Individual Lab Report 1

Guillermo Manuel Cidre

Team G – Bob's builders

Teammates: Eric Newhall, Michael O’Connor, Christian Heaney-Secord

IRL01

2/4/14

Individual Work:

For the sensor lab, I was assigned to work on the software part of reading the voltages from each individual part. The main plan was to set up an average filter that averaged the last five values received from our three sensors in order to lessen the effect of noise. Eric Newhall helped write most of the code, but it contained few bugs. So my main contribution in this lab was debugging the code and making sure it checks out. The final code can be seen in figure 1 of this report. In the mock up, I worked on making some of the cardbox models that represented several part of our model like the 24 hinges that provided support to structures like the poles representing the paths the arms will traverse into. Another cardboard model that I made was a box that repressented another part of the flux and wire dispensor subsystem. I did not contribute to the website development this week.

Challenges / Issues:

Our sensor lab read voltage of some of the sensors like the potentiameter through the use of a voltage divider. The voltage read from arduino was the voltage measured from the extra resistor and not the resistor of the sensor. If one analyses the circuit, the sensor would be able to change its resistance linearly only if our voltage reading follows a inverted graph, or like a 1/x graph. If this type of graph is read from right to left, like if we started measuring the voltage when the potentiameter is set at high resistance, it can easily be confused with an exponential graph and easily reach into wrong conclusion that our potentiameter is not linear. Our potentiameter voltage read such similar exponential graph. So, it could be that our potentiameter might be close to linear. This seem like a minor issue. But it is important to assess the potentiameter since Michael O'Connor and Christian Heaney-Secord have considered the idea of using the potentiameter when rotating the part orientator in order to determine its rotation position. If it would in fact be linear, then we would probably not have to search for another sensor that does that.

Team Work:

Eric Newhal, Michael O'Connor, and Christian Heaney-Secord assembled and connected the sharp sensor, the potentiameter, and the flex sensor into the circuit for the sensor lab. With that, Eric and I programmed the GUI interface needed for the arduino to take measure and data. Then I checked for bugs and Eric made the graphs of the readings for our conclusion.

For the Mock up, I helped make some of the supporting cardboard pieces while the rest went to the machine shop, cut out some components, and helped put it together. For the website, Eric set it up and pasted in all the current work so far.

Future Plans:

I plan to help do the motor lab similar to the way the sensor lab was done. I plan to help write and debug the code for the control algorithm and some of the GUI elements. In addition, I plan to help with the team in assessing different models of hopper to determine which one would best work with our project. Eric Newhal ordered the electromagnetism parts. So I plan to also help him assess the strength of the electromagnet to see if we have enough or if we need to order stronger ones. But for the most recent, I plan to modify the sensor to get a better reading of the potentiameter. I also plan to learn in how to edit the website in order to help contribute in that field.

```
int IRPin = A0;
int PotPin = A1;
int FlexPin = A2;

int IRValue = 0;
int PotValue = 0;
int FlexValue = 0;

float IRVoltage = 0.0;
float PotVoltage = 0.0;
float FlexVoltage = 0.0;

float IRLPF[] = {0, 0, 0, 0, 0};
float PotLPF[] = {0, 0, 0, 0, 0};
float FlexLPF[] = {0, 0, 0, 0, 0};


void setup() {
  Serial.begin(9600);
}

void loop() {

 for(int i=0; i < 4; i++){
   IRLPF[i] = IRLPF[i+1];
   PotLPF[i] = PotLPF[i+1];
   FlexLPF[i] = FlexLPF[i+1];
 }

 IRValue = analogRead(IRPin);
 IRVoltage= IRValue * (5.0 / 1023.0);
 IRLPF[4] = IRVoltage;

 PotValue = analogRead(PotPin);
 PotVoltage= PotValue * (5.0 / 1023.0);
 PotLPF[4] = PotVoltage;

 FlexValue = analogRead(FlexPin);
 FlexVoltage= FlexValue * (5.0 / 1023.0);
 FlexLPF[4] = FlexVoltage;


 IRVoltage = (IRLPF[0]+IRLPF[1]+IRLPF[2]+IRLPF[3]+IRLPF[4])/5;
 Serial.print("IR voltage is: ");
 Serial.print(IRVoltage);

 PotVoltage = (PotLPF[0]+PotLPF[1]+PotLPF[2]+PotLPF[3]+PotLPF[4])/5;
 Serial.print(", Pot voltage is: ");
 Serial.print(PotVoltage);

 IRVoltage = (FlexLPF[0]+FlexLPF[1]+FlexLPF[2]+FlexLPF[3]+FlexLPF[4])/5;
 Serial.print(", Flex voltage is: ");
 Serial.println(FlexVoltage);


 delay(250);
 Serial.flush();
}
```

Shift values in array to left.

Read value and convert to voltage

Average the values and display them.

Figure 1: GUI code for the sensor lab.