Be in charge of the situation with

Chargeable Charms!

The fashion statement that could power your phone or other electronic devices through energy produced as vibrations from speaking and movement.

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The Problem:

When your phone or electronic device dies, so does your connection with family, friends, and even emergency contacts. Without this connection, catastrophic situations could arise leaving no possible way to get help. A majority of women are frightened to walk streets alone, especially at night. The threat of being robbed, abused, or worse hinders the travel of many. Serious injuries or even death might occur in cases where phones die and their chargers or an outlet cannot be accessed. This problem should be solved because staying in touch is vital to safety when detrimental circumstances surface.

Background Research:

A vibration harvester uses vibrations which produce mechanical energy. Through electromagnetic or piezoelectric methods, the mechanical energy will generate electrical energy. One portable charger already created using a form of vibration harvester is a pair of shoes developed by the University of Wisconsin. The shoes harvest the vibrations made from walking. This energy usually gets wasted to heat, but in these shoes it is stored and used to power electronic devices. This could be improved by making it more cost effective, smaller, and easier to use. Integrating waterproof and more durable material would be a necessity for an improvement.

Requirements:

The energy harvesting instrument must be sturdy enough for daily wear-and-tear without deteriorating. The product needs to be water-resistant, so it can become wet and not short out. The design should remain simple and cost-effective; therefore, it must be versatile enough to be worn with any outfit on anyone. The materials needed would include the following: stainless steel, a piezoelectric transducer, a circuit, a battery, a USB Type C to a micro B cable/ thunderbolt to micro B cable, and a piezoelectric material. The stainless steel is a well-known material that is waterproof and durable. A piezoelectric material such as Quartz or Topaz is required to have the energy flow through them while making the device look fashionable. A piezoelectric transducer is needed to take the electrical energy from the vibrations, send the electricity to the circuit, and then store it in a battery to power the phone through the USB Type C to a micro B cable/ thunderbolt to micro B cable.

Costs:

It would cost roughly $46.50 to build the instrument. The stainless steel would cost $5.50, the piezoelectric transducer would cost $7.00, a circuit would cost $15.00, a storage battery would cost $6.00, the USB Type C to a micro B cable/ thunderbolt to micro B cable would cost $7.00, and the piezoelectric material would cost $6.00 ($0.25 per carat). The instrument would be sold for $ 99.99 plus tax in order to make a decent profit, pay workers, and cover production costs. The money would be obtained through various grants and pre-sales of the product. For an additional cost of $5.00, the jewelry could be engraved with the buyer's initials.

The Solution:

The device would be an electronic device charger that doubles as jewelry. The jewelry harvester would capture the amplitude of vibrations. It could be circuited like in mobile chargers; however, this device would be powered by vibrations created from talking and movement. Electrical energy from vibrations would be fed into a crystal to make it oscillate. In turn the electricity would move through a circuit and then be stored in a battery for later use. The instrument could come in necklaces and bracelets. The necklaces would harvest vibrations from speaking, while the bracelet would collect vibrations from the hand and wrist movement. The bracelet would be more popular because it is smaller and people who use sign language can charge their phones without needing vocal vibrations.

Prototype Solution:

The Necklace Design!

The necklace has a built-in piezoelectric transducer that vibrates as you talk, sending electricity to a circuit, which then stores it in a battery to use on electronic devices. The necklace design would be a locket to protect the electronics. The interior would hold the piezoelectric transducer, the circuit, battery, and the USB Type C to a micro B cable/ thunderbolt to micro B cable.

Prototype Solution Continued:

The bracelet has a built-in piezoelectric transducer that vibrates as you move your wrist and hand, sending electricity to a circuit, which then stores it in a battery to use on electronic devices. The bracelet design would be a locket to protect the electronics. The interior would hold the piezoelectric transducer, the circuit, battery, and the USB Type C to a micro B cable/ thunderbolt to micro B cable.

The Bracelet Design!

Prototype Solution Continued:

The jewelry would come in different colors, materials, and styles; this way everyone could find their own fashion taste. These unique designs would cost more than the original design to maximise profits and cover additional charges.

Testing And Improving The Solution:

A problem that might occur would be the dimensions of the jewelry. It would require minute circuits to fit in the design.

An improvement that could be made would be adding a panic button that would make a loud constant noise to scare off the attacker, alert local authorities, and ultimately ensure the wearer's safety. Eventually this technology could be minimized to fit in the size of a ring. This advancement would mainly be used by people who type, work with their hands, or speak sign language.

This invention would mainly be used for charging electronic devices to help better maintain the connection with authorities for protection in dire situations. It could be used to help the military to power their devices when they are without electricity. Another use for this technology would be to bring an unlimited energy supply to developing nations. This would help them to cut back on wasted energy and save them money to use elsewhere.

Citations:

"Power Walk: Footsteps Could Charge Mobile Electronics." *News*, news.wisc.edu/power-walk-footsteps-could-charge-mobile-electronics/.

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