

Phineus Sensor System

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Statistics:

- Visual impairment is one of the world's most common physical disabilities
- Color blindness, to low vision and perception to losing the ability to see at all
- 3.2% of the population have some sort of visual disability (800000 people)

Our Goal:

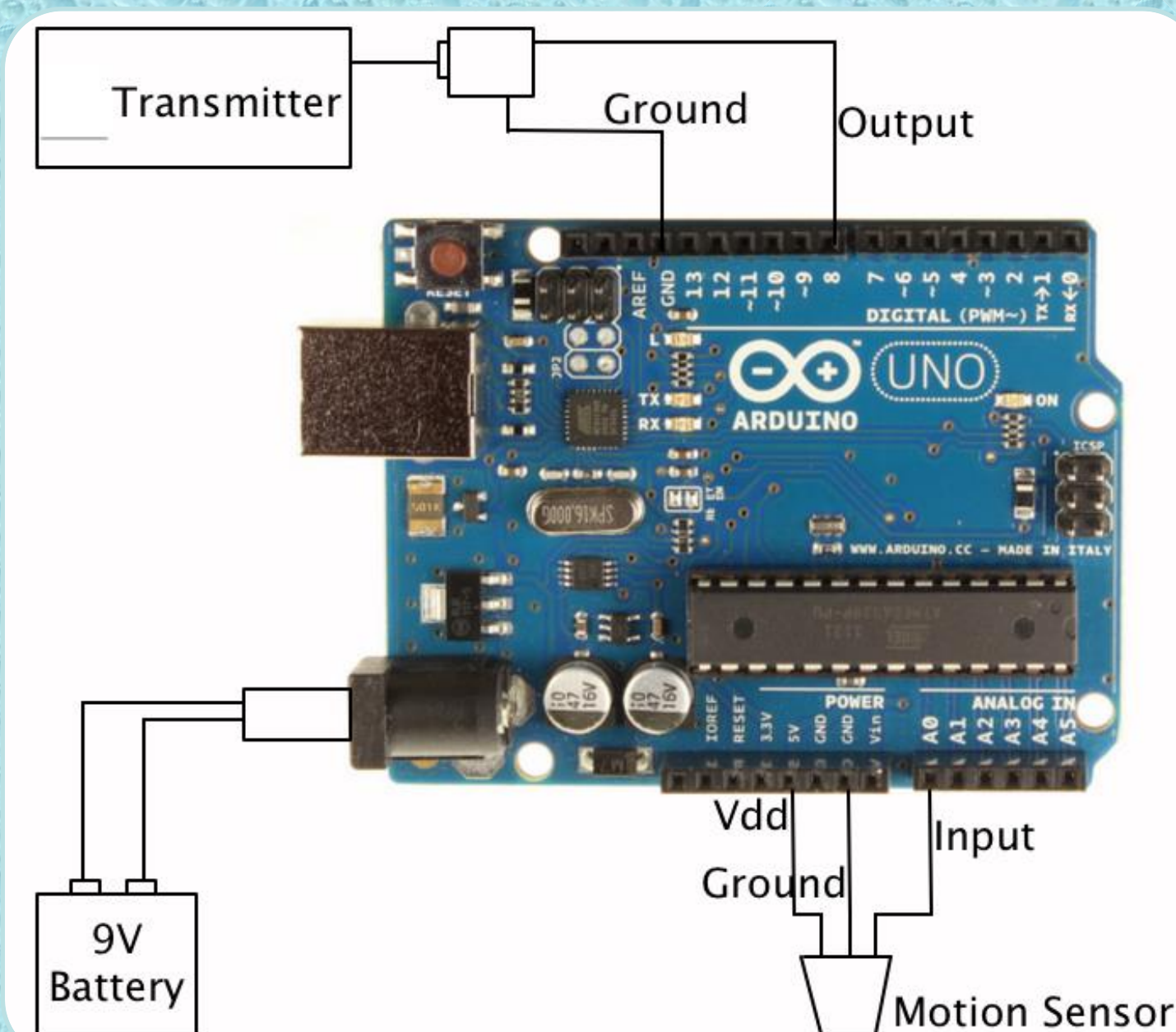
To create a device that can increase the accessibility of everyday life for the visually impaired will undoubtedly assist them in overcoming adversity in their daily lives and therefore allow them to live and act more independently.

Objectives & Constraints:

- **Safe:**
The product's electrical components must be safe and shielded from any sources of current that can cause injury
- **Reliable:**
Reliability must be maximized to ensure that it does not fail when the user is reliant on the product (must be waterproof, and durable)
- **Marketable:**
The product must have marketability for real life applications thus a reasonable cost is needed to allow for profit and implementation
- **Simple to use:**
Simplicity is required for the product to be user friendly
- **Versatile:**
The product must be versatile so it can be applied to more than one purpose and be a general solution to the problem definition
- The prototype must be less than 50 cm X 50 cm X 50 cm in size, less than \$400 in total cost, have a mass less than 10 kg, and use no more than 100W of power

Evaluation:

Objectives	Weight	Sensor Belt	GPS Walking Dog Leash	Braille Spice Rack	Voice Activated Calculator	Swimming Lane Sensors
Affordable	0.098	0	0	2	1	-1
Effective	0.196	1	2	1	1	2
Safe	0.226	1	2	1	1	1
Reliable	0.196	0	1	1	1	1
Marketable	0.069	1	0	1	2	2
Durable	0.147	0	1	1	1	2
Energy Efficient	0.069	0	0	1	1	1
Total		0.491	1.187	1.098	1.069	1.217



Final Design Description:

- Allows people who have visual impairments to perform various exercises (Ex. swimming & running)
- Motion sensor detects when the user is approaching the end of their lane
- When the sensor is triggered, a tone is played and transmitted using an Bluetooth signal
- An Bluetooth receiving device plays the tone to the user so they know when to turn around

Transmitter:

- Arduino Uno Microprocessor
- Sonar Sensor
- CARLON Outdoor Weatherproof FSE Single Gang PVC Device Box – 1/2 In
- Bluetooth Transmitter
- 9 Volt Battery

Receiver:

- Bluetooth wireless headphones



Prototype Cost:

- Transmitter:**
 - Electronics Shop: \$54.72
 - Purchased Material: \$41.45
- Receiver:**
 - Purchased Materials: \$48.50

Total Value of Prototype Parts: \$144.37
Estimated Market Cost: \$100

Applications:

- **Personal applications:** Those who are blind are able to keep fit through home use of the system, training can be achieved to reach maximum efficiency when swimming.
- **Paralympics:** The current method for enabling blind swimming at a competitive level is unreliable, this system can easily be modified to run at a competitive.
- **Other sports:** The system can be modified to function on dry land making the system usable for sporting activities such as track and field.



Improvements to the System:

- **Headphones:** The system is customizable and can be modified by changing the audio components tailoring to color, comfort, and quality.
- A small external nob or screen function could be added the model and connected to make the systems sensor function adjustable, so that the delay rate could be modified.
- **Locking Device:** Creating a device that locks the sensors into the deck when needed.