Extensions of a RoboCup Soccer Software Framework

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Abstract. The RoboCup soccer leagues have greatly benefitted Team DARwIn and the UPennalizers. The stiff competition has hardened our code into a robust framework, and the community has allowed it to flourish as an open source project used by many teams. Working with the open source DARwIn-OP hardware allows even more clairvoyance into the inner workings on the low level code the builds to state machines. We show how our codebase performs in the Webots simulation and on the Open Source DARwIn-OP platform. From these beginnings, we wish to apply our codebase to new scenarios for humanoids including human robot interaction and manipulation tasks. Many of these scenarios are explored by other RoboCup leagues including @Home and Rescue, where we see a new avenue for our codebase. New human robot interaction features are described in our framework, and example performances are demonstrated. Finally, we describe added standards compliance and open source tool usage that will give our codebase more accessibility.

1 Introduction

As a brief background, Team DARwIn and the UPennalizers are teams from the Humanoid KidSize league and the Standard Platform League, respectively, for RoboCup soccer. These teams work on the same codebase for playing software, and have released open source versions of this code since 2011. The current releases can be obtained online[1]. Because these teams operate on two totally different humanoid robots in different leagues, the focus with each software release has always been on portability and compatibility with a variety of humanoid platforms.

As such, this code has been tested, and utilized in competition, on the ubiquitous Nao and DARwIn-OP platforms, and, additionally, on custom DARwIn-XOS and CHARLI platforms. This code has performed well, pushing the DARwIn and CHARLI teams to victory in each of the past two years, and running the UPennalizers standard platform team in the same period. Furthermore, many teams in the humanoid kid-size league have used our code in competition; we have received bug reports from these teams to improve its quality.

This software has been used in-house on humanoid robot experiments outside the realm of soccer, including teleoperative control [14] and recently, the DARPA

[1] http://seas.upenn.edu/~robocup