

Ground Truth Acquisition of Humanoid Soccer Robot Behaviour

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Abstract. In this paper an open source software for monitoring humanoid soccer robot behaviours is presented. The software is part of an easy to set up system, conceived for registering ground truth data that can be used for evaluating and testing methods such as robot coordination and localization. The hardware architecture of the system is designed for using multiple low-cost visual sensors (four Kinects). The software includes a foreground computation module and a detection unit for both players and ball. A graphical user interface has been developed in order to facilitate the creation of a shared multi-camera plan view, in which the observations of players and ball are re-projected to obtain global positions. The effectiveness of the implemented system has been proven using a laser sensor to measure the exact position of the objects of interest in the field.

1 Introduction

A ground truth generation system is a necessary tool to evaluate and improve algorithms dealing with a series of challenging tasks in the RoboCup competitions. In particular, visual data collected from a global view of the environment can be used for validating innovative methods concerning the following aspects:

- Coordination;
- Localization;
- Game strategies;
- Feedback for adaptive methods;
- Quantitative measurements;
- Debugging.

Indeed, since humanoids robots have only a local and limited point of view of the environment in which they operate, tasks like coordination and localization are still open problems [6] and there is the need of creating and adopting publicly available benchmarks in order to validate and quantitatively evaluate different solutions.

In this paper, an open source software for monitoring humanoid soccer robot behaviours in the Standard Platform League (SPL) is described. The software