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Fesentience

Sensors and feedback modules needed in

Raspberry Pi

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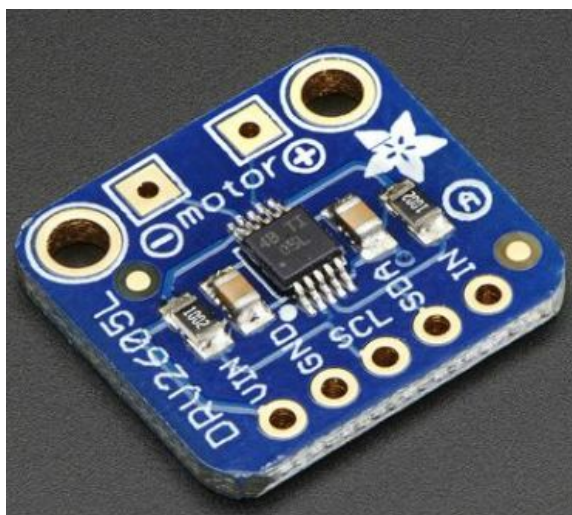
Introduction

Thesis Statement: What sensors and feedback modules are used with Raspberry PI and how do they help in our project?

What is Raspberry Pi? It's a cheap, tiny computer that can be plugged into a computer monitor or TV. It also uses a standard keyboard and mouse. This capable little device enables people to explore computing and to learn how to program in Python, a programming language. It can do everything a desktop computer is expected to do. [6] There are sensors and feedback modules that are used in Raspberry PI. Some of them are haptics, speakers, inflatable lungs, power sockets, and radio controlled outlets. These are some of the multiple parts that help make our project functional with Raspberry Pi.

Haptics

Haptics originally came from the word haptic which relates to the sense of touch, in particular relating to the perception and manipulation of objects using the senses of touch and proprioception. According to Pimoroni, there is a useful motor called the Adafruit DRV2605L Haptic Motor Controller that costs \$9.92. [2] As of February 19, 2018, there are 3 left in stock. It's designed for controlling haptic motors. Not only it can turn those kinds of motors on and off, but this driver has the ability to have various *effects*. For example, ramping the vibration level up and down, 'click' effects, different buzzer levels, or even having the vibration follow a musical/audio input. This chip is controlled over I2C - after initialization, a 'string' of multiple effects can be strung together in the chips memory and then triggered to actuate in a row. The built in effects are much much nicer than just 'on' and 'off' and will make your haptic project way nicer feeling. [2] An example of its use is in the case of BackMap. It helps people who are visually impaired navigate cities and indoor areas. [4] It works by vibrating based on whether they should turn right or left. A haptic like this can be very useful for our project.



Speakers

Since our project is life-like based, speakers are necessary to make it fully functioning. It needs to project pre-recorded sounds that accommodates to the baby. With a certain set of algorithms, our project can say things like “Come to mommy” and other phrases that are typically stated. For example, here is an USB Powered Speakers by Adafruit that is only \$9.95 with 35 in stock as of February 20, 2018. Since it has a USB, it can be connected to a computer which may be very useful to the project. That is assuming the computer has pre-recorded voices made, uploaded, or downloaded. A suggested place to put the speakers can be placed closer to the head.



<https://www.adafruit.com/product/1363>

Inflatable lung

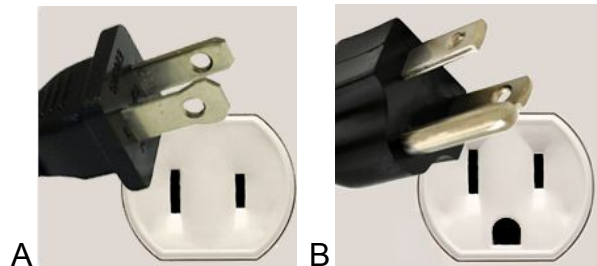
An inflatable lung is necessary to make our project work once incorporated with the rest of the components. Fisher Scientific has a \$295 BioQuest™ Inflatable Lungs Kit that is designed to be as close to life-like as possible (there is a visual below). [3] It demonstrates that real lungs are not like rubber balloons in a bell jar and the touch and feel of a lung that is very similar to a human lung. It includes a pump that inflates and deflates the lungs. It is suitable to our project once there is a realistic way to make everything else arranged in the most life-like manner. For example, putting the lungs inside a bag or a backpack, in this case representing the main body. Also, the pump can be ran by a certain set of algorithms allowing it to function like a normal human lung.



