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CSE 440 – Autumn 2014
1B: Project Proposal

Problem

Everyone knows that loud noises can be bad for our hearing—we've all experienced the ringing ears caused by late night of loud music—but did you know that you can experience hearing loss from blow drying your hair, mowing your lawn, or even waiting at the bus stop? All of those daily activities can expose you to sounds above **85 dB,** the volume level at which hearing loss begins to occur.[1] And though these activities are generally short or infrequent, "noise-induced hearing loss can be caused by … repeated exposure to sounds over an extended period of time". [2]

Problem Analysis

But how do you know if the ambient noise in your life is damaging? Hearing loss is cumulative, and many daily sounds will not cause symptoms until years or even decades of exposure. Accurate noise meters are costly,[3] and many are simply too inconvenient to measure daily noise. A full-time noise tracking mobile application would provide people with an accurate and comprehensive look at the ambient noise levels in their daily life. We already carry around a sensitive microphone in our phone, why not put it to good use? Loud noises could be identified and hopefully minimized, but an app could also help us make time in our life for silence. While sounds above 85 dB can cause damage, silence (ambient noise under 30 dB) improves concentration, fosters learning and memory, encourages empathy, and new studies have even linked it with healing qualities.[4] A noise-tracking app could track silence just as easily.

Suggested Solution

When designing a full-time noise tracking application, the "full-time" qualifier is essential. Search for "sound meter" on either the iOS or Android app stores and you are immediately inundated with dozens of decibel trackers and similar applications. But these apps are situation-specific. They lack the implementation and interface of a personal informatics system that would allow users to look at patterns over time and make conscious decisions about their noise exposure. Sampling rate would be key: too often and battery life would become a problem. Too infrequent and the data loses significance. Future research would be necessary to determine the optimum rate (which will likely require platform specific tests as well). Additionally, users could be prompted with daily "recap journals" that would allow them to tag dangerous levels with a short note about their surroundings at that time. The "when" is an important first step, but we can't make any changes until we know the "what"!

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[1] http://www.cdc.gov/niosh/topics/noise/stats.html

[2] http://www.ata.org/for-patients/how-loud-too-loud

[3] http://www.extech.com/instruments/product.asp?catid=18&prodid=504

[4] http://www.nytimes.com/2010/05/02/opinion/02prochnik.html