Sharing Open Hardware through ROP, the Robotic Open Platform

Janno Lunenburg, Robin Soetens, Ferry Schoenmakers,
Paul Metsemakers, René van de Molengraft and Maarten Steinbuch*

Eindhoven University of Technology,
Den Dolech 2, P.O. Box 513, 5600 MB Eindhoven, The Netherlands
www.roboticopenplatform.org, rop@tue.nl

Abstract. The robot open source software community, in particular ROS, drastically boosted robotics research. However, a centralized place to exchange open hardware designs does not exist. Therefore we launched the Robotic Open Platform (ROP). A place to share and discuss open hardware designs. Among others it currently contains detailed descriptions of Willow Garage's TurtleBot, the NimbRo-OP created by the University of Bonn and the AMIGO robot of Tech United Eindhoven. Eventually, ROP will contain a collection of affordable hardware components, allowing researchers to focus on cutting-edge research on a particular component instead of having to design the entire robot from scratch. As an example of how the Robotic Open Platform is able to facilitate this knowledge transfer, we introduce TURTLE-5k: A redesign of an existing soccer robot by a consortium of our university and companies in the wider Eindhoven area. Cooperating with industrial partners resulted in a significant cost reduction.

Keywords: Open Hardware, RoboCup, Low-Cost Robot Design, Robotic Open Platform, TURTLE-5k, Robotics Hardware

1 Introduction

In recent years, increasing research efforts have been devoted to domestic service robots. Creating robotic agents able to autonomously assist humans in a highly unstructured environment is a huge step in research and engineering, too big for any university, research institute or company alone. Collaboration and knowledge exchange is therefore of utmost importance. Within robotics, the open source community has given software developments a tremendous boost, with the Robot Operating System (ROS) as its best-known exponent. Open hardware, on the other hand, is less common.

Nevertheless, some examples of open robotic hardware designs already exist. Willow Garage's PR2 [16] has been introduced as an Open Platform: Users are encouraged to modify the system and open interfaces enable the use of different

* This researched received funding from the Dutch ministry of Economic affairs.