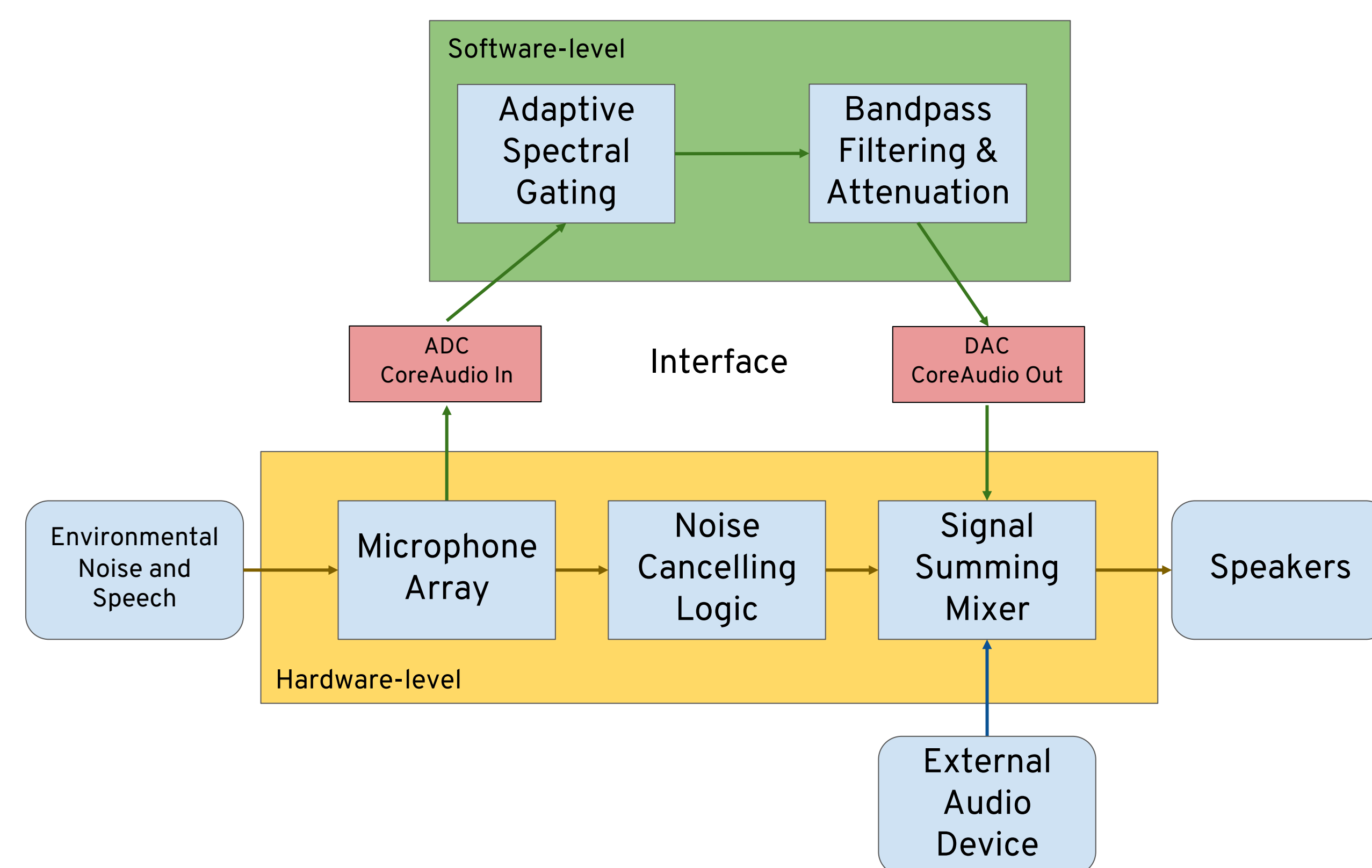


Selective Noise Cancelling Headphones

Josh Kalet, Adam Peters, Joseph Sinkovits, Finn Tekverk

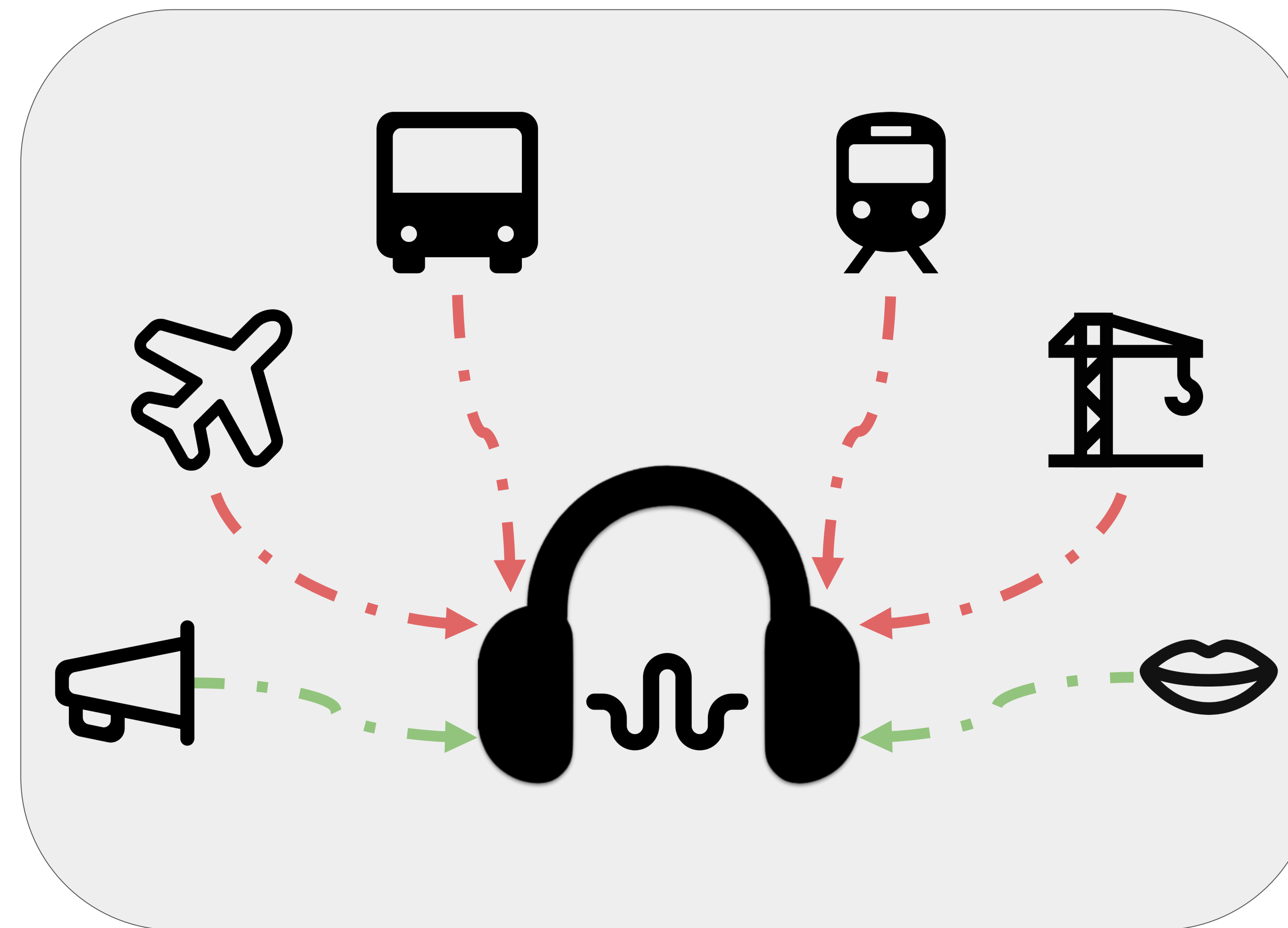
Introduction

This project applies selective noise isolating technology to a wearable headset device that enables effective communication in noisy environments. Using a binaural microphone array, the headset collects environmental data for hardware-level active noise cancelling. Proprietary voice isolation software applies spectral gating noise reduction that feeds the headset speakers, such that the user can distinguish human speech in noisy environments.



