Microtaur: A Low-Cost Easily-Implementable Quadrupedal Research Platform

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Background

The advent of the robotics age has brought us several fascinating applications that are pushing the forefront of technology in our world. Of them, the quadrupedal robot is one of the most versatile robotic applications due to its joint-based architecture that allows it to conduct intricate animalistic behaviors. Today, research into quadrupedal robots focuses on the mobilization, implementation, and utilization of these advanced technologies. However, during testing, the wear and tear of expensive components not easily accessible can lead to prolonged delays and outstanding expenses. Moreover, the implementation and development of such quadrupeds can prove to be intricate and quite difficult.

The Ghost Minitaur: the first direct-drive legged robot.

The Average Quadruped

On the left, is a quadruped whose leg snapped, which will require contacting the distributing company to acquire replacement parts. And on the right, is the current state of a quadruped in development. This image highlights the intricacy behind these fascinating walking devices.

Solution

- **Miniature**
  - 190mm x 160mm x 40mm
  - 746 g
- **Inexpensive** in Comparison
  - Roughly $1,200
- **Quickly Implementable** and **Easier to Maintain**
  - Modular (PCB)
  - Straightforward code
  - **In-House Manufacturing**
    - 3D Printed
    - Acrylic (Laser Cut)
- **Less** Energy Consumption / Computation Power

Microtaur

A robot that highlights the scalability of intricate quadrupeds, such as The Ghost Minitaur, while still maintaining its predecessor's prominent features.

