Tomoaki MASHIMO

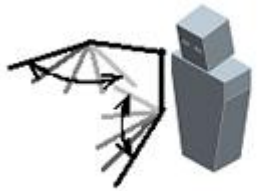
Tenure Track Assistant Professor
mashimo@eiiris.tut.ac.jp

With new actuators and mechanisms, I am developing the robotics such as home robot, medical robot, and pipe inspection robot.

Theme1 : Singularity Link Mechanism for Robot Arms

A singularity has been avoided in robotics because it loses degree of freedom of robot arms. However, we focus the interesting dynamic characteristics of the singularity. Singularity Link Mechanism (SLM) performs high responsiveness, high torque, and high energy efficiency. This mechanism is very suited for a lifting task in humanoids and exoskeletons.

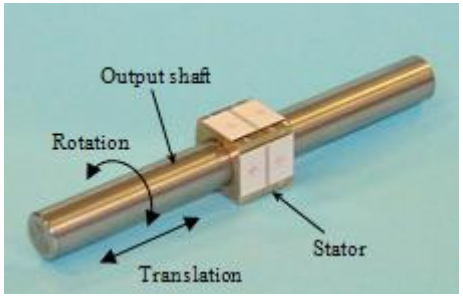
Keyword : : Singularity, Power assist, Mechanism design, High efficiency



Medical robot, microactuator

Theme2 : Rotary-Linear Piezoelectric Actuator (RLPA)

Rotary-Linear Piezoelectric Actuator (RLPA) is fabricated as a single metallic cube with a through-hole. We can obtain rotation and translation from a shaft inserted to the hole. The shape of RLPA is a cube with side length of 14 mm. The micro RLPA is a cube of length 3.5 mm. One of attractive applications is an endovascular surgery.



Theme3 : Spherical Ultrasonic Motor (SUSM)

Spherical Ultrasonic Motor (SUSM) is an actuator with omnidirectional DOFs in a compact body. It is composed of three annular piezoelectric actuators and a spherical rotor of 20 mm in diameter. It can rotate like eyes, a wrist, and a shoulder in human body.

Keyword : : Manipulator, Spherical actuator