Nao-Team HTWK 2010 SPL Team Description Paper

Nao-Team HTWK

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1 Nao-Team HTWK

The Nao-Team HTWK is a RoboCup team that consists of graduate and undergraduate students of Leipzig University of Applied Science and was founded in February 2009. The team participated in RoboCup German Open 2009 and reached the second place as well as the first place in the Technical Challenge of RoboCup 2009.

Our main research interest is the automated creation of dynamic movements of simulated or real humanoid robots with evolutionary algorithms.

Our current algorithm allows a robot to autonomously train movements utilizing its complete potential given by its architecture and sensoric equipment. A previous knowledge of the robot's architecture is not needed for this algorithm to work. Sensoric equipment (e.g. accelerometers, gyroscopes) is used dynamically to support and stabilize the trained movements. Because of the algorithm's independence of the robot's architecture, it can be easily adapted to a new robot. The algorithm is currently successfully used in a simulation environment (Webots) to train efficient omni-directional movements for different robots (i.e. Nao, Qrio, Aibo and KHR-2).

In contrast to an application in physics simulation software, the practical usage of such an algorithm demands a drastical reduction in the required training steps. Through major algorithmic optimizations, we were able to greatly reduce the needed individuums an generations of our evolutionary algorithm. At the moment, we are able to completely autonomously train a single movement (e.g. straight walking, bended walking, turning, shooting) within a few days (real time).

Figure 1: First place in Technical Challenge at RoboCup 2009 in Graz

Figure 2: Second place at RoboCup German Open 2009 in Hannover

1.1 Team Supervisor

The Nao-Team HTWK is being supervised by **Prof. Dr. rer. nat. habil. Karl-Udo Jahn** who is a Professor of Computer Science at the Leipzig University of Applied Sciences.

1.2 Team Members

Nao-Team HTWK 2010 includes six student members from one academic department:

Rico Tilgner, B. Sc., Student of Computer Science

Thomas Reinhardt, B. Sc., Student of Computer Science

Daniel Borkmann, B. Sc., Student of Computer Science

Nils Rexin, Student of Computer Science

Stefan Seering, B. Sc., Student of Computer Science

Tobias Kalbitz, B. Sc., Student of Computer Science