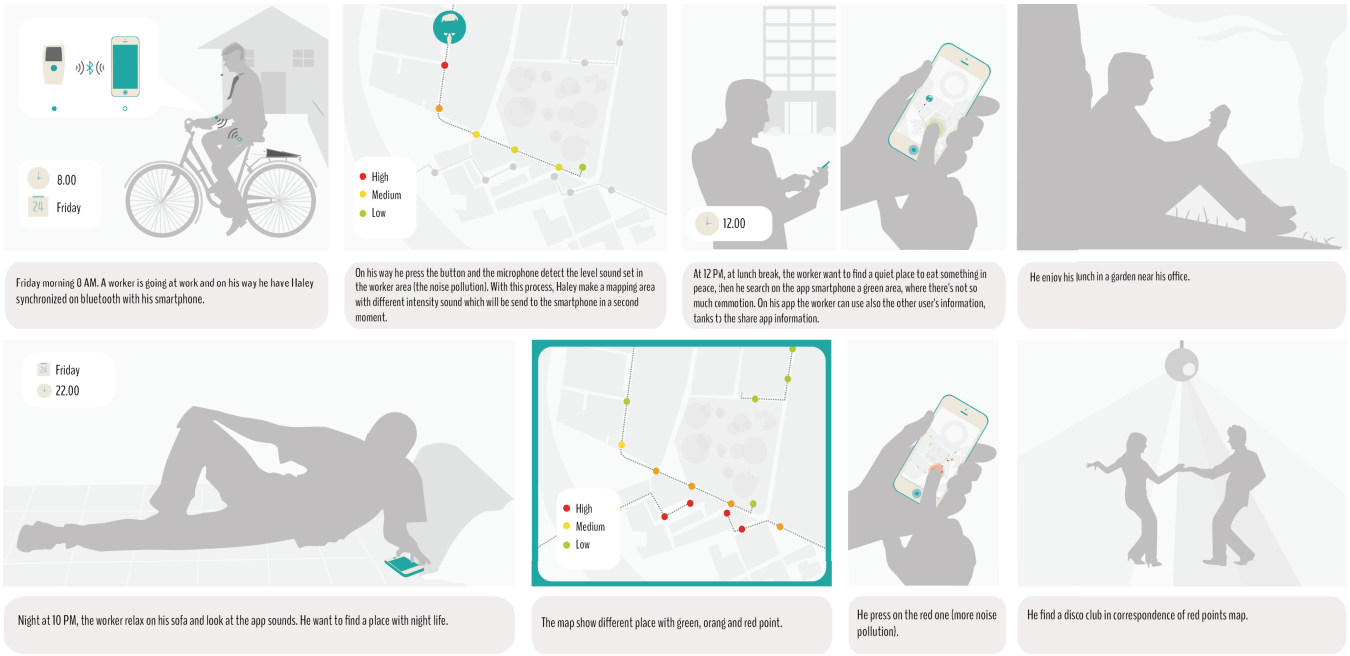

Figure 4: Scenario: A typical day with Haley

Conclusion

"Haley – Sound around clock" in our opinions can resume in a good way the concept of the object, its functions and its spirit.

This device is an important step in the outlet consciousness of people in matter of noise pollution. With a small a useful object you can have a simple and instantaneous detection of noise and after you can consult the map to discover the most pollution places and zone of your city and chose where you want to go. Haley: capture the sounds around the clock!

References

[1] Giannoni, N., Seiko l'altro volto del quarzo, http://arretrati.orologi.it/articoli/186/seiko.htm

[2] ISDE Italia - Associazione medici per l'ambiente, Inquinamento acustico, http://www.mednat.org/ecologia/inquinamento_acustico.htm

[3] Silva, A., HI))((LO. Paesaggi sonori, http://www.abitare.it/it/highlights/hilo-paesaggi-sonori/ http://ilrumorefamale.jimdo.com/sitemap/

[4] http://quartzimodo.com/the-seiko-kinetic-boon-or-bane/

[5] Board Blend Micro with BLE, http://www.seeedstudio.com/depot/Blend-Micro-an-Arduino-Development-Board-with-BLE-p-1834.html

[6] Displays, http://www.tme.eu/it/details/ld-s028sr-c/display-a-led-singoli/# http://www.tme.eu/it/details/ld-s028sr-c/display-a-led-singoli/#

[7] Mems microphone, https://www.sparkfun.com/products/9868