LOCOMOTION DEVICE AND METHODS AND RELATED SOFTWARE

Tech ID: 27105 / UC Case 2017-042-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,938,044	03/26/2024	2017-042

BRIEF DESCRIPTION

Next-generation robotic technology is driving towards better control of agile motions. This includes a technology focus on generating enhanced peak power for jumping agility. Most leaping robots use a spring mechanism with a latch. Due to the on/off nature of latches, the result is very high-powered releases of energy which are difficult to control. To address this problem, researchers at the University of California, Berkeley, have developed a new mechanical approach using “power modulation” that allows for high amplitude, high frequency jumps without the use of latches. In one embodiment, a multi-bar linkage connected only by revolute joints is capable of minimizing impulse loading and manipulating power output while performing rotation-free jumps. The Berkeley team has demonstrated an 85 gram prototype which delivered almost four times more peak jumping power than the maximum its motor can produce. Moreover, *in silico* testing predicts the prototype could reach an agility levels exceeding that of the most agile animals if the actuator power is raised to 15W.

SUGGESTED USES

- Military robotics
- Civilian robotics
- Industrial robotics

FEATURES/BENEFITS

- Uses many off-the-shelf-parts
- Precision control with latchless/catchless scheme
- Output power exceeds the maximum of the motor element
- Constant output force during sprung linkage release to minimize impulse loading
- Compact, lightweight design
- Minimally actuated

RELATED MATERIALS

- 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems - 10/09/2016

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Printable Repulsive-Force Electrostatic Actuator Methods and Device

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OTHER INFORMATION

KEYWORDS

power modulation, robot, rotation-free, series elastic, monopod, jumping, leaping, jump, leap, jumping robot, leaping robot, agile robotic, MIT Cheetah, actuator, actuation

CATEGORIZED AS

- **Engineering**
  - Robotics and Automation

RELATED CASES

2017-042-0

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