Dutch Nao Team: Team description paper: Standard Platform League: German Open 2010

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Abstract. This is the debut of the Dutch Nao Team in the Standard Platform League. The team is a recreation of the Dutch Aibo Team, which was active in the predecessor of the SPL (2004-2006). This year participation is mainly intended to gain experience. As basis for the competition the code release of B-Human is used, with two modifications. The first modification is improved kicking behavior to accommedate the new ball. The second modificition is two use both Nao camera's (one for ball control and one for localization).

Introduction

The Dutch Nao Team consists this year of two enthousiast students from the Bachelor Artifial Intelligence, supported by two international students from the Master Artificial Intellingence.

Because of the limited size and experience of the team, the main challenge will be to get an operational team, and include our modifications to a limited number of modules. Based on this experience new research direction will be formulated.

The predecessor of this team, the Dutch Aibo Team, participated in three RoboCup competitions (2004-2006) [1–3] and several local events. More important, a wide variety of articles, papers, theses and reports [4–20] were published as a result of the research performed inside the team.

1 Team Members

The code was originally developed by the B-Human team [21] and all other contributions have been built into his framework.

The following contributions have been made this year:

Arnoud Visser	: coordination
Ravi Kumar Gupta and Bardia Khalesi	: ball kicking
Robert Iepsma and Maurits van Bellen	: camera selection

2 Kick

Inspired by the movie accompanied by the recent work of Hester et al [22], a new kick was designed in Choreographe[1]. The new kick is stronger, because the ball is hit in the center with a higher speed. Additionally, the Nao has an improved balance, by using its arms as counter-balance and a lower center of gravity by a stronger bending its of knees. Movies of this movement (both real and ssimulated) are online available [2].

The Choreographe movement was converted to a special action which can be called from the MotionControl. This convertion involved an unit change (from degrees to radians), a reordening of the different joints and the transformation of a few coordinate systems:

$$\phi_{LShoulderPitch} = 90^o - \phi_{LShoulderPitch} \quad (1)$$

$$\phi_{LShoulderRoll} = \phi_{LShoulderRoll} - 90^o \quad (2)$$

$$\phi_{LHipRoll} = -\phi_{LHipRoll} \quad (3)$$

$$\phi_{RShoulderPitch} = 90^o - \phi_{RShoulderPitch} \quad (4)$$

$$\phi_{RShoulderRoll} = -90^o - \phi_{RShoulderRoll} \quad (5)$$

$$\phi_{RElbowRoll} = -\phi_{RElbowRoll} \quad (6)$$

This conversion was implemented in a Python script, which allows us to easily develop new movements.

3 Camera selection

The Nao is equiped with two cameras in his head. Currently, only the one is used to recognize objects such as balls, lines and goals. For objects along the horizon, such as the opponent goal, the upper camera seems to be a better choice. For objects nearby, such as the ball, the lower camera seems to be a better choice. An algorithm should eb found when to switch cameras. Further, the perceptional distortion and the lighting conditions for both camera will differ. This means that the all detection algorithms should be redesigned, trained and tested.

4 Conclusion

This paper summarizes the intentions and contributions of the Dutch Nao Team for the German Open 2010 in Magdenburg.

[1] `http://www.aldebaran-robotics.com/en/programmable`
[2] http://naologbook.blogspot.com/2010/01/blog-post.html

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