CS26020: Experimenting with Sensors

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1 INTRODUCTION

1.1 Purpose of this Document

This document shows and discusses the result of experimenting with the IRSensors and Encoders on the Formula AllCode robots[1] and the in-robot API[2]

1.2 Objectives

- Collect Infrared Sensor data.
- Collect Encoders data
- Visualize the data.
- Analyze and discuss the data.

2 Infrared Sensors

2.1 Programming

To get the Sensor reading from the robot I wrote a function to display the data on screen.

```
void IRSensors(){
 double IRDataSum [8] = \{0,0,0,0,0,0,0,0,0,0\};
 int j;
 for (j = 0; j < 10; j + +)
  int i;
  for (i = 0; i < 8; i++)
        IRDataSum [i]=IRDataSum [i]+FA_ReadIR(i);
 double IRDataAverage [8];
 int i;
 for (i = 0; i < 8; i++)
  IRDataAverage [i]=IRDataSum [i]/10.0;
  if (IRDataAverage[i]>600) {
  FALEDOn(i);
  } else {
   FA_LEDOff(i);
 FA_LCDClear();
FA_LCDNumber(IRDataAverage[IR_RIGHT], 0, 12, FONT_NORMAL, LCD_OPAQUE);
FA_LCDNumber(IRDataAverage [IR_REAR_RIGHT], 0, 1, FONT_NORMAL, LCD_OPAQUE);
FA_LCDNumber(IRDataAverage[IR_REAR] 40,1,FONT_NORMAL,LCD_OPAQUE);
FA_LCDNumber(IRDataAverage [IR_REAR_LEFT], 80, 1 ,FONT_NORMAL,LCD_OPAQUE);
FA_LCDNumber(IRDataAverage[IR_LEFT], 80, 12, FONT_NORMAL, LCD_OPAQUE);
FA_LCDNumber(IRDataAverage [IR_FRONT_LEFT], 80, 20, FONT_NORMAL, LCD_OPAQUE);
FA_LCDNumber(IRDataAverage [IR_FRONT], 40, 20, FONT_NORMAL, LCD_OPAQUE);
FA_LCDNumber(IRDataAverage [IR_FRONT_RIGHT], 0, 20, FONT_NORMAL, LCD_OPAQUE);
 FA_DelayMillis (100);
```

- 2.2 Data Acquistion
- 2.3 Data Captured
- 2.4 Data Visualised
- 2.5 Discussion
- 3 Encoders

3.1 Programming

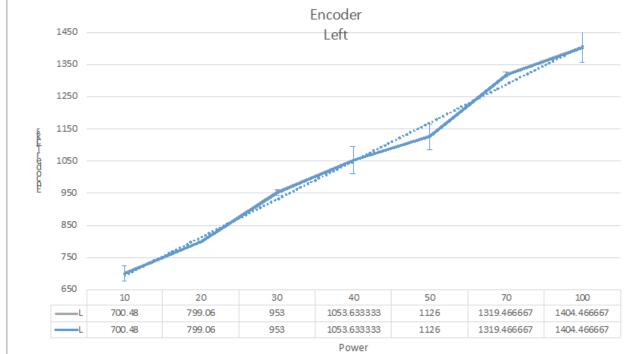
```
void encodersDataGathering(int power){
        FA_SetMotors (power, power);
        FA_DelayMillis(500 + power*10);
        int i;
        for (i = 0, i < 5, i++)
                 FA_ResetEncoders();
                 FA_DelayMillis (1000);
                 FA_LCDNumber(FA_ReadEncoder(1), 20*power,
                          1, FONT_NORMAL, LCD_OPAQUE);
                 FALCDNumber(FA_ReadEncoder(0), 20*power,
                          12, FONT_NORMAL, LCD_OPAQUE);
        }
}
int main(){
        FA_RobotInit();
        FA_LCDBacklight (50);
        int power = 0;
        \mathbf{while}(1){
                 \mathbf{if}(FA_ReadSwitch(0))
                          FA_LCDClear();
                          encodersDataGathering(power);
                 if (FA_ReadSwitch(1)){
                          power++;
                          FA_DelayMillis(200);
                 }
        }
```

3.2 Data Acquistion

3.3 Data Captured

3.4 Data Visualised





3.5 Discussion

References

- $[1] \ \textit{Formula AllCode Robot} \ \texttt{https://www.matrixtsl.com/allcode/formula/}$
- $[2]\ in\text{-}robot\ API\ allcode_api.h\ \&\ allcode_api.o\ Pete\ Todd\ \&\ Laurence\ Tyler\ 1.1$