OFFICIAL ABSTRACT and CERTIFICATION

Hybrid Artificial Muscle Robot(HAMR): Exosuit Building Block

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While previous artificial muscle studies have achieved a significant variety of actuation functions, they require unreliable external power supplies and are not customizable by the user. HAMR is an individual artificial muscle cell unit that can perform both independently and in multiples to achieve cohesive locomotion, providing the user easily accessible flexibility while avoiding central system malfunctional. A fuel cell was implemented in order to develop an energy-efficient muscle chip, used in conjunction with a hydrostatic skeleton structure to maximize actuation performance. Mimicking human tensile strength, HAMR prototypes created an energy surplus in the process of expanding and contracting in straight lines in both horizontal and vertical positions. Future iterations will use internal microchips and batteries to harness the energy surplus in order to develop a self-sustainable cell unit. This indicates potential in HAMR as an efficient soft actuator that can become the building block of a larger, wearable exosuit.

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