SONAR GLOVE FOR THE VISUALLY IMPAIRED

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(/member/DavidDrones/)
By **DavidDrones (/member/DavidDrones/)**
Speed Dash! (https://play.google.com/store/apps/details?id=com.MacroBytes.DiamondDash&hl=en)

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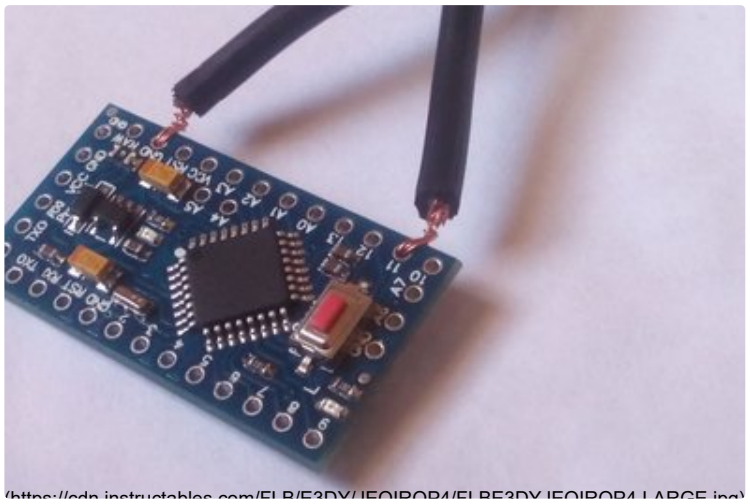
About: I'm a drone inventor, a web designer, an app developer, a computer coder, and a science enthusiast who strives to make life easier with technology. More About DavidDrones » (/member/DavidDrones/)

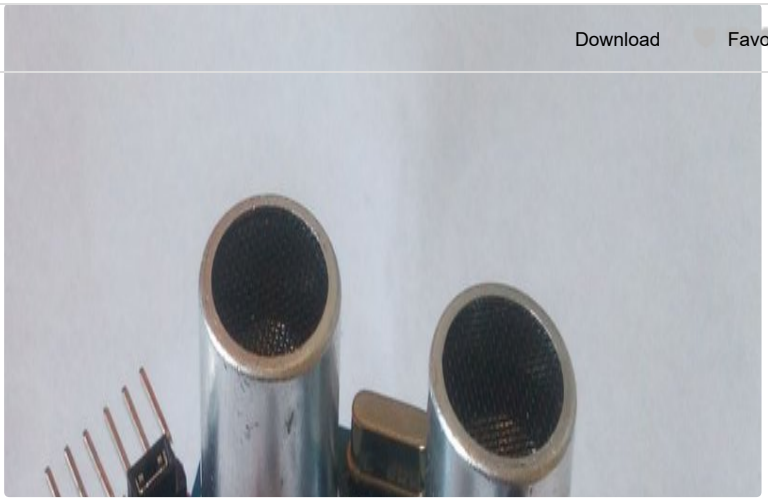
With minimal practise, this device is capable of greatly aiding someone visually impaired have a sense of their surroundings. The glove has a longer range than a cane and is able to detect obstacles like cars, people, walls, and trees. It will greatly aid in mobility and positional awareness.

The Sonar Glove is a compact, hand held sonar device similar to that on a large watercraft. Using the on-board ultrasonic sensor, it detects the nearest object from the user and alters the frequency of a beeping noise accordingly so the user may gauge the distance of obstacles around them.

Our hearts and talents go out to the disabled as we keep improving technology to make their life easier. This project was solely created for that purpose.

Step 1: The Hardware





An Arduino Pro Mini was used for the on-board logic due to its shear compact size and flexibility with power sources (between 3.3 and 12 volts DC)