Impact

The developed noise reduction technology has significant benefit for its users in noisy environments. Primarily, users have improved situational awareness to audio stimulus such as speakerphone announcements or calls of distress. This is an important safety feature of the technology that mitigates the risks of using active noise cancelling technology in public spaces. It is crucial that these augmented-perception technologies do not inhibit instinctive human behavior, but rather improve recognition and response time to events in the user's surrounding environment.



Project Goals

01

Implement Hardware Level Active Noise Cancellation (ANC) Model

02

Isolate Voices from Noisy Environments in Real Time With Software

03

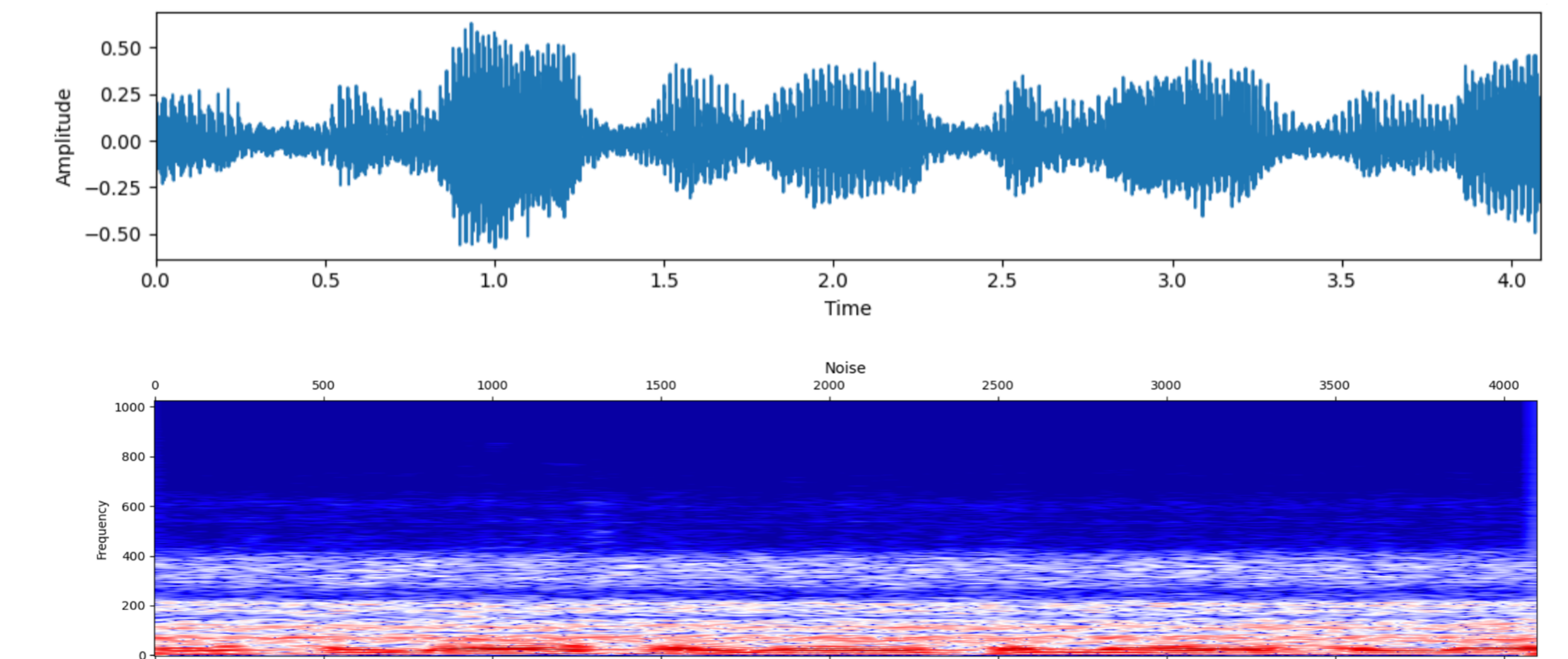
Collect and Evaluate Noise Patterns To Parameterize Noise Reduction Software

