

# Simultaneous estimation of role and response strategy in human-robot role-reversal imitation learning

Tadahiro Taniguchi<sup>\*</sup>   Hiroto Nakanishi<sup>\*\*</sup>   Naoto Iwahashi<sup>\*\*\*</sup>

<sup>\*</sup> Ritsumeikan University, Kusatsu, Shiga, Japan (e-mail: taniguchi@ci.ritsumei.ac.jp)

<sup>\*\*</sup> Ritsumeikan University, Kusatsu, Shiga, Japan (e-mail: nakanishi@ci.ritsumei.ac.jp)

<sup>\*\*\*</sup> National Institute of Information and Communications Technology, Kyoto, Japan, (e-mail: naoto.iwahashi@nict.go.jp)

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**Abstract:** In this paper, we describe a novel imitation learning method which enables an autonomous robot to acquire response strategy and to estimate roles through human-robot real-time interaction. The robot becomes able to respond to human user's social action, e.g. bye-bye and shake hand, correctly. We constructed the learning method based on role reversal imitation which is found in human infants in developmental psychological researches. A probabilistic model is proposed which assumes that delayed reactions are stochastically generated by initiative actions. In an experiment, we show a robot hand became able to exhibit correct reaction and estimate whether another's action is an initiative action or a reaction.

**Keywords:** Learning algorithms, Machine learning, Probabilistic models, Human-machine interface, Man/machine interaction, Adaptation

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