Animatronic Octopus Tentacle: Designing a Control System for a Soft Robot With the Capability of Transporting a Lobster With a Success Rate of 90% to Demonstrate Its Use in Real-World Exploration

McConnell, Kai (School: Homeschool)

Animatronic Octopus Tentacle Kai McConnell Home school, Eustis, Florida, United States This engineering project, in the realm of soft robotics, has the opportunity to be world changing. This robotic arm is based on the logarithmic spiral of an octopus' tentacle, allowing it to have a very versatile range of motion. This breakthrough in robotics technology is very simple, strong, and able to do more than a robotic hand due to its flexible nature. Its unique design lets it bend around corners while also being rigid enough to grip and lift heavy objects. This project was inspired by Chinese engineers Mr. Wang, Mr. Freris, and Mr. Wei, who designed the original robotic tentacle that mimics animals with this logarithmic spiral. The goal of my project is to take their ideas further and build, code, and control a robotic arm with a pre-coded system. This arm will be able to pick up small objects and move them around its box, representing what large-scale versions of it could do in real-life. In order to complete this project, the box must be built and painted, the arm fabricated on a 3D printer, the electronics installed, the microcontroller coded, and the arm controlled. This project has little to no risk because of its small size, though the spinning motors on top could pose a risk to people not paying attention. The data that was collected includes which combinations of pulls on the three wires of the arm contribute to different motions, how changing the weight of the objects impacts how it will react and move, and how much power is needed for it to fulfill its tasks.

Awards Won:

NC State College of Engineering: Scholarship to attend NC State Engineering Summer Camp