Zigorat 2008 Development Team Description Paper

Amin Mohammadi[1], Mahdi Hamdarsi[2]

[1] Islamic Azad University,
[2] Shahid Beheshti Univerity
{amin.mohammadi, hamdarsi}@gmail.com

Abstract. The RoboCup development competition is an attempt to speed up the development of the current simulation environment by encouraging members of the community to present implementations of improvements, and add missing functionality to it. This paper describes the main contributions of Zigorat 2008 Development Team that is going to take part in RoboCup competitions this year. Our contribution focuses on creating multi-purpose RoboCup monitor which is capable of physics analysis, full-functional log playback, agent based analyzer and simspark integration.

Keywords: RoboCup, Soccer Simulation, Development, Zigorat, Physics Analyzer, Log Player.

1 Introduction

Zigorat Team is an inter university research group made by two university students from Islamic Azad University and Shahid Beheshti University from Iran. It has been successful in past events. We started as our way in the field of developing RoboCup 3D Soccer Simulator as SBCe smart spheres with Team Assistant 2006 which gained 2nd place in RoboCup 2006 Bremen. With our name changing to Zigorat we had another successful presentation: ZigoBot Designer became 2nd in RoboCup 2007 Atlanta.

Since simulator changed its course from spheres to spark, most teams have encountered series problems in their work progress. Most of the problems arise from inadequate features of official simulator package. These include insufficient details of simulation objects, and matches. There is no information available for developers who want to debug their agents, like positions, velocities, joint states, Center of Mass, force indications, momentum accelerations and so on. On the other side, with taking in account current development status of some teams who have agents fully capable of basic skills like walking, turning, kicking, etc., more high level information is needed soon, like pass accuracy, ball control and possession, scoring probability and so on. Considering the premier goal of robotics to be fulfilled till 2050 and current status of soccer simulation field which needs a speed boost towards higher levels of learning, we are designing a tool specifically for this purpose. “Zigorat Agent Development Tool” is a multi-purpose analysis tool, designed specifically for simspark (The current RoboCup soccer simulator). It has capabilities of agent based physics analysis, agent information monitor, fully functional and easy to use

embedded log playback system, complete integration into simspark, new visual monitor worthy of RoboCup soccer simulation games, with autonomous camera agents [1] and a soccer strategy and positioning review tool.

2 Our Approach

Taking in mind all of the problems above, we started our project with the hope of fulfilling these problems. Zigorat Agent Development Tool (ZigoDev) is composed of a window which everything goes in it. There are varieties of camera's, each based on autonomous camera agents [1], plus a free roam camera. Agent analysis tool nearly shows every detail relative to the agent, Center of Mass and other physics related stuff are calculated by the physics analyzer, the Log Player which enables real-time and offline log viewing capabilities, which we hope help agent development a lot, plus a lot of things to facilitate a 3D soccer agent development.

Like our previous published works, much attention has been paid to software engineering aspects. The code has been written with minimal complexity, yet with maximum speed and power, and as always it is heavily documented, with Doxygen documenting system. We started ZigoDev based on our previous implementation for previous soccer simulation simulator[1]. Currently there are 4 significant features awaiting completion as follows:

2.1 Agent Based Physics and Details Analyzer

Providing an easy and clear way to gather information about what the agent intends and how the world looks like, according to the agent, is essentially needed. The following features are judged beneficial and essential to debug handwritten behaviors and to verify the decisions of learned behaviors. The tool is also helpful for probing the agents' internals. The Layered Disclosure concept [2] was first introduced in CMUnited99 simulated agents, and it proved to be very helpful in development of intelligent agents. The goal of the Layered Disclosure concept is to make various agent characteristics [3]. In our approach we have disclosed lots of details relative to agent for the developer, enough for agent based analysis and even agent corrections. These include a range of data from low-levels to high-levels, Like Agent position, velocity, angular positions and velocities of joints, Center of Mass, Simulation objects data relative to agent and much more other useful information.

2.2 Log Player

One of the main problems we encountered during our own 3D agent development was log playback. Although simspark contains a basic log playing capability, it is too far

[1] The previous 3D soccer simulator was based on sphere agents and our previous work was SBCe Team assistant 2006.

to be an adequate log playback system, so there flashed the idea to add a full featured log playback system. When talking about a log player or a monitor, it essentially means the same program in two different operation modes, Log player program replays log files of a previously simulated game, and monitor, monitors a game that is currently being simulated. What we done is more than just a basic log player. We have merged the two usages of monitor into one and made them just one generic monitor / log player. Playback system is embedded into the monitor, can be used even in real-time match progress, playback speed can be adjusted, there is a shortcut mode for jumping into any valid desired frame, and meanwhile all features of monitor are at hand and ready to use.

2.3 Soccer Strategy and Positioning Review Tool

With taking in account current development status of some teams who have agents fully capable of basic skills like walking, turning and kicking, more high level information is needed. We added several tactical and strategical overview tools for debugging high-level actions of agents. These include several match facts, like Pass count, Successful passes review, scoring opportunities and probabilities, ball possession and so on.

2.4 Simspark Integration

ZigoDev idea was started as a package, outside of official simulator. But upon completion we observed that it can merge into the official package and be available to the public, since it has all the basic abilities of kerosin and much more extras. Besides, no major changes is needed while adding it to the simulator.

3 Future Plans

ZigoDev is highly extendible, and is capable of adding anything which facilitates use of soccer simulator, weather for technical committee, RoboCup researchers, or outside viewers. There are so many ideas to be merged to current application package, from which we can mention Commentary, and direct movie export [1]. Commentary is one of optional add-ons that can improve match illustration. Direct Movie export is previously mentioned at [1] and it has proven to be a successful idea for presenting soccer 3D matches over internet or for simple demonstrations.

References

1. Heni Ben Amor, Oliver Obst, RoboLog 3D Development Team Description, VR and Multimedia Group, TU Bergakademie Freiberg, Freiberg, Germany, School of Electrical Engineering and Computer Science, The University of Newcastle, Callaghan, NSW 2308, Australia
2. P. Riley, P. Stone, M. Veloso, Layered Disclosure, Revealing Agents' Internals, the seventh International Workshop on Agent Theories, Architectures, and Languages (ATAL-2000).
3. Amin Habibi Shahri,Ali Almasi Monfared,Mohammad Elahi, A Deeper look at 3D soccer simulations, Electrical & Computer Engineering Faculty, Shahid Beheshti University, Tehran, Iran
4. S. Planthaber, U. Visser, Logfile player and analyzer for RoboCup 3D simulation, in Proc of RoboCup 2006 symposium.
5. E. Nazemi, V. Kazemi, A. Habibi Shahri, A. Hosseingholizadeh B. Nooraei B, SBCE SmartSpheres 3D Development Team Description. in Proc. of RoboCup, 2006
6. T. Takahashi, Logmonitor, From player's action analysis to collaboration analysis and advice on formation. in RoboCup-99: Robot SoccerWorld Cup III, ser. Lecture Notes in Computer Science. Springer-Verlag GmbH, pp. 103 - 113.