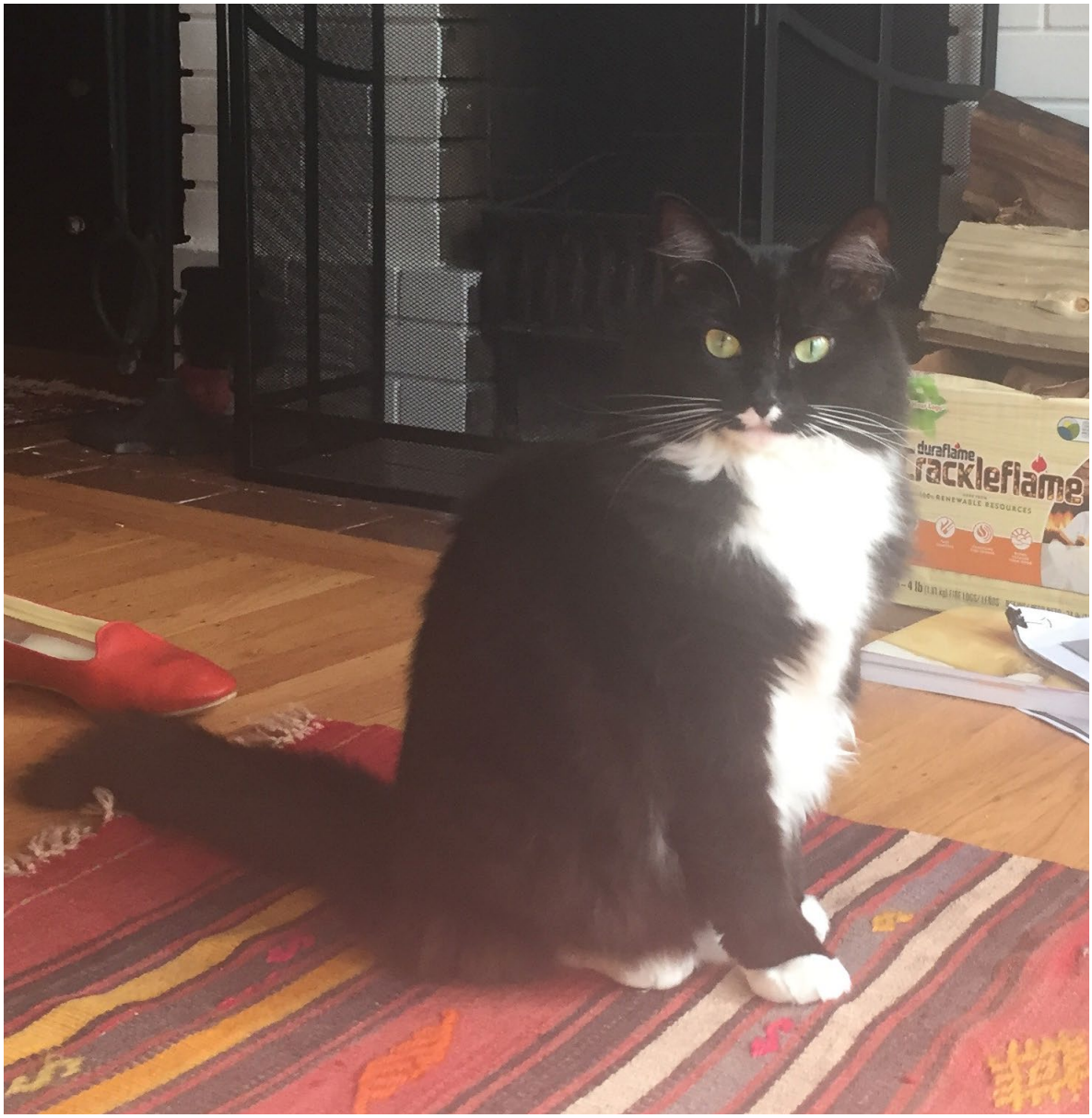

The CATastrophe!

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Project Description

The goal of this project was to design and build a small autonomous vehicle that uses distance sensors and a servo motor to steer around an apartment or home while running away from cats, causing them to chase it, have fun and get exercise. I ended up making it so that the robot would run away from the cat or other objects should they get too close instead of running around at all times so that the interaction would be initiated by the cat, not in constant motion.

Technical Analysis

I used ultrasonic distance sensors for this project. They view a cone shaped range and work well with distances between 10 and 20 centimeters making them a good choice for the somewhat flexible goal of the project. I used DC motors with an H-bridge to power the vehicle and, while the mistiming of the motors gives the cat toy personality, it may have been better to use a stepper motor or to separate the motors on the H-bridge to avoid battery drain. The servo motor works well for steering but in the future I would use the H-bridge and motors to steer with a simple caster in the back. Overall the technical choices were fairly well considered but could be further refined to achieve a more dependable, albeit less personable, cat toy.

My code is an if/else statement with a combination of a code that converts the ultrasonic sensor data into centimeters and a set of if/else statements that interpret the data in the order is is collected. I initially wanted the overarching else to be going forward, meaning that the default would be for the vehicle to go forward, but I changed that to be not moving because it made more sense for the cat toy to be at rest until the cats play with it. I also use delays to control how long the motors run for and that is very simplistic and may cause problems when signals get mixed. Overall the code is fairly simplistic but it does provide reliable results and an interesting version of a cat toy.

Key Hardware

4 x Ultrasonic Sensor - HC-SR04
1 x Arduino Uno
2 x DC Motor
1 x servo motor
1 x Prototyping Shield