Progress Report
for a Motion Sensing Cat Toy

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Introduction

At CatStone, the project that we are currently working on is a motions sensing cat toy, Purrsuit. Purrsuit is a cat toy that can detect a cat's approach and react to roll towards the opposite direction, mimicking a fearful escaping prey for the cat to pursuit. Purrsuit is composed with two main parts, the interior parts and the outer shell. The interior components are, motion sensors, motors, offset weight, microcontroller, battery, and PCB. The idea of this product is to create something that satisfies both cats and cat owners. As technology advances, the pace of people's life speeds up as well. Cat owners do not always have enough time to play with their cats anymore. With Purrsuit, cat owners can relax while their cats can still enjoy unlimited amount of fun.

Schedule

We are currently at 85% completion of our product. Interior structure design, circuit design, and microcontroller implementation are completed as scheduled. The remaining tasks are the design and printing of the outer shell, and final system testing. Although we had spent more time than expected on the design of the PCB, we were able to start on the design of the outer shell earlier than anticipated. Therefore, we are still on track and will be able complete our product as scheduled.

Financial

Table 1 below shows a simple breakdown of the budgeted spending and the actual spending. All the parts are purchased and the only remaining spending anticipated is the 3D printing of the outer shell. (Note: We do not have any funding)

Equipment Needed	Budgeted	Actual (to date)	Remaining
Interior Parts & Others	$270	$220	$50
3D Printing	$200	-	$200
Total cost	**$470**	**$220**	**$250**

Table 1: Financial Progress

Progress

In order to minimize the inner component size, we used Adafruit Pro-trinket as our product's microcontroller, which is much more compact and more efficient than the traditional Arduino board. By using the existed sample code, we used Pro-trinket to test our motion sensor and offset weight motor. It worked out fine and met our expectations. The motor can be controlled with the motor driver by different motion sensor to switch between forward and reverse. We fabricated two sets of offset weight with radius of 20mm and 40mm respectively. We are waiting for further test to find out which one is more suitable for our product. We did some research via YouTube and other scientific articles to establish the materials and procedures needed for the project. On the Internet, we found a more compact motion sensor with the same specifications as our big one, which is good for optimizing our product. Due to the limited space inside the ellipsoid, we designed a PCB via Frizing software and the size is only 6.4cm*4.24cm. The data and diagram was sent to Omni Circuits for fabrication, which will be done in the next few days. We are now working on the final step of our project, designing outer shell for 3D printing and final product functional testing. If we still have free time at the end, we will try to optimize our product regarding the size and features.

Conclusion

During the past weeks, we have successfully implemented the motor drivers and the microcontroller. We also completed the design of the PCB board, which allow us to minimize the interior space. Although we spent a large amount of time on the design of the PCB than scheduled, the interior structure design, circuit design, and implementations are completed on schedule. Furthermore, we were able to start on the outer shell design ahead of schedule. Thus, the schedule of our project is on track and undergoing as expected.