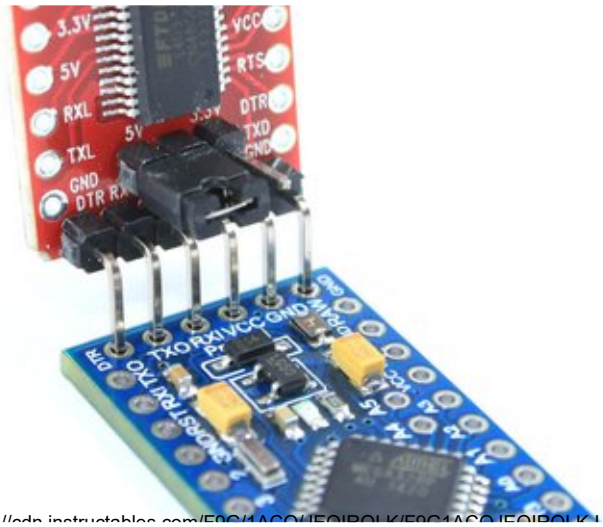
The HC-SR04 ultrasonic sensor was used here. Now, this sensor was less that desirable because it glitched occasionally, only giving accurate readings maybe 95% of the time. Although the price and compactness is unbeatable with this sensor, I recommend using a different one with greater reliability and range.

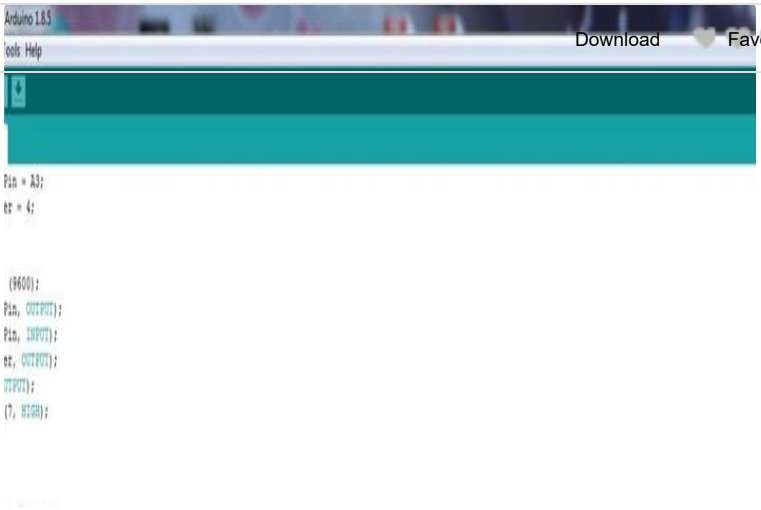
A piezo buzzer is perfect for the sound since the pitch and time between beeps can be altered via the Pro Mini.

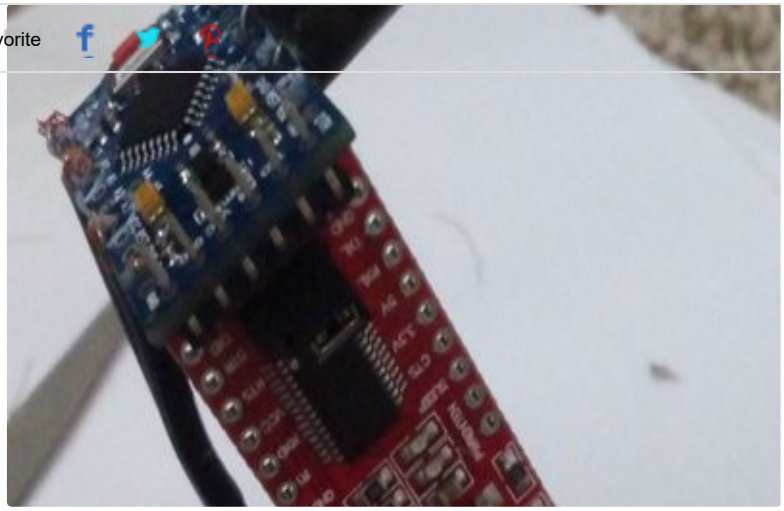
You will also need a FT232RL USB programmer to program the Arduino Pro Mini, a simple woollen glove to mount the components onto, and some wires for the connections.

Any DC power source would suffice as long as its compact and between 3.3V and 12V.

Step 2: Uploading the Software







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You will first have to download the Arduino IDE.

You also need to download the FTDI driver here (http://www.ftdichip.com/Drivers/VCP.htm). After clicking on the link, scroll down a little. In the "comments" column in the table, download the executable setup for your specific operating system. Then run the executable.

Next assure the FTDI programmer's voltage matches the make of the Pro Mini (whether it is 3.3V or 5V) by adjusting the binding connector in the center of the board. Then simply insert the FTDI pins into the Pro Mini (see the pictures). Connect the FTDI programmer to your PC via a USB cable.

