A Multi-Usage Hydraulic Powered Underwater Robot Arm

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Current robot arm designs, mainly traditional (hard), are either limited in their ability to adapt, or in their ability to be exposed to different environments. This hinders their potential for multi-usage. Regarding this drawback, I envisioned creating a robot arm capable of deep-sea exploration, preserving underwater habitat and ecosystem, underwater rescue and aid, and helping with the fishing industry, while embodying characteristics of affordability, cost-effectiveness, and deformability. Elaborately, this robot arm is manipulated with the withdrawal of water from any of its four bellow pipes, which put together makes up the torso of the device. When in action, the robot arm bends with two 90 degrees, forming a Z shape. Apart from the robot arm, the robot hand has three silicone coated rubber fingers, which guarantees a stable, non-slippery, and gentle grasp onto most irrationally shaped or fragile objects. General testing concludes that the robot arm has an omnidirectional workspace of 60cm, with its bending taking 9 seconds on average. To simulate different oceanic conditions, the robot arm was also tested in different concentrations of salt water. Results show negligible impact. Overall, this robot arm prototype only represents the fundamentals of its operations, while its effectiveness enhances with size. Moreover, when the robot is exposed to increased depth, thus pressure, underwater, there are other materials to choose from for the pipes. Looking forward, there are multiple improvements with this robot, such as an active underwater rescuer, a soft human replica, a medical detection instrument, or much more.

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