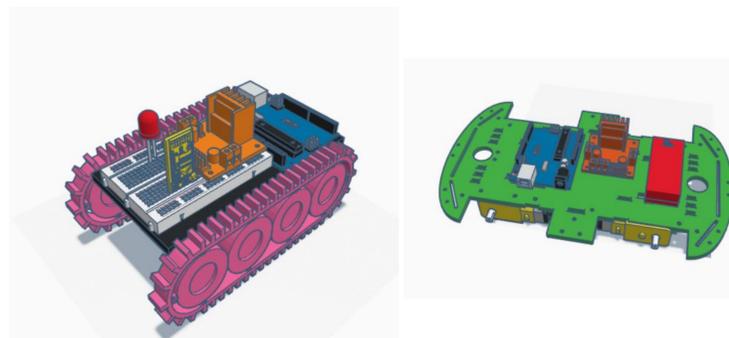


Introduction

The scope of this research was to build a robot that can localize odor in a controlled environment, mimicking that way the behavior of animals, specifically mice. Understanding animal behavior has been proven beneficial in the past, and thus understanding how animals are able to detect the source of odor is of great interest. Neuroscientists would have to spend a great amount of funds and time in order to analyze the brain structure of the animal and extract the “algorithm” they are using. However, building a low cost, Arduino based robot, and trying different algorithms, is much easier and doable in a small lab.

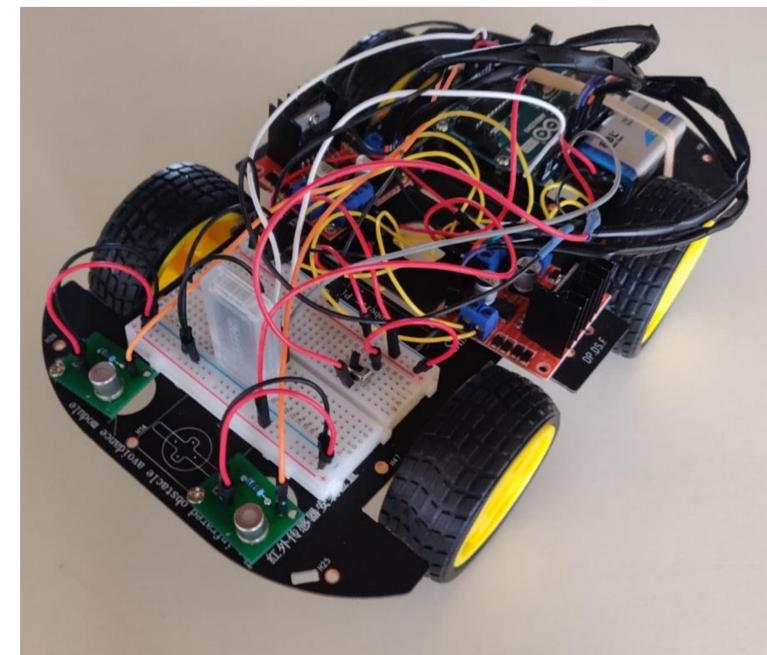
Methodology

First, a 3D model was designed with the use of autoCAD. A first model was built and evaluated. Changes were made accordingly. Since there was no any background research on how to build such a robot, trial and error with the use of educated guesses was our best option.



3D Models

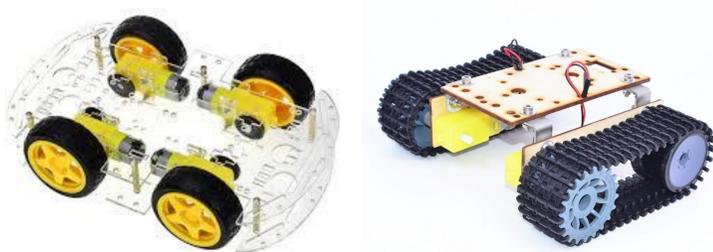
Result



Problem

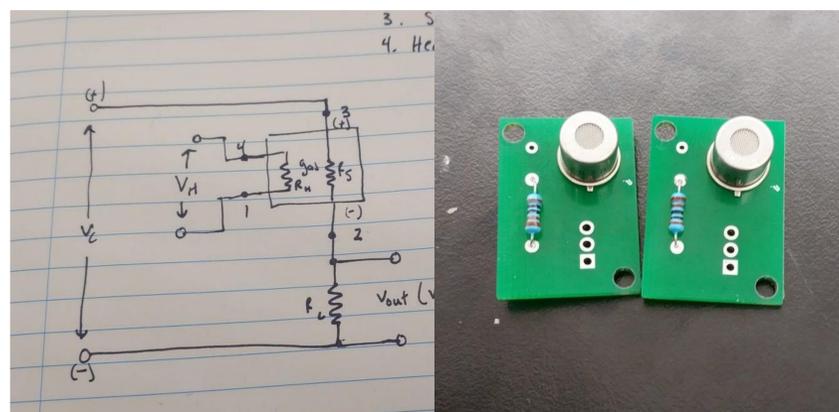
Design and build a robot with using the following criteria:

- Low cost
- Able to move naturally
- Ideal size to be concise and have enough space for all the electrical components to fit on it
- Be able to navigate to different terrains



Possible platforms

Circuits were designed by hand and then using Fritzing. Printed Circuit Boards (PCBs) had to be designed, to attach the ethanol (odor) sensors.



Future Work

Future work should include testing the robot and making measurements. Also, different algorithms should be tested until the robot mimics the behavior of mice, and maybe even surpasses it.

Acknowledgments

I would like to express my special thanks of gratitude to my mentor Dr. Venkatesh Gopal as well as Elmhurst College and the Honors Program for giving me the golden opportunity to conduct this research.