Then open the .ino file attached to this instructable. In the IDE, select the Pro Mini as the type of chip you are using in the menu bar under "tools". Then upload the program by selecting the arrow icon on the top left.

You may need to calibrate the values for the distance in the code.

sketch_nov27a.ino Download (https://cdn.instructables.com/ORIG/FLV/JBGO/JEOIRZ5L/FLVJBGOJEOIRZ5L.ino)

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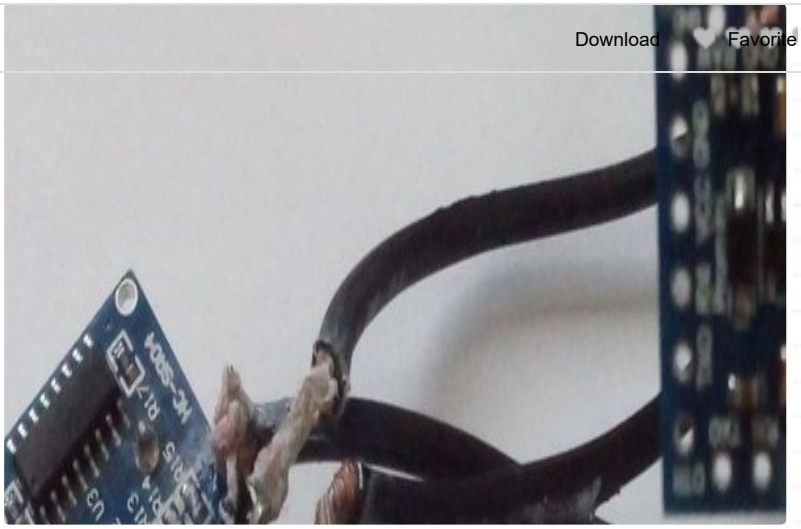
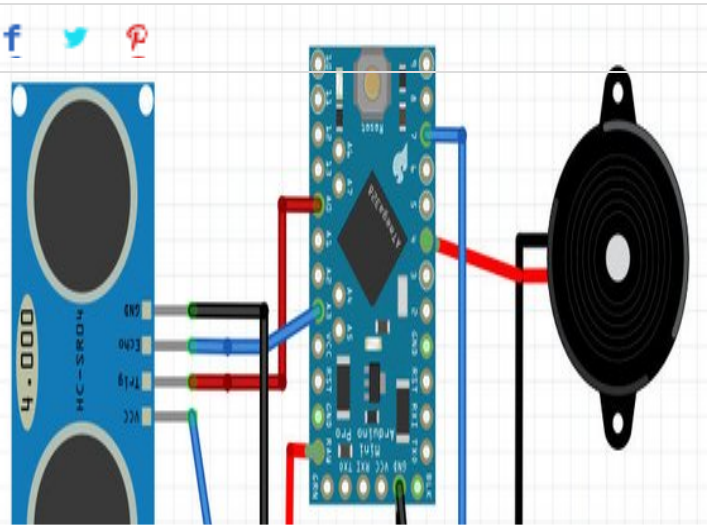
Step 3: Connecting the Hardware





Connect the pins as shown in the diagram above.

Make sure that if you are not using regulated voltage (3.3V or 5V depending on the make of the Pro Mini) you use the RAW pin for the input so the current goes through the on-board voltage regulator.

With glue, I attached the sensor beneath the two center knuckles next to the middle and ring finger. The Pro Mini went under the left side of the wrist. This positioning allows the user to use his hand as the parts don't interfere with the fingers or palm.

Step 4: Testing and Improving

Once powered, your sonar glove should be on and working.

Feel free to adjust and improve on this project in any way as it is 100% open source and free. I hope this project provides some insight or inspiration for any device that my aid the disabled in any way.

Also, don't hesitate to share any improvements or creative ideas in the comment section below.

Thanks for reading!

