

NON-TRADITIONAL ACTUATORS OF ARTIFICIAL MUSCLE ON THE ANDROID ROBOT

Ching-Kuo Wang

*Graduate School of Intelligent Robotics and Department of Electrical Engineering,,
Hwa Hsia Institute of Technology
New Taipei City, TAIWAN, R.O.C*

ABSTRACT: This paper analyzes the artificial muscle of android robots with pneumatic actuators. The grasp-positioning reliability and the finger maneuverability play increasingly important roles in the development of the dexterous hand of android robots. Generally speaking, the insufficient phenomenon of the grasping force and heavy-weight motors may perplex biomimic design of the humanoid robots. Additionally, the awkward mechanism of the traditional cylinder structure also prevents the innovational design of the pneumatic actuator on each dexterous joint. To construct a non-traditional approach in supporting the robotic actuators, this paper introduces an inventive mechanism of the artificial muscle. It can not only improve the driven force but also reduces the heavy loading of the traditional servo motors for the robot joints. The proposed mechanical design is to construct a bi-lateral module, which can stretches and shrinks each muscle of the robot arms. The mathematic modeling, control strategy, and realistic application of nonholonomically dynamics are also verified on the geometric point of view. Finally, dynamic simulations and experiments of a sensor-based prototype are made to justify the performance of the proposed algorithm.

Keywords: non-traditional actuators, artificial muscle, and android robots.