

Dashboard for displaying unsafe instantaneous and cumulative sound level exposure



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Introduction

In music classes across the world, people are playing their instruments at volume levels that are considered unsafe for extended periods of time. The students and teachers in these classes are at risk of hearing loss due to being exposed to unsafe levels of sound. This project aims to create an easy to use dashboard that will provide teachers and students with awareness of the sound they are being exposed to so they can make informed decisions about how to safely play music.

This project is a dashboard that provides real-time visuals of sound data collected from a microphone. It is a locally hosted web application built using HTML, CSS, and Javascript with an external library called p5.js.



Methods

As a group we met with sponsors from the College of Biomedical Engineering to better understand the problem, and work together to come up with a software solution.

Once a week for the duration of a semester we have met as a group with our sponsors to iron out small details and come up with a product that will be both easy to use, and useful for anyone who needs analytical data about the sound they produce.



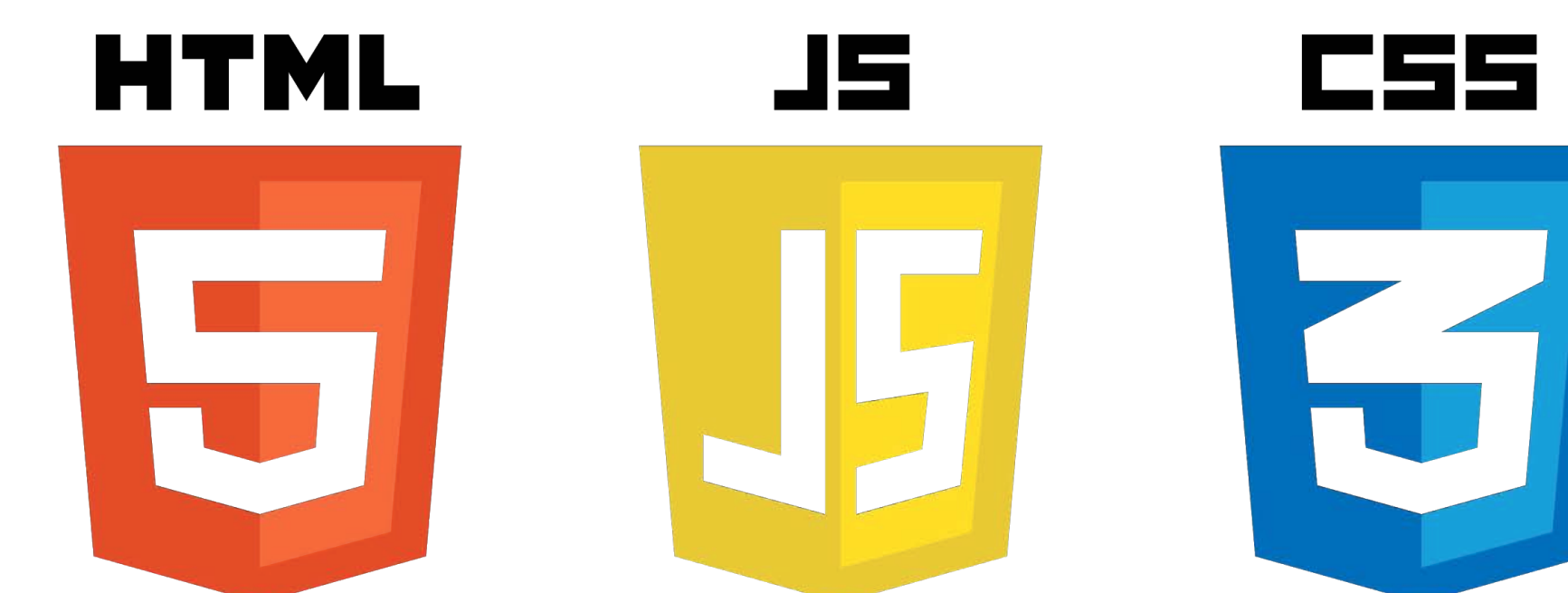
Design

Technology used in this project:



p5.js is a JavaScript library that makes coding and design accessible for artists, designers, educators, and beginners that reinterprets this for today's web through its processing capability.