Takeaway

During the development of Microtaur, we benefitted greatly from the property this project is promoting: its ease of maintenance. Many components of Microtaur needed replacement during the implementation process, however, since each piece was inexpensive and easily accessible, there was little to no delay. Additionally, Microtaur successfully adopted Minitaur's behaviors and qualities.
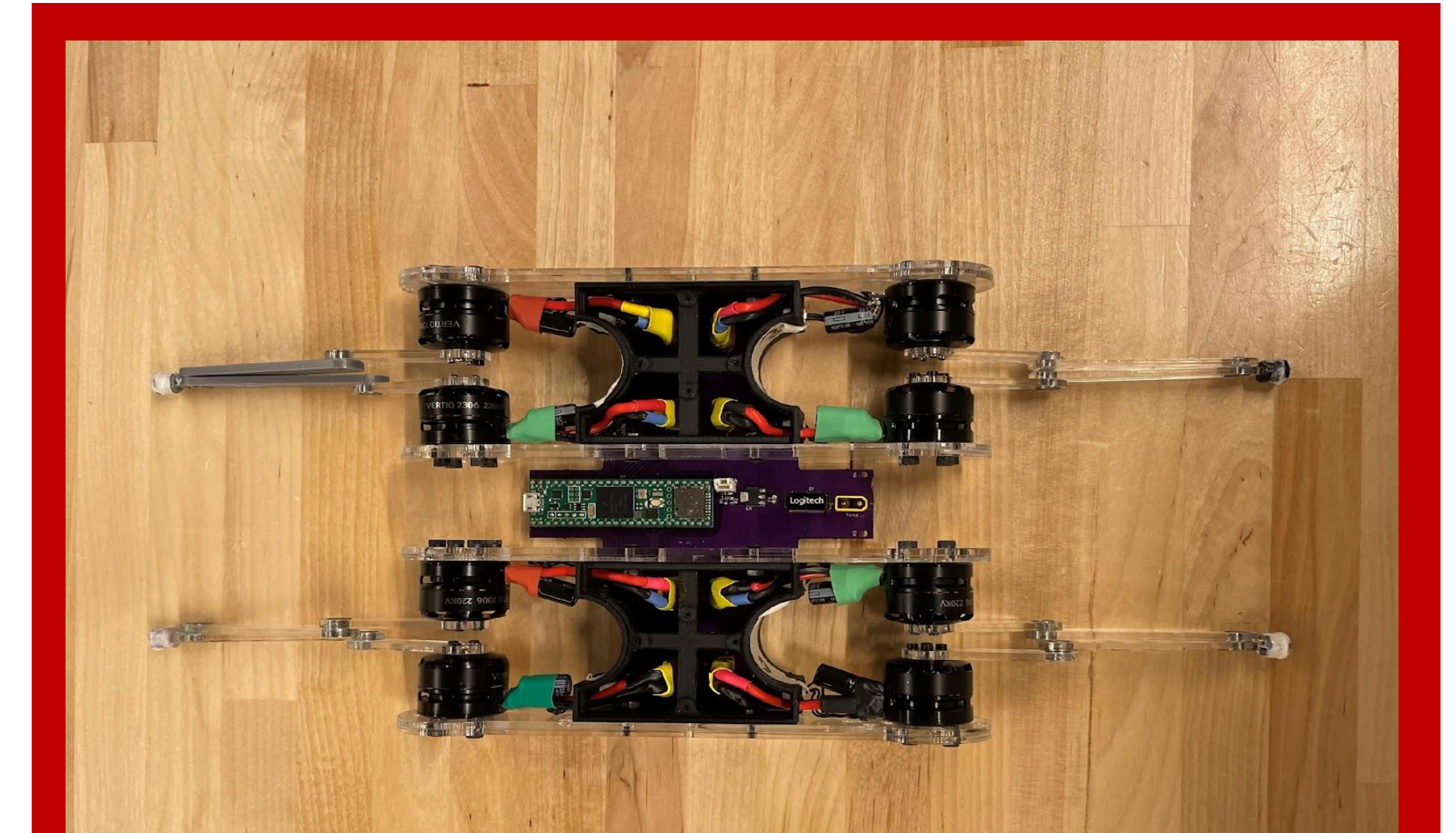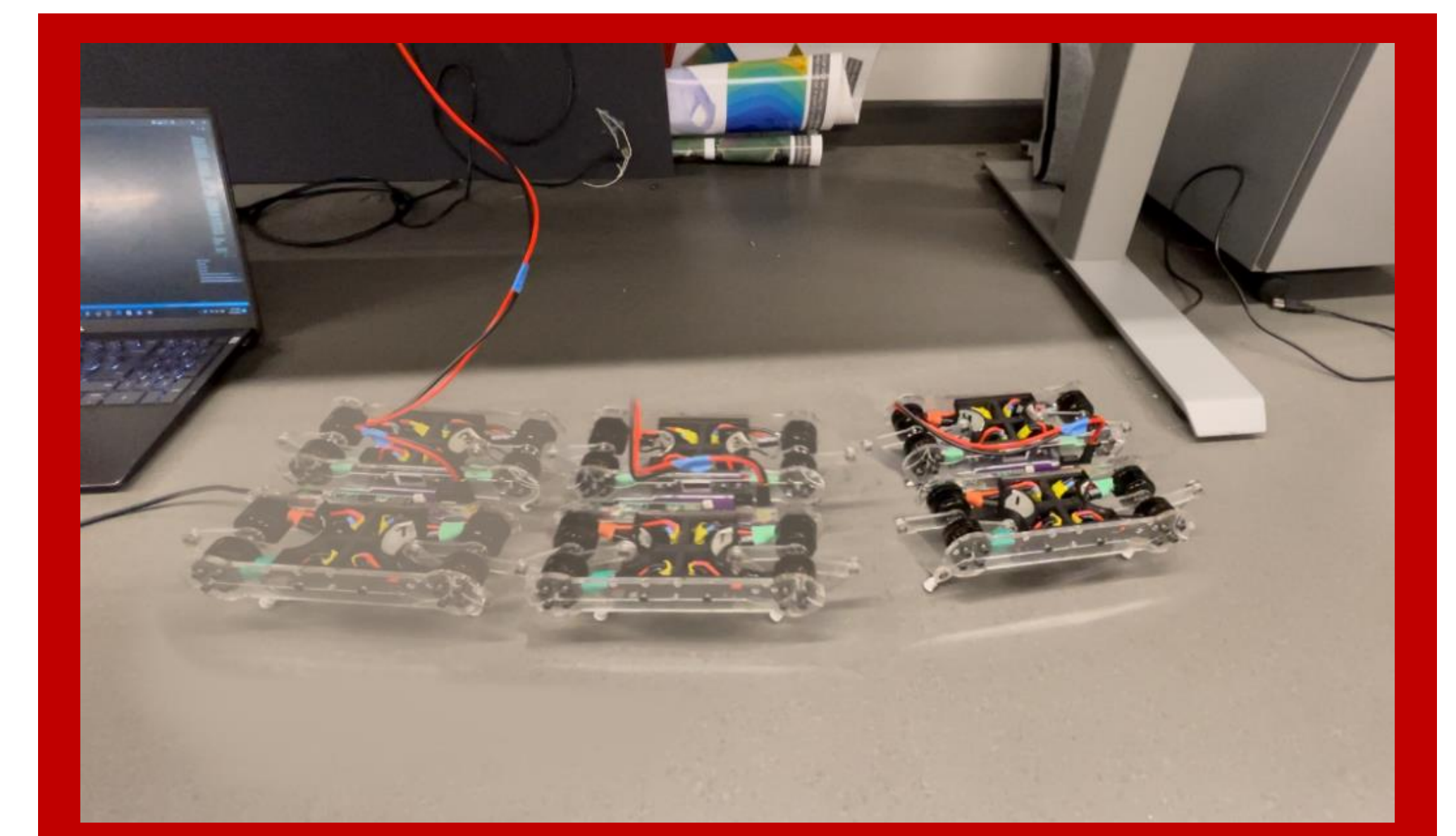
Behaviors:
- Trot
- Hop
- Bound

Programmed:
- C++
- Arduino

Here, Microtaur is mimicking a common locomotive gait of many four-legged animals: the trot.

Robomechanics Lab