

HearWear: The Fashion of Environmental Noise Display

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Abstract

HearWear is an electronic wearable, which is not only a fashion apparel but also reacts to urban noise with moving light patterns. HearWear keeps the wearer and all passers-by in touch with their environment through a playful display of urban sounds and noise pollution.

Keywords: Environmental, fashion and technology, noise pollution, noise, wearable technology, urban fashion

1 Introduction

For people living in the city, urban noise is an omnipresent part of life. Every day, every minute, we are exposed to its residual pollution. The noisier it gets, the less we seem to notice exactly how loud it really is.

Compared to public awareness of air and water pollution, awareness of noise pollution is relatively small. It is not that we do not suffer from loud noises, car horns, fire trucks, construction – we just do not seem to notice them in our everyday cityscape.

HearWear addresses these issues and expands on prior work in the fields of wearable devices, networked displays and environment-reactive art. The feral robotic dogs of the Bureau of Inverse Technology¹ bark within areas with high radioactivity and are an early example of a physical object representing crucial environment information. WiFisense² deals with visual representation of wireless network connectivity on the go.

Inside/Outside³ displays air pollution with color changes of the bag's fabric. There have also been numerous projects integrating EL-wire and LED technology in clothing such as the technology jacket for AfroFuturistic performance at Kitchen⁴. HearWear stems from this research but is unique as one of the first wearable projects to look at environmental noise pollution, seamlessly and subtly integrating technology with everyday fashion.

2 Exposition

HearWear version 1.0 is a skirt reacting to environmental noise. As everyday apparel, it becomes your lifestyle with its comfort and convenience. Additionally, it enables you to express your experience of the noise levels in the area you pass through.

Noise Perception

HearWear employs noise recognition technology. The system includes one embedded microphone reading the environmental noise levels on a scale of 1 to 5, with 5 being the loudest. It also

includes a sound recognition microcontroller, which recognizes common street noise

patterns such as a car horn, an ambulance/fire truck/ police siren, or loud human noises, such as in a crowd.

The multiple perception of the sound allows us to analyze noise amplitude and frequency of the environment we pass through and transform them into a visual wearable art display.

Experience and Expression

To simplify-HearWear is a wearable VU meter. It reacts to subtle and abrupt changes of noise levels in the areas we pass through. Imagine a loud screaming ambulance reflected by HearWear's VU meter. Or the thumping sound in a dance club reflected on your clothing. Or even a catcall, which could be considered a mild harassment, turning into a light pattern response by the wearer of the skirt.

HearWear perceives and qualifies its noise perception with beautiful light patterns. It is best experienced outside at night when colorful light expresses mundane noises visually and alarmingly.

As a fashion item, HearWear connects people through sensing and displaying noise pollution data. We work not only towards a better environmental awareness, but also towards the barely perceptible integration of technology in your day to day lifestyle.

Everyday Fashion



HearWear V.01A lit

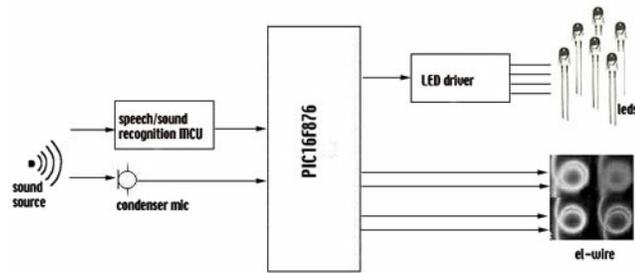
HearWear's design embeds the underlying technology in a very discrete way. Even when it is not turned on, it is equally fashionable, attractive and comfortable. We work towards a

creating a practical everyday apparel augmented by technology instead of technology augmented by apparel. Our goal for HearWear version.1.0 is to demonstrate how technology can stop being a gadget screaming for attention and can be elegantly integrated into familiar everyday fashion design.

We aim to create fashion out of a practical art form that walks around the city and reacts to the constant change of city sounds. HearWear is a wearable, and as such it is an art piece yet part of the person who wears it. HearWear is a personal experience but it also displays the surrounding noises to all passers-by and is therefore a shared experience. The shared experience becomes fashion.

Technology

HearWear integrates a custom-engineered printed circuit board and software with existing hardware components.



Technical Schematic of HearWear

We experimented and designed a system that interprets sound with light in an innovative way. A condenser microphone is amplified to read in general sound amplitude levels of the environment. It is combined with a sound recognition module driven by a microcontroller to qualify a number of common noise patterns. Depending on the HearWear model, the microcontroller is programmed to activate either a number of LEDs or electroluminescent wire.

The electronics are seamlessly integrated in the wearable design - the sound-detecting sensor is subtle and unnoticeable, and the LEDs and electro-illuminating wire are embroidered in the translucent textile. The developed system can be applied to a number of wearable apparels and accessories.

Future Plans

Our idea is very simple, and we hope to make it go far through multiple applications. The first obvious future step is integrating the technology we developed in different fashion clothes and accessories. We are planning to incorporate HearWear in skirts, bags, T-shirts, jackets, pants and belts. Other plans already on our schedule are using HearWear in a performance setting, so that e.g. a violin performer illuminates on stage based on the intensity and vigor of their playing, or dancers' clothes react to the music mood of the performance.

In the long term we would like to start working towards transmitting the information that each HearWear unit collects and visually displaying the data coming from separate HearWear units. We live in a very noisy world (at least us here in New York City) but no one seems to be aware of the long-term detrimental effects of noise pollution. Our goal is to contribute towards raising people's awareness of noise pollution and eventually bring about action to decrease it. Therefore HearWear version 2 will probably include a communications protocol which can send out the information that the each HearWear-er collects on his/her daily route. In this way we can work towards a real-time noise map of the cities we live in.

3 Conclusion

It is true that fashion is a statement. With technology, fashion can be more expressive and informative. We are looking forward to wearing more discreet technology in everyday fashion in the near future.

We also hope to visualize everyday noises with everyday wearable items and thus to provoke a discussion about the detrimental impact of noise pollution and bring about social awareness to decrease it.

References

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