This library has a full set of drawing functionality that allows us to create and adjust our design for a dashboard quickly and efficiently.



The current version of our dashboard is created with standard web development protocols such as HTML, JS, and CSS.



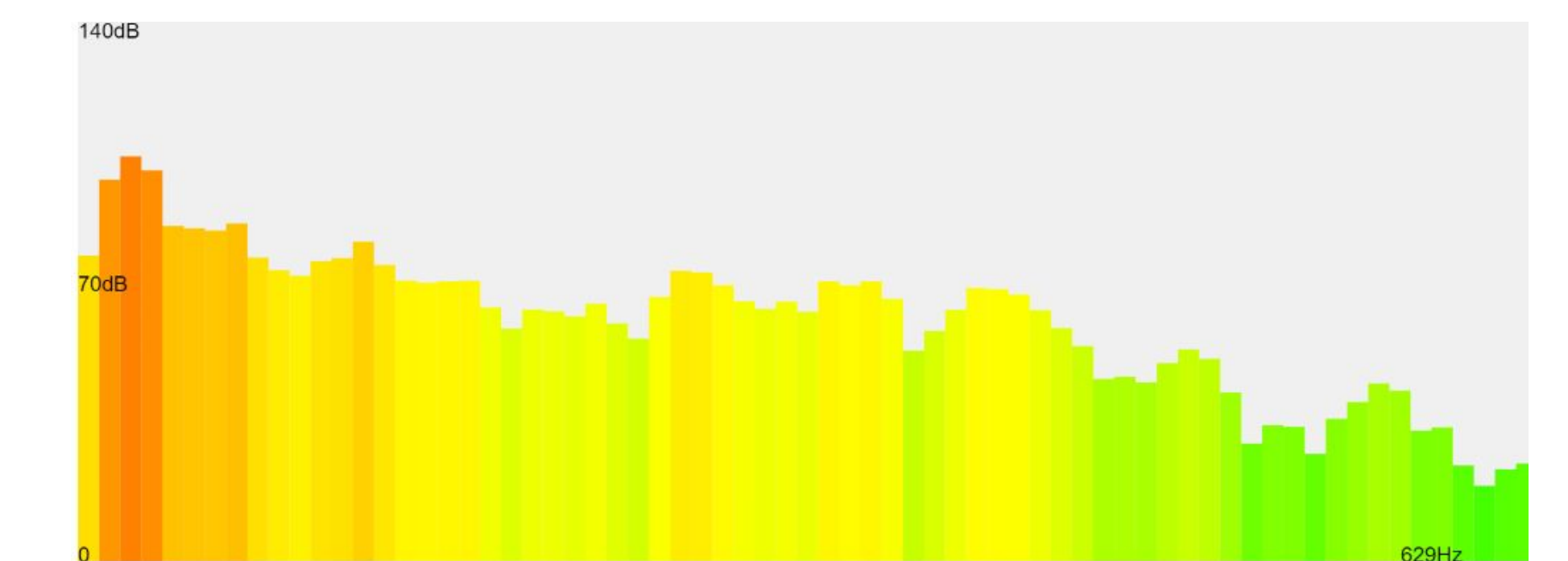
We planned on integrating a noSQL database structure using Google Firebase Cloud Firestore for its flexibility and scalability specifically designed for our current webapp and foreseeable future mobile development.



