Mauricio Vicente Villa
Deep Dive Coding
IoT Cohort 2
19 - August - 2020

Capstone Final Product Proposition

Introduction

For the enhancement of safety in both the commercial, and industrial sectors, I will be building a modular safety system that utilizes sensor packages that can be linked together in any configuration to create an array of sensors for detecting unsafe conditions. Utilizing bone conduction transducers and op amps, the data for these sensors will be linked to sound packages that will be exported to the headset to alert the user of unsafe conditions.

Use Cases

Use in an industrial environment would be extended to, but not limited to, using a wearable band around the skull and having the transducers touch a point with a low concentration of flesh. This would not compromise a workers ability to wear appropriate safety gear such as, but not limited to, helmets, hard hats, goggles, glasses, respirators, and ear protection. With the high noise pollution that comes with working in an industrial environment, relaying information in the form of auditory inputs is unreliable without compromising ear protection. Utilizing bone conduction transducers eliminates that hurdle and provides a safe, efficient, and cost effective way to ensure workers health.

In the commercial sector we find use cases in any situation where audio input may be required in a noise polluted area. In cases of people who may work with power tools and heavy machinery, that may enjoy listening to music would find this product helpful and even necessary to have the entertainment they desire without compromising ear protection. Those who enjoy sport shooting would find use in this greatly as it would allow clear communication between users without the debilitating consequences of removing ear protection.

Use is not limited to looping warning messages though. Communication with a supervisor through RF signals and a walkie-talkie module are available as well. Providing clear instruction is hazardous work is vital to the health of the worker, as well as the productivity of the company.

Modular Packages

Modulation of the available sensor packages lets the consumer piece together whatever modules they see fit for their environment. For instance, a chemical plant may want air quality reading, temperature readings, and pressure reading, allowing them to only purchase those required modules. If a mine were to purchase modules they may include dust sensors, air quality sensors, temperature and pressure sensors in their order to ensure that workers only enter high dust pollution areas with respirators. Audio feedback directly to the worker includes a warning message that plays on a loop until the worker acknowledges they are in a dangerous situation with the module.

Mauricio Vicente Villa
Deep Dive Coding
IoT Cohort 2
19 - August - 2020