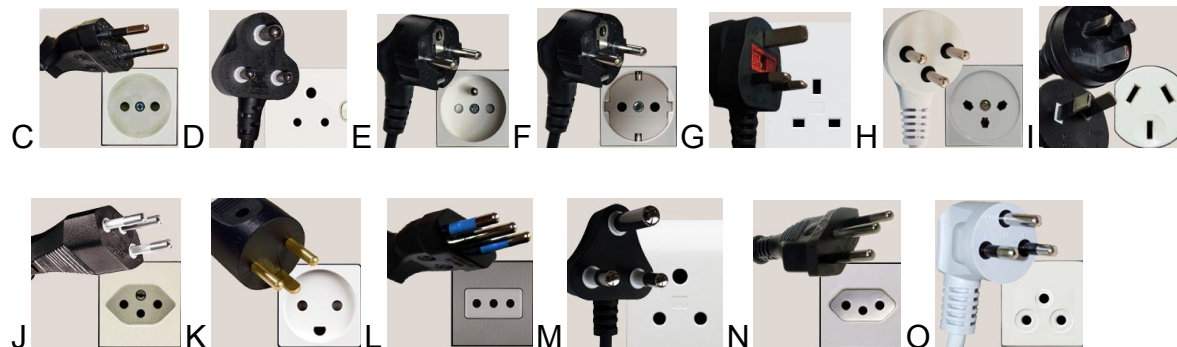
<https://www.fishersci.com/shop/products/bioquest-inflatable-lungs-kit-inflatable-lungs-kit/s801131>

Power sockets

Our project is going to need an outlet to work properly. Fortunately, there are 15 different types of power sockets (plugs) used all around the world labeled in alphabetical order. [5] The United States uses Type A and B which is going to be used to power our main project and here is a visual.



The other Types from C-O are irrelevant as of right now but here is a visual of each one:



All pictures on page 7 come from this source which includes a brief set of basic facts of each Type:

<https://www.worldstandards.eu/electricity/plugs-and-sockets/>

Radio controlled outlets

According to Safewise, there are 6 useful remote controlled outlets that can be incorporated in our project. The average price of all six is between \$30-\$50. [1] As stated before, our project is going to need an outlet to work properly. With technology constantly advancing, outlets have also changed. Our project is going to need multiple outlets for it to work.

1. Insteon On/Off Outlet

Pros

- Unique
- The upper and lower outlets can be controlled independently—there's no need to purchase two Insteon outlets to control two electronic devices.
- Smartphone app included.

Cons

- Device must be hardwired into the wall
- Doesn't rank high on the user-friendly scale.

2. D-Link Wi-Fi Smart Plug

Pros

- D-Link app connects with a smart plug has an extensive list of features including the ability to monitor a user's home's energy usage and see how much power each connected device consumes.

Cons

- Several reviewers note that the setup can be difficult.
- Wi-Fi connection can be unreliable.

3. Quirky Outlink Smart Remote Outlet

Pros

- Outlink offers energy monitoring through its connected app.
- Outlink takes a step further and lets users set a monthly energy usage budget.
- When a user's limit is reached, the user can schedule Outlink to turn off connected electronics and conserve energy.
- Designed for more versatile appliance control

Cons

- Only the top outlet on the Outlink is a smart plug.
- The bottom outlet is a traditional plug.
- Limits the number of devices you can connect.

4. Caséta Wireless Lutron Smart Plug

Pros

- Includes a lamp dimmer.
- Lights can be turned on or off and raise or lower them to adjust brightness manually on the plug or through the connected app.

Cons

- This plug doesn't work with any electronic devices—just lamps.

5. Etekcity Wireless Remote Control Electrical Outlet Switch

Pros

- Relies on a remote control to turn electronic devices on or off from as far away as 100 feet.
- Can activate multiple devices with one remote or control one device with multiple remotes.

Cons

- Least-sophisticated remote control outlet of the bunch
- Doesn't connect with an app or allow users to remotely control devices beyond turning them on and off.

6. Belkin WeMo Switch

Pros

- Works anywhere you have an internet, 3G, or 4G connection.
- Even if the Wi-Fi is down, it can still control a user's plugged in appliances if they desire to have an internet connection.

Cons

- Bulky
- Only offers only a single plug.
- Due to the size, most outlets won't fit two Wemo Switches.
- If desired to connect multiple devices, they have to be spread throughout the room on different outlets.

Conclusion

Thesis Statement: What sensors and feedback modules are used with Raspberry Pi and how do they help in our project?

Raspberry Pi, with the help of some of the sensors and feedback modules that are used in it make it work the way it does. This little device, with the capability to do everything a desktop computer is expected to do, enables people to explore computing and to learn how to program in Python. Here is a recap of some of the sensors and feedback modules that are used: haptics, speakers, inflatable lungs, power sockets, and radio controlled outlets. With these components, Raspberry Pi can work the way it was intended to and help make our project functional.

Citations

Works Cited (APA)*

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