

Behavioral Tracking of Physical Activity in Small Social Rodents



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Abstract

Prairie voles are small homogenous rodents that are perfect model to humans that can correlate the benefits of exercise to social stress. The goal of this project is to develop a self-sufficient system able to distinguish, identify, and collect data on prairie voles on a running wheel. A raspberry pi is connected to a hall sensor and an RFID that will collect the amount of running each prairie vole runs in a session and in a day.

Introduction

Prairie voles are distinct rodents that share some attributes with humans. Research derived from these rodents can provide valuable information about social behaviors and exercise. In the laboratory setting, two rodents are put into a cage designed to mimic their natural habitat. Up to date technology measures distance traveled each individual wheel. New technologies will be a feasible, cost-effective, and efficient method of tracking which of two prairie voles is using the running wheel, as well as quantifying the information across several weeks.

Methods and Materials

In Fig. 1, it provides a schematic of how the Parallax RFID and the Hall effect sensor will be connected to the Raspberry Pi. Fig. 2 provides the assembled prototype, and Fig. 3 demonstrates how the components are assembled.

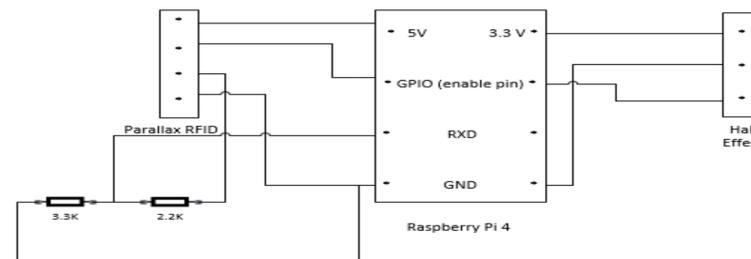


Fig. 1 Circuit Diagram

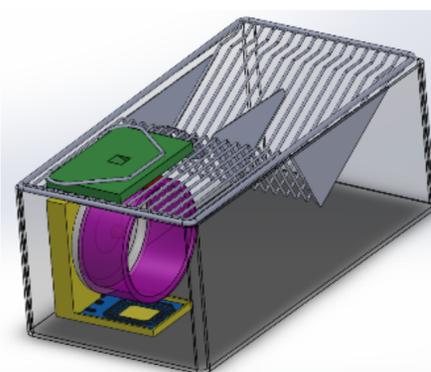


Fig. 2 Assembled PROTO

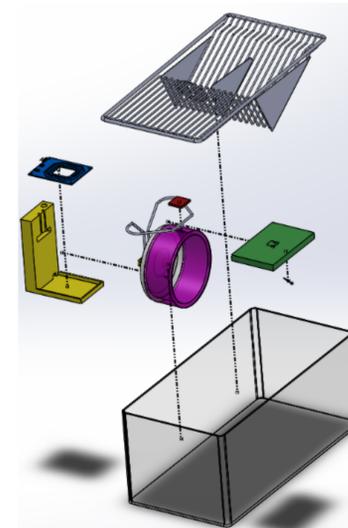


Fig. 3 Exploded View

Results/Discussion

Fig. 4 provides an output of data taken in one day for each time the wheel was used and then total distanced traveled that day.

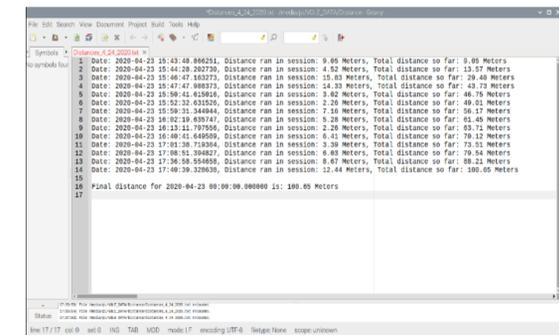


Fig. 4 Data Output

Conclusions

Prairie voles provide a very valuable model to investigate the interactions of social behaviors and exercise. A challenge arises when it becomes impractical for a researcher to monitor the prairie voles. We have developed a method of tracking two prairie voles in the same cage.

Acknowledgements

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