WAVECHECK

RIDE THAT WAVE

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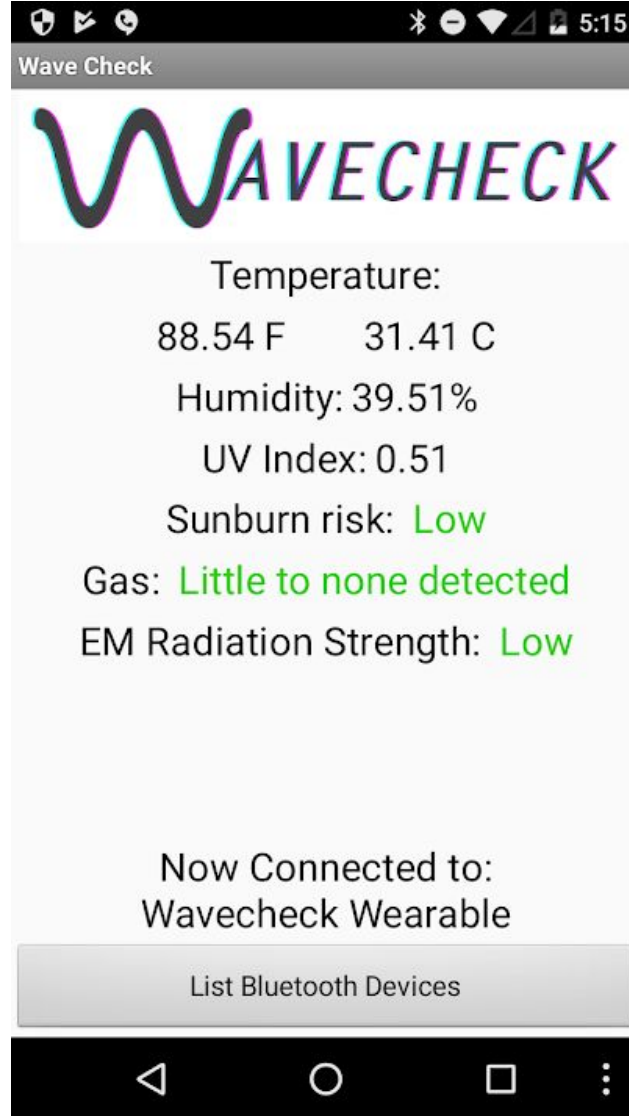
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PROBLEM AND SOLUTION

Problem

Upon being challenged to ask ourselves "What If...? ," ByteSize Cookies, realizing that summer is just around the corner, wanted to create a product that makes it easy for people to avoid the burns and health hazards of being in the hot summer sun. 1 in 40 people are expected to get some form of melanoma in the US. With the environment rapidly changing and the ozone layer depleting, people are often unaware of how much sun their skin is actually exposed to. People are oblivious to the strength of the sun, the power of the UV index, and how long they should actually be exposed to the sun. So, *what if* there was a way to make it easy for people to be aware of the harmful radiation of the sun and actually help prevent it? That's where Wavecheck comes in.

Solution

Wavecheck, currently, is a portable-sized box that is paired with an app that when prompted to, through a mobile app created with App Inventor, will use an Arduino Metro Mini with an ATmega328 processing chip to connect to 4 sensors. The first sensor is a VEML 6075 sensor that will detect UVA and UVB to calculate the UV index. The second sensor is a SI7021 sensor that will detect humidity and temperature. The third sensor is called the MiCS5524 which will detect the amounts of different gases in the air. The fourth sensor is one created by our team to detect voltage which in turn detects electromagnetic radiation. Once the processing chip connects to the 4 sensors, the chip sends all the data, through the bluetooth channel, to the user interface which will display all the data collected in a reading. The reading will include the UV index, temperature, sunburn risk, percent humidity, amount of different gases, amount of electromagnetic radiation, and instructions on how to be safe in the sun that day in regards to your location. The combined functions of the box and the paired-app will educate the users of how to prevent the harmful effects of the sun. With further funding, we also have plans to turn the box into a wearable device and expand the function to detect not only UV radiation, but gamma and x-ray radiation.

This is a screenshot of the Wavecheck App which shows the user the temperature, % humidity, UV Index, risk of sunburn rating, amount of gas in the air, and electromagnetic radiation strength.

RESEARCH: The Competition

Extensive research was conducted on innovations similar to Wavecheck, but these products were proven to be not as sufficient.

