OpenHRP Made More Accessible

*Hajime SAITO(GRX), Yuichiro KAWASUMI(GRX), Kei OKADA(U.Tokyo)

1. Introduction

OpenHRP has already been introduced several times before[1][2][3]. However, the introductions tend to focus on the architecture of the system and do not cover the actual application of the software itself, that well. Here we hope to give you an idea of how to apply OpenHRP to new robots. The idea is to give people a sense of what you get in return for the amount of data you provided.

2. Overview

OpenHRP is basically a server/client based robot simulation system. It uses CORBA to connect the various components that are required for the dynamic simulation of a robot. To actually perform the simulation, forward and inverse kinematic functions, robot model data file loading functions and collision detection are provided through libraries and servers. The libraries are useful for building software robot control systems as they allow you to perform forward and inverse kinematics on robotic structures defined a robot model that uses a supported model data format.

To facilitate the adoption of the system by other researchers and vendors, a basic controller is also provided as an example, and this demonstrates how the HRP series controllers actually connect to the simulation environment and also the real robot.

However, this together with the webpage[5], does not seem enough for the adoption of OpenHRP in itself.

3. The Problem

Over the years we have found that people have problems, trying to apply OpenHRP to their own project. We now think that this partly because there are too few use cases, and that a sample that works doesn't really illustrate how to go about applying the system for your use. The attitude that the source is available doesn't work because, OpenHRP being a server/client system, people do not know which part to start reading from. Another point is the fact that the whole system is a hybrid system, that uses a combination of C++, Java and Python. The client is written in Java, which also comprises the GUI so there is a lot of source code to sift through.

We have also found that there are no forums for a user to make new suggestions. There is also no formal way for someone to send patches with new capabilities.

For an open source project to really succeed, there has to be some freedom. However, currently the situation is closed and not very welcoming to new users.

4. The Solution

To remedy this we have created a new repository which is open to users outside of the tight knit OpenHRP community. By cooperating with other projects such as OpenRAVE and ROS, we hope to create dialog, which will act as entry points through which new users could start to explore the OpenHRP system.

The project is hosted on Google Code[6], also has a web page. Users should be able to find typical use cases for OpenHRP here. We have nearly finished support for Collada robot model files, and users can follow development, through the repository.

5. Future Work

The main reason for the new repository is experimentation. Current areas of interest are as follows.

1. **Remove "start with WAIST" restriction**
   All models currently need to start from the joint "WAIST". This becomes counter intuitive when you just want a box.
2. **Try out OpenSceneGraph**
   Many open source projects are starting to use OpenSceneGraph and we think this is worth looking into.

References

[1] Hirohisa Hirukawa, Fumio Kanehiro and Shuuji Kajita: "OpenHRP: Open Architecture Humanoid Robotics Platform," Proc. Int. Symp. Robotics Research, 2001.

[2] Hirukawa,H., Kanehiro,F. and Yokoi,K.: "HRP develops OpenHRP," IEEE/RSJ IROS Workshop on Explorations towards Humanoid Robot Applications, 2001.

[3] Fumio Kanehiro and Hirohisa Hirukawa: "OpenHRP: A Software Platform for Humanoid Robotics," Humanoids 2006 Workshop on Humanoid Technologies, 2006.

[4] "VRML Preparation for Robot Simulation" `http://sourceforge.net/apps/mediawiki/free-cad/index.php?title=VRML_Preparation_for_Robot_Simulation/`

[5] "The Official AIST OpenHRP Website," `http://www.openrtp.jp/openhrp3/en/index.html`

[6] "The UnOfficial Radical OpenHRP Website," `http://code.google.com/p/openhrp-aist-grx/`