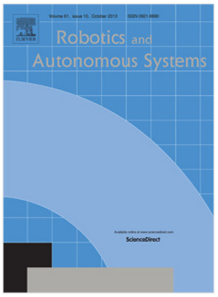
Accepted Manuscript



On the mechanical, cognitive and sociable facets of human compliance and their robotic counterparts

Aude Billard

PII: S0921-8890(16)30630-3
DOI: http://dx.doi.org/10.1016/j.robot.2016.08.030
Reference: ROBOT 2725

To appear in: *Robotics and Autonomous Systems*

Received date : 20 February 2015
Revised date : 29 September 2015
Accepted date : 31 August 2016

Please cite this article as: A. Billard, On the mechanical, cognitive and sociable facets of human compliance and their robotic counterparts, *Robotics and Autonomous Systems* (2016), http://dx.doi.org/10.1016/j.robot.2016.08.030

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

On the mechanical, cognitive and sociable facets of human compliance and their robotic counterparts

Aude Billard

Learning Algorithms and Systems Laboratory (LASA),
Institute of MicroEngineering, Institute of Mechanical Engineering,
School of Engineering,
Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland

Abstract

Compliance has become a key requirement for robots meant to interact with humans. It is viewed as a necessary property to increase safety and efficiency in human-robot cooperative actions. In humans, compliance takes three dimensions: mechanical, cognitive and social.

While robotics has focused primarily on modeling the first two, we here discuss the importance to consider also the social dimension that compliance takes in human-human interactions and how this can be extended to human-robot interactions. We discuss situations in which requesting that the human complies to the machine may be advantageous, and not the converse. We conclude with a list of open ethical and legal issues that may arise from developing actively non-compliant machines.

Keywords: Compliance, social robotics, human-robot interaction

1. Introduction

This special issue follows a recent trend in human-robot interaction (HRI) that advocates the need to provide robots with compliant motion, so as to ease the interaction [1, 2, 3]. This paper follows suit and provides a global overview of the main roles that compliance can take in Human-Robot Interaction. Note of caution: It is not intended as a comprehensive review of all approaches in robotics taken to model compliance, since several comprehensive reviews of the role of compliance in robotics and in human-robot interaction have been published of late. Instead, this paper offers pointers to these works, and emphasize the way by which compliance can be taught to the robot, an aspect not covered in these surveys.

We first revisit the implications that endowing a robot with compliant behavior entails in HRI. We start by delineating the mechanical, cognitive and social aspects which compliance takes in human-human interactions. We then review briefly which of these aspects have

Email address: aude.billard@epfl.ch (Aude Billard)

Download English Version:

https://daneshyari.com/en/article/4948899

Download Persian Version:

https://daneshyari.com/article/4948899

Daneshyari.com