Tech Expo, Spring/Fall 2026 – Team 05

Electro-Pneumatic Shark

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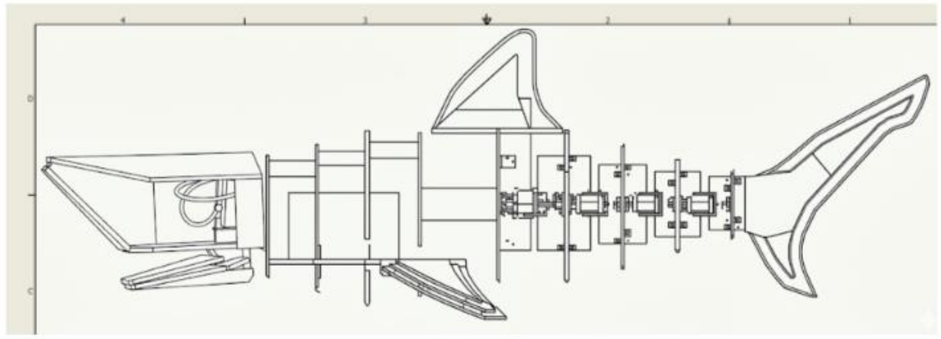
Problem Statement

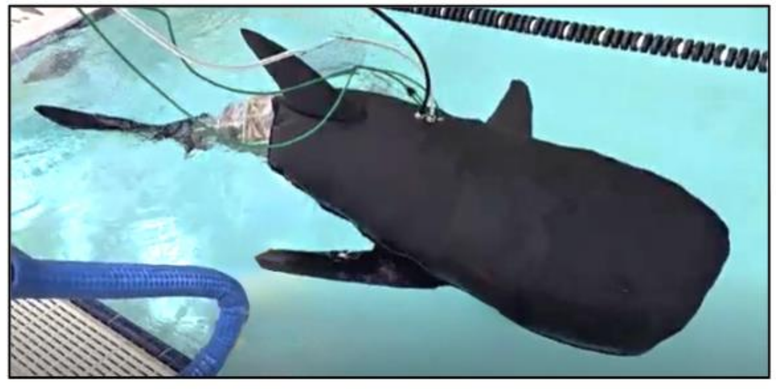
Our goal is to expand upon the shark's functionality by integrating pneumatic movement into the head and jaw of the shark, as well as by adding a ballast system for controlled depth swimming. A realistic outer skin layer will also be added to waterproof the system and improve the realistic appearance of the shark. The automatic swim cycle, including the tail and jaw movement, will also be developed. Our final goal is to get the shark in the water to prove full functionality and minimal leakage.

Proportion-Air is a manufacturer of proportional electronic air pressure regulators and flow control valves. Their products are used in manufacturing, testing, and automation systems.

Requirements

- Jaw and head move pneumatically
- Tail can push the shark through water
- Ballast sinks and floats
- Electronics, pneumatics, and frame are waterproof
- Automatic shut off if water gets in
- Uses 70 PSI air





Testing and Experimentation

- Electronics box waterproofing
- Water Sensor Test
- Adhesives Testing
- Fabric Test
- Tail and Jaw System Testing
- Water Test

Final Design

The design includes a wooden frame sealed with epoxy that uses pneumatic cylinders to simulate a swimming motion. A Raspberry Pi sends signals to an Arduino, which controls the movement of 8 cylinders in the tail and 2 in the jaw. The shark has a waterproof inner layer made of polyethylene and a realistic outer skin layer made of neoprene. Depth is controlled using a ballast system with an air tank and compressor. There are water sensors to protect the electronics box found inside of the belly of the shark.