Skill Modeling and Robot Teaching
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Today's robots demand detailed and complicated motion teaching to make them work. In order to enable the robots to perform various tasks flexibly, we have to model "skills" for robot tasks and realize skill-level robot teaching. Currently, we are studying skill representation for robots and skill transfer for several tasks as follows:

- Human-Robot Cooperative Rope Turning Based on Rhythm Entrainment (Fig. 1)
- Human-Robot Cooperative Manipulation with Motion Estimation using the Minimum-Jerk Model (Fig. 2)
- Analysis of Human Skills Using Hidden Markov Models and MDL Criterion (Fig. 3)
- Teaching of Grasp/Graspless Manipulation by Human Demonstration and Motion Planning (Fig. 4)

Mathematical modeling of human skills and/or robot control inspired by human dexterity is conducted on the above robot tasks. We hope these research leads to the development of novel methodology for robot teaching.

Keywords: Robot Teaching, Skill Representation, Skill Transfer

References

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Fig. 1 Human-Robot Cooperative Rope Turning
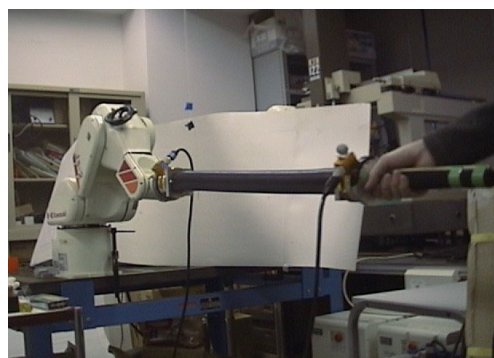

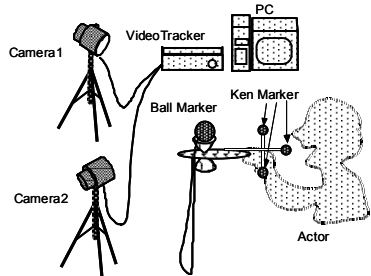Fig. 2 Human-Robot Cooperative Part Handling

Fig. 3 Measurement of Kendama Play
for Human Skill Modeling

Fig. 4 Human Demonstration of Manipulation
and Playback of the Demonstrated Manipulation