Designing a Bodysuit to Counteract Wobbling in Cats with Cerebellar Hypoplasia

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Engineering Problem

Engineering Problem: Cats with cerebellar hypoplasia (CH) often having trouble walking, coordinating movement, and controlling their balance. It can become unpredictable as they are prone to falling and stumbling.

Engineering Objective

The objective is to design an assistive bodysuit that can reduce wobbling present in cats with CH. It will be tested on a vertical mass spring system that mimics the symptoms of a cat with CH.

Creating a device that reduces wobbling on a vertical mass spring system can maintain stability in cats with cerebellar hypoplasia

Data Results

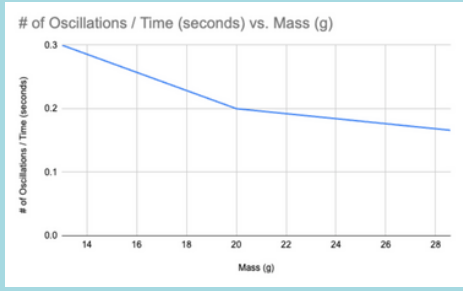


Figure 2: # of oscillations/time (seconds) vs Mass (g)

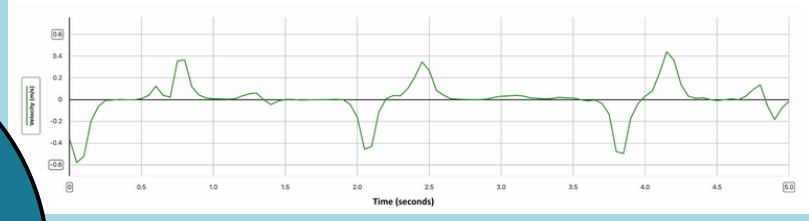
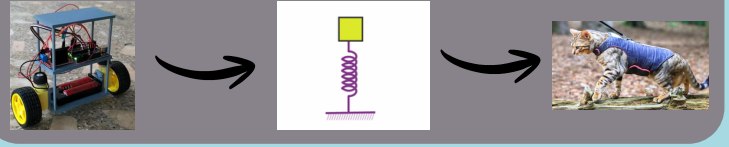


Figure 1: Velocity (m/s) vs. Time (seconds) - 13.4g

Methodology

A vertical mass-spring system was set up to mimic the symptoms of a cat with cerebellar hypoplasia. Data on the relationship between oscillations over time vs. mass, and velocity over time to compare after the device is built. Two-wheeled self-balancing robot will be repurposed to create a wearable device using IMU's, DC motors, Arduino, MPU6050, brushless motors, and PID controller.

Methodology Infographic



Interpretations and Conclusions

Mass-spring system shows as mass increases, # of oscillations decreases. The Velocity vs. Time graph can illustrate a baseline of how much speed the device has to reduce in order to be effective. The overall outcome is to see the relationship between a cat's gait and the toll cerebellar hypoplasia has on their day-to-day walking. This knowledge will be used for designing the bodysuit, it provides a clearer picture as to how much counter torque the brushless motors should be producing.