Runner's Earphones: Custom-Fit Audio System with Intelligent Noise Selection
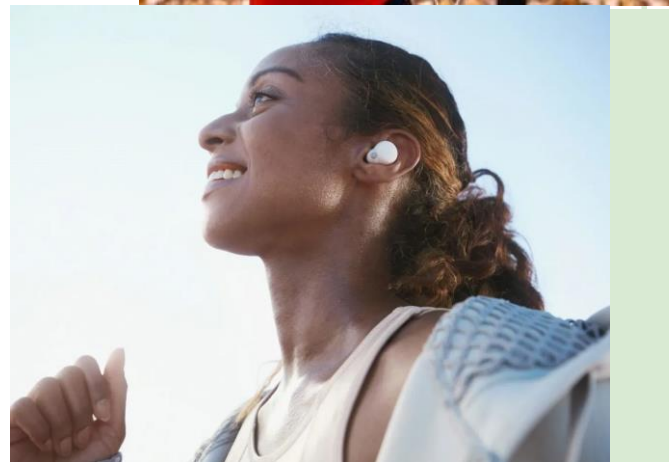
Arabella
Hunter
Ava
Zain
Ari

We propose a **smart earbud design and customization platform** that combines:
- **User-designed earbuds** (style, color, finish, theme)
- **Personalized fit** using future ear scanning
- **Intelligent sound awareness** using machine learning

The system allows users to design earbuds that are not only personal and comfortable, but also **aware of their surroundings**.

This project moves beyond aesthetics and sound quality by prioritizing:
- **User safety**
- **Personalization**
- **Human-centered AI**

It demonstrates how **machine learning, design, and hardware concepts** can work together to create smarter consumer technology.

