

HELIOS Base: An Open Source Package for the RoboCup Soccer 2D Simulation

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Abstract. To promote the research of multiagent systems, several base codes have been released for the RoboCup soccer 2D simulation community. As described herein, we present HELIOS base, currently the most popular base codes for 2D soccer simulation. HELIOS base involves a common library, a sample team, a visual debugger, and a formation editor, which help us to develop a simulated soccer team.

1 Introduction

In this paper, we present a base code, named HELIOS base, for the RoboCup soccer 2D simulation. The RoboCup Soccer Simulation 2D League is a long-running competition among the RoboCup leagues. It is based on the RoboCup Soccer 2D Simulator [8,11], which enables two teams of 11 autonomous player agents and an autonomous coach agent to play a game of soccer with highly realistic rules and real-time game play. Because of its stability, the 2D soccer simulator is extremely useful for research and education related to multiagent systems, artificial intelligence, and machine learning.

The soccer simulation league has devoted more attention to team work techniques than to robot control techniques. The 2D soccer simulator adopts a discrete timer model and an abstract and simple kinematic model, although its virtual soccer field has a continuous space. Therefore, we can avoid the burdens of developing and maintaining mechanical devices and also developing complex robot control tasks such as bipedal walking. These characteristics enable us to concentrate on research efforts related to multiagent systems. However, developing an agent program from scratch is as difficult a challenge as ever because other complex modules, such as a stable network communication, synchronization, world modeling, and so on, are necessary to produce an agent program that fully functions in the soccer simulator. We must resolve these technical problems before progressing with research of multiagent systems. The base code presented in this paper provides a framework that enables us to concentrate on teamwork techniques.

The remainder of this paper is organized as follows. Section 2 introduces the base code released by other teams. Section 3 introduces an outline of our