MEDSense: Accessible Pill Dispensing Device- Week 9 Report

**Work Completed**

Hoping to capitalize on the momentum I had last week, I continued to work on the Bluetooth technology. There are two central elements to the project that separate this particular device from all of the other devices on the market. The first element is that our device can cut pills. I was able to control all motors last week and we will be able to test the cutting of pills later this week. Since one major component was finished I wanted to finish the other element. I hoped to be able to send notices from the PIC to the PC so that Chris could then work on a program to send an e-mail. I was able to establish communication between the PIC and the PC but it was not finished.

Since I had never programmed a microcontroller to communicate with a Bluetooth module I wanted to run some sample code so that I could better understand the technology. I programmed the microcontroller with the sample code but I was unable to achieve my goal. In the final version of the device the PIC will send data from the Bluetooth module to a Bluetooth dongle. From the Bluetooth dongle a LabVIEW program will receive the data and ultimately send an e-mail or text message. This will require only a one way communication between the PIC and the PC.

Thus far I have only been able to achieve interaction one way between the PC and the PIC but it is not the way I want. I have only been able to send data from the PC to the microcontroller but not back to the PC. There are multiple reasons for this. The first reason could be that the microcontroller was fried. To test this theory I programmed a brand new microcontroller and had the same results. Instead of testing more microcontrollers I decided to test other possible problems.

One other possible problem could be the code that I used. I did not think this was the problem since I was using code from HI-TECH Software but the more possibilities I ruled out the more information I could obtain. I programmed the microcontroller and established a serial connection with the PC through a cable. Though communication through a cable is not the ultimate goal of the device, it would provide me with information as to the validity of the code. If the code was incorrect the correct communication between the PC and the PIC could not be obtained. After programming, the PIC communicated correctly with the PC and thus the code was not a problem. I will continue work on this tomorrow and hope that I can find an answer soon so I can move on to other elements of the project. Figure 1.1 shows the circuit of the Bluetooth module and the PIC. The receive and transmit wires are not attached in the figure but were attached when the Bluetooth interaction was tested.
I decided that progress must be made in the project regardless of the difficulty I have had with the Bluetooth technology. Instead of spending all of my time on the Bluetooth part of the project and obtaining minimal gains, I spent time on creating the alarm system whenever I became too frustrated with the Bluetooth technology. The deadline is approaching quickly and I do not want to waste time with any particular element of the project.

The easiest way to create an alarm system is through the use of interrupts. I have learned a lot about interrupts throughout this week and feel I have a great deal of knowledge now. There are so many working components of the device that organizing all of the elements will be important in the upcoming weeks. I created a flowchart of how the device will function. Figure 1.2 shows the flowchart I have created. Knowing that I have a general outline of how the device will function will be valuable as I get the various components to function properly.
Using interrupts, a flag will go up when it is time to take the medication. This will ignite the alarms which include the text-to-speech module, the LEDs and the vibrating motor. If the button is pushed a digital high will be created. The program will check if the infrared indicator pin is high or low. If the pin is high that will mean that the detector detected the infrared signal and a pill is not in the correct position. This will prompt the user, by LEDs, to shake the device which should cause a pill to be in the correct the position. Once the pill is in the correct position the motor sequence will commence. This will invoke the motor function in the program which will cut the pill. After the pill is cut the function that will dispense the pill will be enacted. This will complete the medication dispensing sequence and the program will reset and wait for the next time the medication should be dispensed.

**Future Work**

This week I need to accomplish a lot to finish the project. I went out of order since the Bluetooth part of the project did not go as smoothly as I would have liked. I thought I would finish the Bluetooth and start on the text-to-speech module this week and work on the alarm system after that. I am not behind in my work since I did accomplish a lot on the alarm system but the Bluetooth and the text-to-speech are pressing needs. I plan on finishing both these elements this week and then turn my attention back to the alarm system. If I do become frustrated with the Bluetooth or the text-to-speech I will resume work on the alarm system. I feel that I would be wasting time continuing work on one element and not making progress.
Project Overview

I feel we are on schedule with the project though we have not worked on the elements we have planned. The Bluetooth and the text-to-speech elements of the project have not been finished but we have made progress on the alarm system and the e-mail protocols. I want to turn our attention back to the hardware elements of the device which I feel are more important. I think we have been successful in the sense that we have not wasted time on aspects of the project that have frustrated us. I feel that we will accomplish a lot this week and will finish the project on time.

Hours Worked

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