04

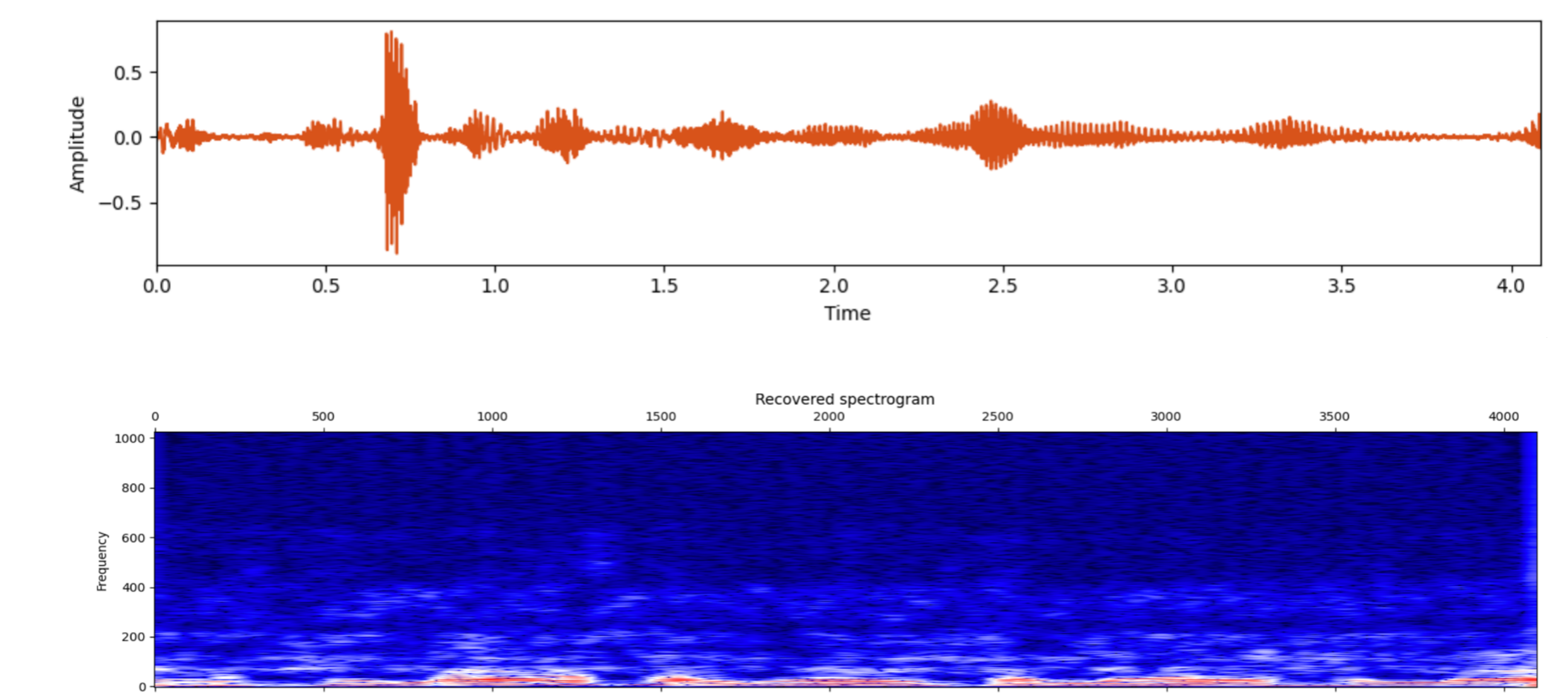
Implement Into Wearable Device That Can Be Worn In Noisy Environments

Behavior

Before Noise Reduction:



After Noise Reduction:



Future Work

1. Reduce latency throughout noise reduction algorithm
2. Integrate microprocessor into headphones to minimize interfacing complexity
3. Research and implement other filtering methods for noise reduction
4. Improve ANC to operate within larger frequency spectrum