The Seventeenth Annual Interactive Audio Conference
PROJECT BAR-B-Q 2012

Group Report: BACON™ for Your Ears: Designing a Musical Hearing Enhancer

Participants: *A.K.A. "**BACON™ - B**iometric **A**udio **CON**figuration"*

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Problem Statement

As the population ages, more and more people are suffering from hearing loss. More specifically, as the earbud / headphone population ages, hearing loss is expected to become even more prevalent than it is today. Hearing aids are geared to improve speech (not music), carry a stigma and are expensive. Additionally, hearing aids are medical devices which require a visit to a specialist, need frequent tuning, and are optimized to the speech spectrum. The result is simply a correction for a limited use case, and offers no personalization for music, movies and general entertainment consumption.

A brief statement of the group's solutions to those problems

Our solution is to define a system that collects subjective data about users' hearing and audio environments in order to create personalized presets, which are then added to a biometric database. Applications or devices use this database to enhance the audio experience for each individual in their current environment and with their specific hardware. Speech is improved, and music and ambient sounds are enhanced, unlike current solutions. Our solution does not limit the user to a specific device or use case.

By freeing the analysis and processing from a single purpose device, the BACON™ system avoids the social stigma faced by "corrective" devices and can be made cool, hip, and trendy. Also, unlike medical products, BACON™ devices can be made readily available and affordable to the consumer. BACON™ products allow you to "hear all of the music, not just some of it." By incorporating celebrity presets, you can go beyond mere correction and hear the music as the artist intended.

USE CASES (or, what do we really mean)

Mature Mick
Mick is an older rocker who notices he can no longer hear the high-hat in his favorite music. This makes Mick sad. Very sad. He wants to hear all the details like he did when he was younger. Mick downloads a free application for his iPhone 3G that allows him to play a game that helps evaluate his hearing. Once he completes the game, the application stores the data in the "cloud", tied to his personal ID. He can then use the application to access his music library and correct the audio specifically for his profile, device and

environment. This goes well beyond traditional EQ, providing the precise frequency correction, dynamic range compression, and environmental noise compensation. This is all accomplished behind the scenes, without the need for the Mick to configure or tune his phone.

Elderly Elton
Elton is an avid movie buff. He has noticed that when he is in the theater, he has a hard time hearing the dialog. Elton decides to invest in a pair of Thumps headphones. Thumps has a built in processor that allows him to download his BACON™ profile, allowing him to use the in-house audio feed, which in combination provides the clear dialog Elton needs.

Kosher Ke$ha
Ke$ha really likes the artist formerly known as Snoop-Pig. She really really likes the way it sounds. Ke$ha is in her 20's and does not have hearing loss (yet). Ke$ha's BACON™ profile allows her to modify her music playback so that her entire collection can sound as if Snoop-Pig had mastered it himself.

Broadway Betty
Betty loves her some show tunes. Consequently, she goes to Broadway shows monthly. But the sound is becoming dull and difficult to hear as she ages, and her seats are waaaay in the back. She would love to have a headset that allows her to hear the music like she is in the front row. Unfortunately, there is no in-house audio feed available. Betty whips out her BLT™ (BACON™ Loves Theatre) earphones. With their built-in personalized correction, de-reverberation, and noise isolation, she can now hear every note without disturbing Lori in front of her.

DATA GATHERED

- Frequency sensitivity (gain)
- Subjective preference questions
    - Bass
    - Treble
    - Dynamic Range
    - Reverb
- Distinguish Instruments
- Differentiate between Left-Right
- Noise level
- GPS/Contextual information

Core Features

- Testing and data for individual customization
- Personal sound preferences (ability to eliminate sounds you don't want to hear)
- Correction could be at the system level, application level or external device
- Handles a greater dynamic range input than a hearing aid
- Target is not musicians, it's people who wouldn't wear hearing aids now
- "Open ID" accessible by different apps
- Open source database
    - Encourages adoption by multiple developers/vendor

Possible additional features:

- Bat mode (frequency transposition, compression, filtering) 96K+
- Software approach can use a person's existing devices. (iPhone, Android, etc)
- Metadata inside the content itself (provided by ecosystem, i.e. iTunes store)
    - Identifies type of audio - music, movies, games, VoIP, etc
    - Dynamic range coefficients, speech vs. other, diffuseness

- Geotagging/Geofencing – learns from the environment
- Automotive tie-in, car profiles
- Web app to test, create profile, and optionally configure device

Marketing Angles:

- Photoshop for Audio
- Like prescription sunglasses for your ears
- Listening glasses
- Rediscover your music
- Hear recordings as the artist intended.
- Personalize the audio experience for specific conditions and situations: in the car, live concerts, sporting events, theater, home, work, and play.
- A personalized audio experience, optimized specifically for YOU.
- Increased frequency response and enhanced dynamic range.
- Audio that is richer and smoother than butter
- Put the sizzle back into your sound.

Action Items

	Who's Responsible	**Due Date**	**Description**
1	Scott Snyder	12/21/2012	Develop best in class Demo App
2	Lori Solomon	02/01/2013	Invite Scott to present concept to Industry Leader