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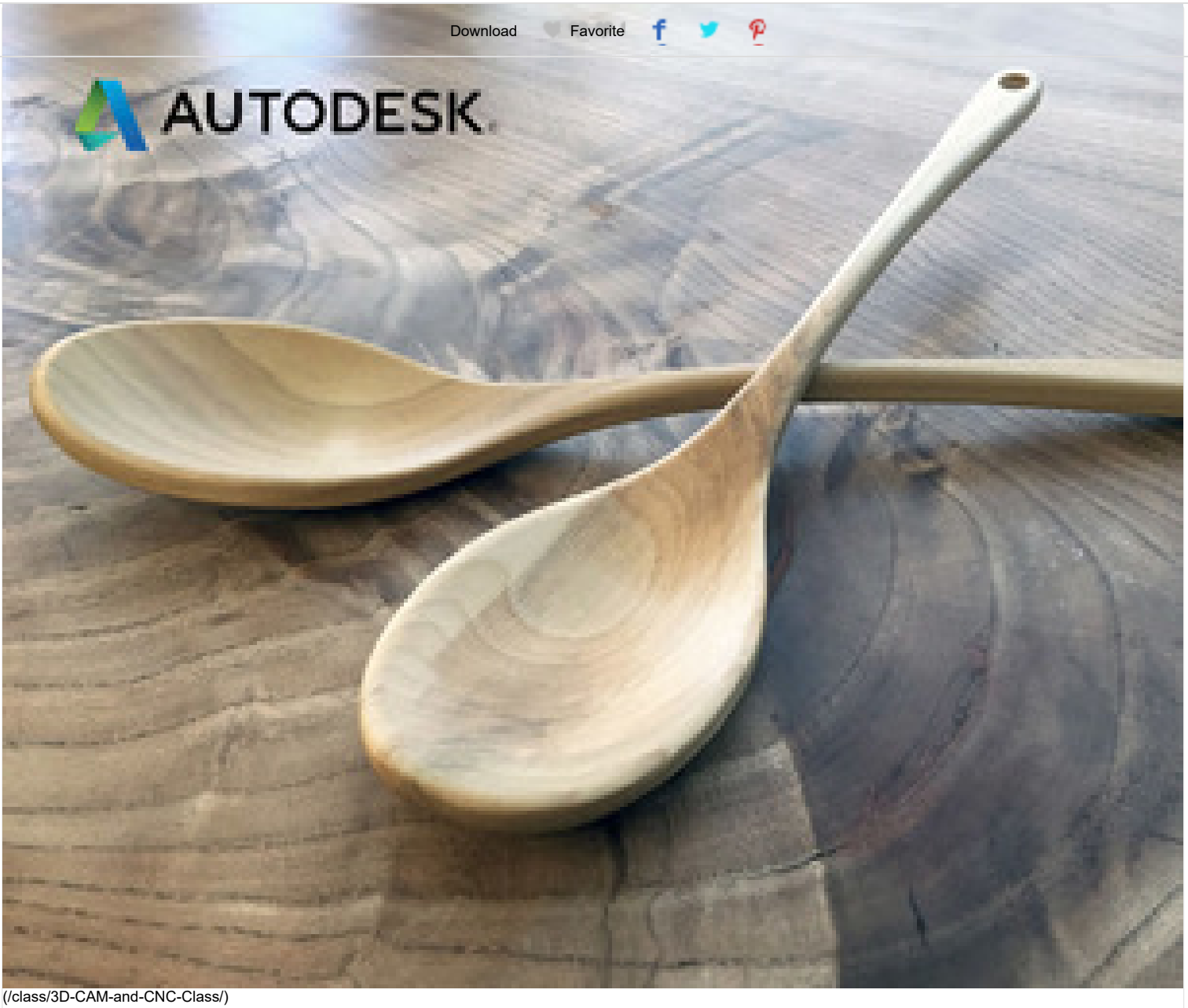

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SiliconsSherwood (/member/SiliconsSherwood/) 27 days ago (/member/SiliconsSherwood/)
Reply

Good idea!
If I had to build one, I think I would replace the buzzer with some kind of vibrator, to have the distance feedback without making constant noises.

rickatt (/member/rickatt/) 27 days ago (/member/rickatt/)
Reply

Good project! I have found that the HC-SR04 works better if you increase some of the delays. i would suggest at least a 100 to 200 ms delay after you read the distance, and increase that 2 ms delay at the start to 10ms. see if that helps.
I would also suggest adding more comments to your sketch, to help explain what you are doing.
Thanks!

Penolopy Bulnick (/member/Penolopy+Bulnick/) 4 weeks ago
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Reply

Sounds like a helpful project! Do you have a video of it being used?

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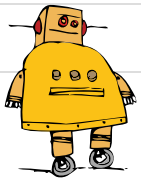

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