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Assignment 2 for Mobile Health and Wireless Systems

Github Link: <https://github.com/psturmfels/tilt_measurement>

**Part 1:**

I measured the angular velocity and acceleration over 5 minutes while the phone was not moving, and plotted the recorded values in each plane in a box plot, below:

A screenshot of a video game

Description automatically generatedA screenshot of a social media post

Description automatically generated

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Direction** | **Mean of Angular Velocity Around Axis** | **Standard Deviation of Angular Velocity Around Axis** | **Mean of Acceleration in Axis Direction** | **Standard Deviation of Acceleration in Axis Direction** |
| x | -0.012881 | 0.001041 | 0.002524 | 0.002873 |
| y | 0.024203 | 0.000846 | -0.000348 | 0.003575 |
| z | -0.021752 | 0.001315 | -1.0004805 | 0.004191 |

**Part 2:**

We plot the tilt of the device when held still for 5 minutes using the gyroscope only (red), the accelerometer only (blue), and using a complementary(orange). Using only the accelerometer is unbiased but noisy. Using only the gyroscope has very little noise, but incurs drift. Using a combination of both provides the best results.

