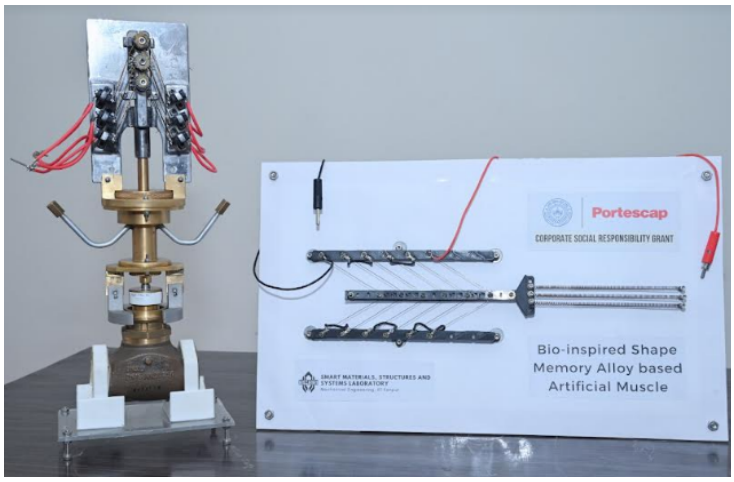
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India develops bio-inspired artificial muscle for medical prostheses

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It will be utilised for adaptive robotic prostheses for bio-medical application in the country



The Smart Materials, Structures and Systems (SMSS) Lab at the Indian Institute of Technology (IIT), Kanpur, has developed a bio-inspired artificial muscle for next-generation space robots and medical prostheses.

Encouraged by the industry demand and growth in the field of miniature, light weight, non-magnetic gear-free actuators, shape memory alloy (SMA) based actuators have emerged with an excellent power-to-weight ratio as a suitable alternative to the conventional actuators. However, existing SMA actuators have limited scope in terms of higher force or torque output due to the relatively simple architecture of the actuation mechanism.

To address this limitation, the SMSS Lab at IIT Kanpur, inspired by the Portescap CSR funding, have expanded the design space of the SMA actuator by leveraging the characteristics of bi-pennate muscle architecture with about 70% enhanced muscle force output per unit weight.

The interesting property of the customizable multi-stage hierarchy of the shape memory alloy-based bio-inspired muscle design will also encourage researchers in the domain of bio-mechatronics to develop adaptive robotic prostheses for bio-medical application in the country. This will significantly reduce (one third of the current cost) the cost of bio-medical devices and increase the affordability of high performance systems like MRI Scanner, CT scanner and Surgical Robots. The technology will also enable development of patient rooms with low maintenance and quieter operation.