Current Layout

Future Layout
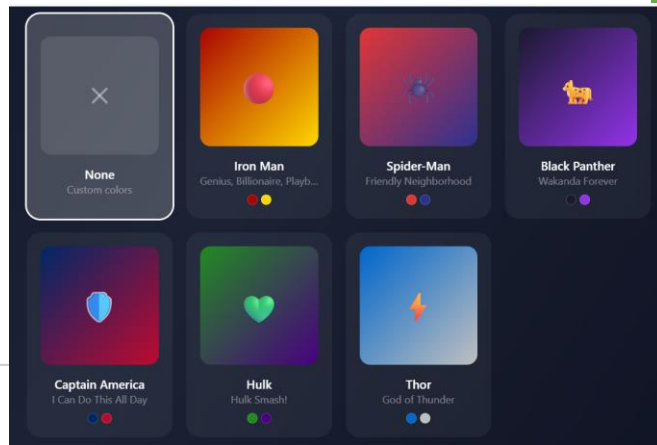
Detecting the Alarm

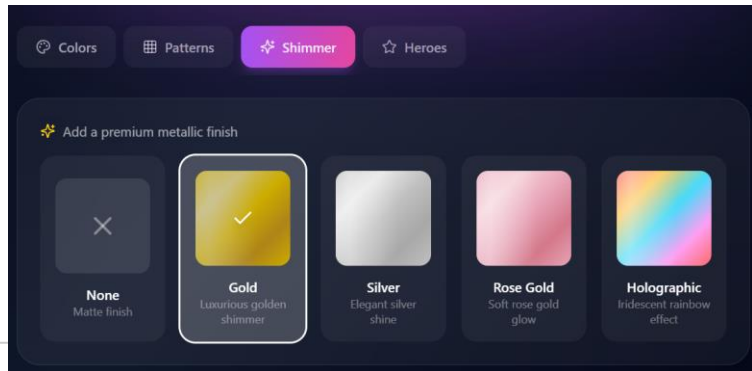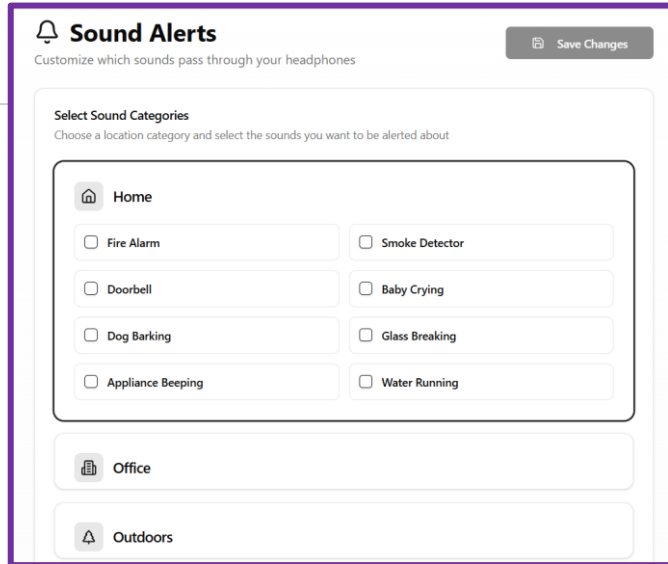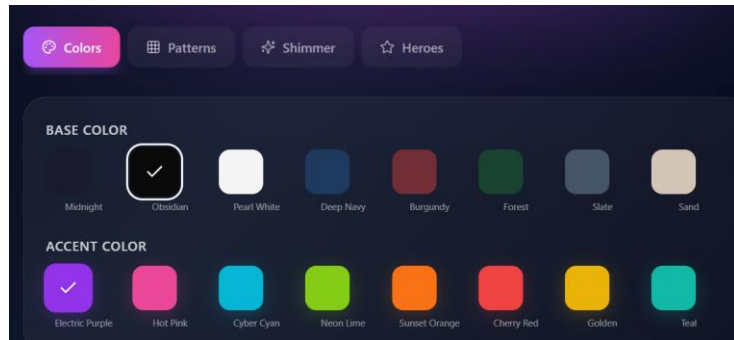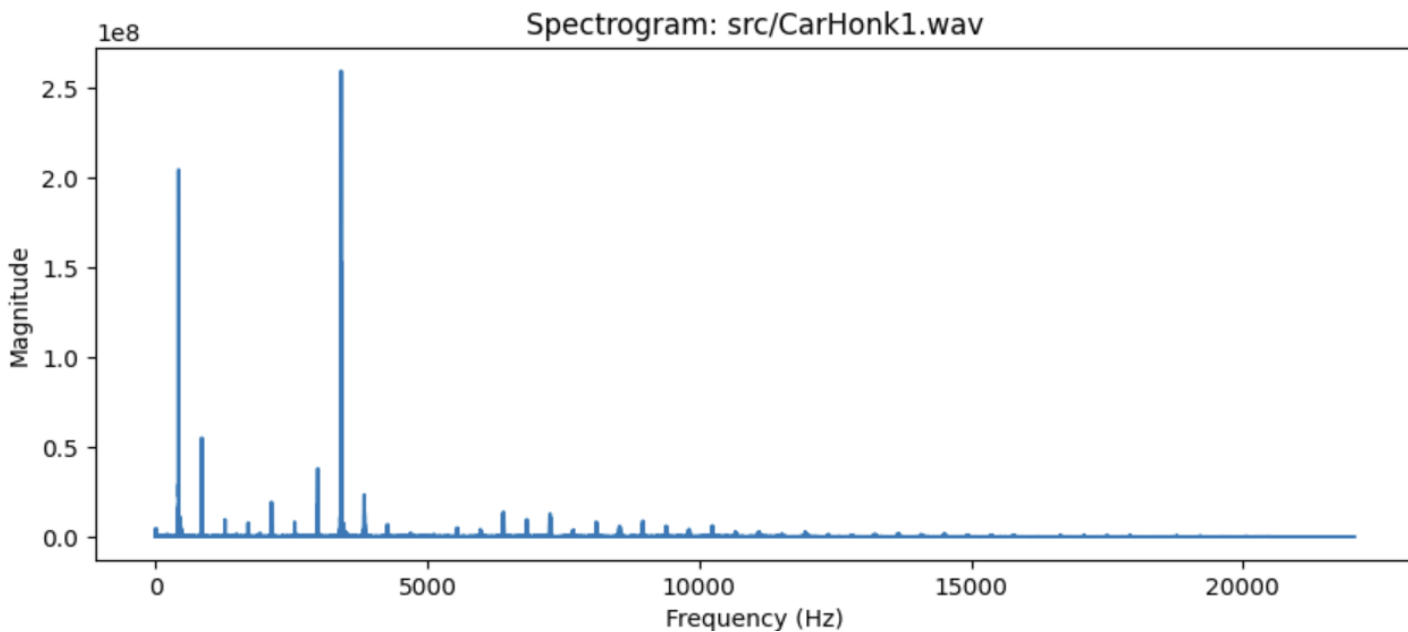- Utilize SciPy to take the Fast Fourier Transform of the received audio
- Break the frequency spectrum into chunks of 500 Hz
- Compare the amplitudes of each chunk to the sample audio for a car horn
- If frequency range is similar, then car horn is detected

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Detecting the Alarm

Spectrogram: src/CarHonk1.wav

Thank You!
Questions?

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