Electromagnetic Detector EMF (on the app store):
Features Included:
- Reading and warning of electromagnetic radiation around the user
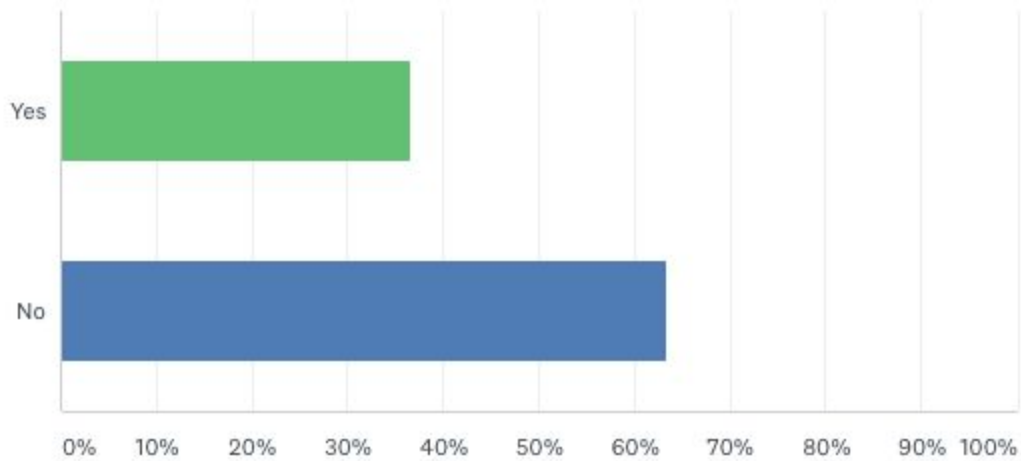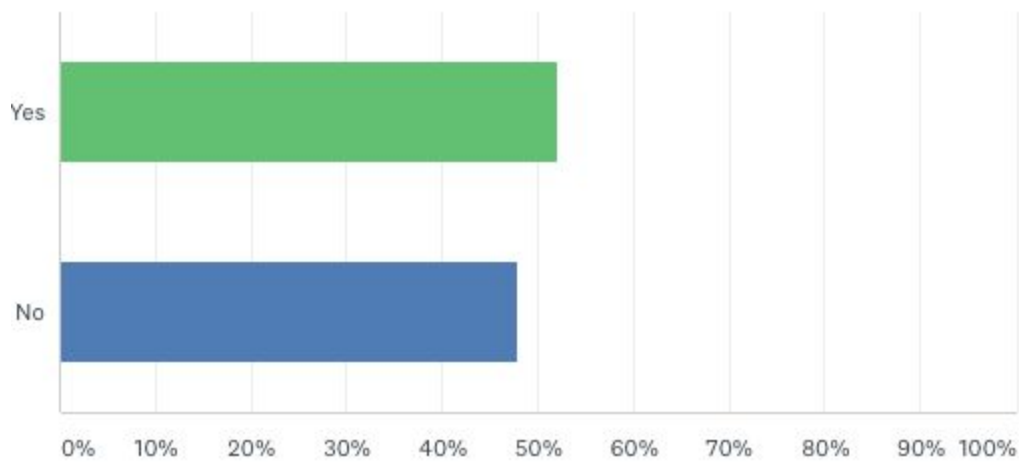- uses beeping signal to warn user of dangerous EMF levels

Features Lacking:
- does not have paired wearable for user, which suggests a possible flaw in accuracy
- does not specify what kind of EMF waves are being detected
- does not include tips on how to be safe

Almost all the other apps we researched had the same features as Electromagnetic Detector EMF app. They were all lacking the wearable that users can wear in their day to day activities. Here at Wavecheck, we used Arduino hardware paired with an ATmega328 processing chip to create a convenient, wearable device that helps alert AND educate the users about the safety of the electromagnetic radiation surrounding them.

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RESEARCH: Our Survey

We conducted a survey to collect data on people's concern about the electromagnetic radiation surrounding them in their everyday lives. Of the 113 people that answered the survey, 52% responded that they are concerned about their health in regards to electromagnetic radiation. In a follow up question, 36% of people said they would take advantage of a product that alerted and educated them on the electromagnetic radiation in their environment.

About Wavecheck

To answer the Skills21 expo's question of "What If?", Byte Sized Cookies looked to dig deeper into bringing the public closer to science. In researching, we discovered how dangerous how common radiation caused medical issues are. We've identified that UV overexposure is one of the greatest sources of preventable health conditions, and that there are easy and accessible ways to prevent said conditions by improving public awareness through the use of technology and computer science. Thus, we asked ourselves "What if detecting radiation was just as easy as going on Facebook?"

REFERENCES

Bello, Jorge Gregorio Martin. "Electromagnetic Detector EMF." *App Store*, 2 Aug. 2014,

itunes.apple.com/us/app/electromagnetic-detector-emf/id836603095?mt=8.