Name(s)	Project Number
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Project Title

Replicating Biological Walking Patterns in Robotic Systems

Abstract

Objectives/Goals
The main goal of my project is to recreate quadruped walking motions seen in certain species into a self-built robotic system. In addition to this, the aim was to also integrate a level of autonomy into the robot and program a turning sequence to allow the robot to avoid collisions with any object in front of it.

Methods/Materials
To achieve this I built a four legged robot using aluminum sheet metal, acrylic glass panes, servo motors, an arduino, and an assortment of nuts and bolts purchased from my local hardware store. I cut out desired shapes from the aluminum and the acrylic and then shaped them using a dremel. I then programmed the robot to walk, using an arduino microcontroller, with the same biological footfall pattern as a pray mantis, otherwise known as a canter.

Results
I successfully replicated the biological walking pattern of the pray mantis by evaluating and diagramming its walk. I was able to program a walking sequence to control the servos in such a way that the robot was able to efficiently walk in a manner that resembled a canter walking pattern.

Conclusions/Discussion
After multiple attempts to write a code for the walking sequence, I eventually created one which I was satisfied with. Despite minor setbacks and a few stripped gears, I successfully created a walking pattern which mimicked biological quadrupedal walking motions. For future research and experimentation, I would like to create a hexipod robot and create a walking sequence to mimic six legged species to further my investigation of different animal and insect walking patterns

Summary Statement

Mimicking four legged animal walking patterns in a robot.

Help Received

Father aided me in using power tools