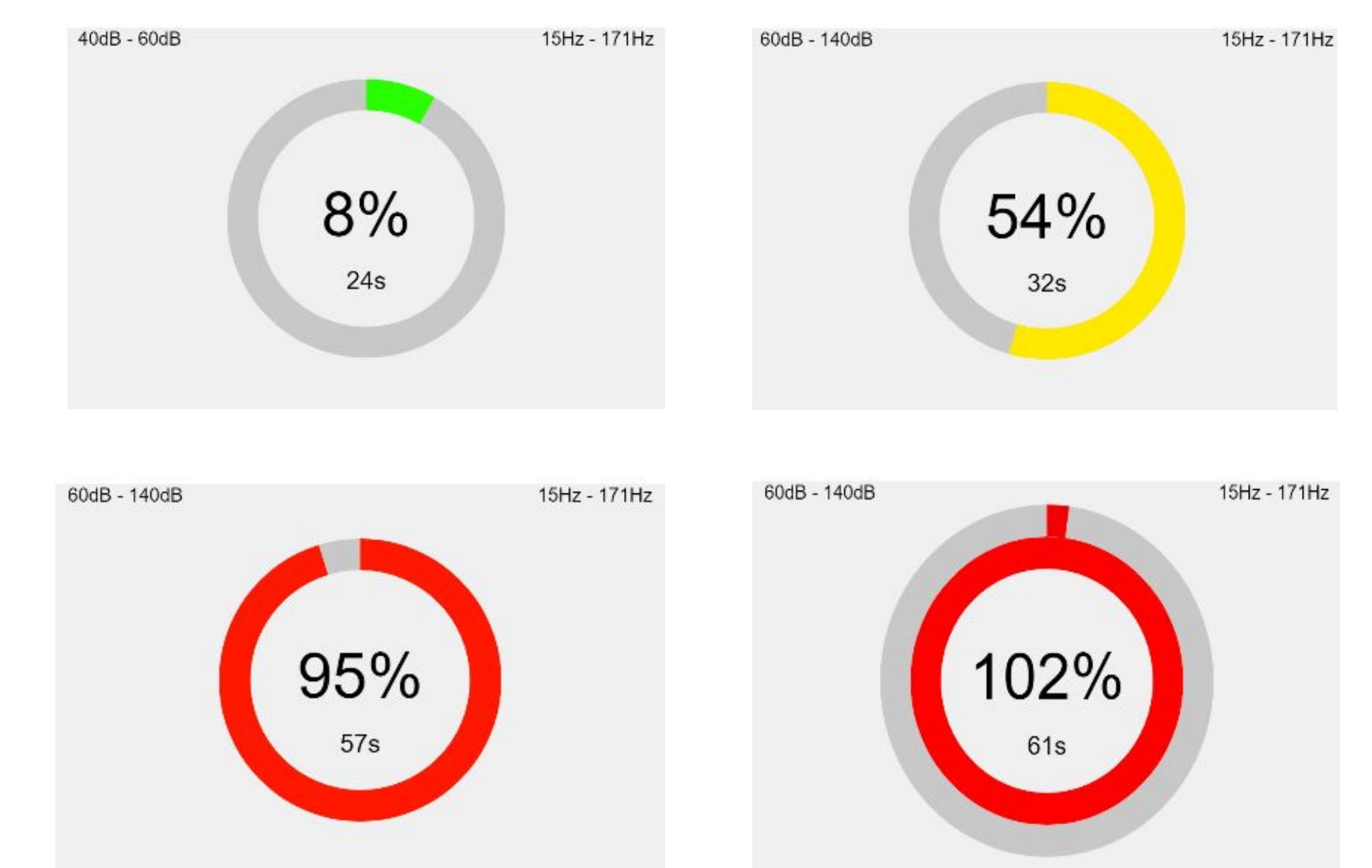
We also planned on integrating a simple mail transfer protocol to connect user accounts to their emails in the likely case that a user wants to collect data from their recording sessions for research purposes.

Dashboard

The dashboard includes visuals that display information about the sound energy being collected that can be easily understood at a glance. The first diagram is an equalizer that displays the overall sound being collected by the mic. This display is used to quickly see if the sound being played is too loud at certain frequencies.



It also uses a collection of dial graphs that show how much sound at certain frequency and decibel ranges you have listened to, and how much more you can safely listen to. These displays have a percentage in the center that show how much sound you have been exposed to already out of the amount that can safely be heard. When the display reaches 100%, it becomes unsafe to continue being exposed to sounds in the same frequency and decibel band.



References

- <https://p5js.org/reference/>
- <https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference>
- <https://developer.mozilla.org/en-US/docs/Web/HTML/Reference>
- <https://developer.mozilla.org/en-US/docs/Web/CSS/Reference>
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