Project Progress Report
1) Backpack Lever Arm System
2) Shampoo-Conditioner Identification Device
Week 6
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1) Backpack Lever Arm System

Work Completed
This week, the team progressed on two different components of the project. In addition to designing an electrical circuit (to interface the PIC16F877 with the two servo motors), we were able to physically make and assemble parts of our system. Based on a schematic to run appliances of a PIC (and Prof. Fox’s ICD circuit), my teammate and I worked to design and build a circuit to run the two servo motors. Currently, its design is still being worked on. Its main features include a switch to control the On/Off (subsequently Forward Movement/Reverse Movement) of the Backpack Lever Arm System. In addition, there is a normally open push-button to reset the PIC if necessary. This will not be pressed, unless there is a major problem with the PIC and its memory needs to be erased.
However, I am still trying to get a sinusoidal output from the two oscillator pins (CCP modules) for my PWM signal with the desired frequency, but have not been successful in doing so yet with this circuit design. My teammate and I have also been working on a code to test whether all the hardware is working correctly or not. This will be done by connecting a LED to a single location, and varying the frequency of the On/Off switch to see if we can monitor a change in the LED blink frequency.

In addition, the machine shop work was this week’s biggest accomplishment. We were able to mount the first Servo motor (which will enable 270 degree rotation) onto Limb 1 by making a small frame. Also, we made T-shaped aluminum pieces onto which the hinges could be placed. Finally, we made T-nuts (similar to the ones available on the 80/20 website). These can be placed in the grooves of each limb, and can successfully slide along it. By doing this, we were able to connect the arm of the motor to the T-shaped nuts by long screws and test the movement of the Limb 2 (270 degrees) by allowing the motor to rotate.

**Future Work**
So far, in terms of servo movement, we have only been successful in using the Timer (hardware) to create a pulse. I still need to work and program the PIC for PWM output from the CCP1 and CCP2 modules. However, with the new circuit that we have designed (to interface the motors), the entire system is starting to make more sense.

In terms of the mechanics, we still have to mount the second motor (between Limbs 2 and 3), work on making a casing for them, the attachment part to the wheelchair, crossover clamps, and electrical insulation.

**Project Review**
The team is proceeding according the schedule. The development of the code and programming of the PIC is time-consuming, and will need to be expedited.

**Hours Worked: 16**

2) Shampoo-Conditioner Identification Device

**Work Completed**
This week, we focused on ordering parts to prototype the circuit design for our device. Primarily, this involved finding surfboards to mount chips onto, and obtaining the correct speakers for the device. Finally, to insulate the device, my teammate thought of ordering a waterproof iPod case, and a purchase order was carried out for that.
Future Work
Once we finalize the functioning of our circuit on the protoboard, the team will order the PCB. We still need to connect the button, and insulate the electrical components of the design.

Project Review:
This project is on track, as the voice amplifier has already been constructed. In addition, the design of the circuit has been finalized using ExpressPCB. Once its functioning has been verified by a model on the protoboard, we will order the PCB boards. After assembling the circuit, we will mount the button and affix the circuit inside the waterproof case.

Hours Worked: 1