Dance Imitation by a Humanoid Robot

- Effective Presentation Method for Digital Archives of Traditional Folk Dances -

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The goal of this study is to develop a humanoid robot that can master a dance performance by observing a human dance performance. This is one of our attempts to develop a total technology of digital motion archive for traditional dance preservation.

We currently use a motion capturing system in order to acquire dance motion from a human performance. Our current problem is how to import the captured motion data into a robot. A robot body is different from the human body in terms of joint structure, mass distribution, athletic ability, etc. It causes constraints when the captured motion is applied to the robot. In this study, robot motion is not directly converted from the original motion, but re-generated from a symbolic representation acquired from the original motion. Symbolic representation is based on the concept of 'Primitive Motion', which is a minimal unit of dance performance. This approach can simply solve the constraints of the robot, and can enable various applications such as choreography editing.

By using this method, we have realized actual dance performances by the humanoid robot HRP-1S.

Publication

1.   Shinichiro Nakaoka, Atsushi Nakazawa, Kazuhito Yokoi, Hirohisa Hirukawa and Katsushi Ikeuchi, "Generating Whole Body Motions for a Biped Humandid Robot from Captured Human Dances," IEEE 2003 International Conference on Robotics and Automation, September, 2003, Taipei, Taiwan

2.   Shinichiro Nakaoka, Atsushi Nakazawa, Kazuhito Yokoi and Katsushi Ikeuchi, "Leg Motion Primitives for a Dancing Humanoid Robot," IEEE 2004 International Conference on Robotics and Automation, April, 2004, New Orleans, LA, USA

Dance Performance of Japanese Traditional Folk Dance "Tsugaru Jongara-Bushi"
(The humanoid robot is HRP-1S developed by HRP Project)