Leopold-Franzens-Universität Innsbruck

Assignment 1 - Report

Computer Haptics

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Degrees	Readings
-50	-3,590
-40	-3,070
-30	-2,290
-20	-140
-10	-560
0	259
10	1,150
20	2,050
30	2,940
40	3,840
50	4,350

Table 1: Measured values for degrees

1 Assembly

During assembly we ran into a few difficulties: Which screws, nuts and washers to use was often unclear, we had to try different thicknesses, lengths and combinations of nuts. Another problem was fixing the motor to the "main upward plastic thing", using the appropriate screws didn't work, as they didn't hold on to the plastic. We needed to use some washers, so that the screws wouldn't "fall through". Other than that the assembly was fine and we were able to assembly the hapkit device.

2 Calibration

Our readings after running the given example code on the haptic device can be seen in Table 1. We also plotted these readings in Figure 1. The plot was created with: Linear Regression Calculator. (2019, March 29). Retrieved from `https://www.socscistatistics.com/tests/regression/default.aspx`

As expected a linear function emerged from our readings. To note is that the values for 50 and -50 degrees are slightly off curve, since the readings occurred a little before & after 50 degrees, since the haptik device doesn't quite reach the 50 mark.

We took our results and calculated values for a and b of the regression equation

$$X_m = a * update_{pos} + b$$

We found the values: $a = -3.97074$ and $b = 0.01197$. Since our intial values are sometimes different we tried to calibrate the b value depending on the initial state of the haptic device. Using these values we can calculate degrees based on the readings of the haptic device.

$$degrees = a * reading + b$$

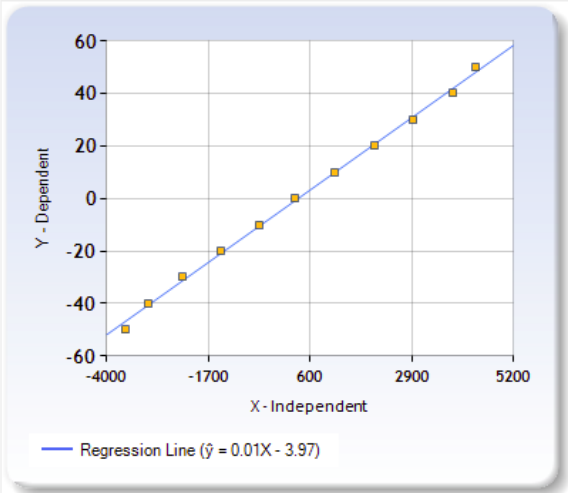

Figure 1: The plot depicting the received linear function.

With those degrees we can further calculate the distance in radians of the position X_m in milimetres.

$$distance = angle/360 * 2 * PI * radius$$