

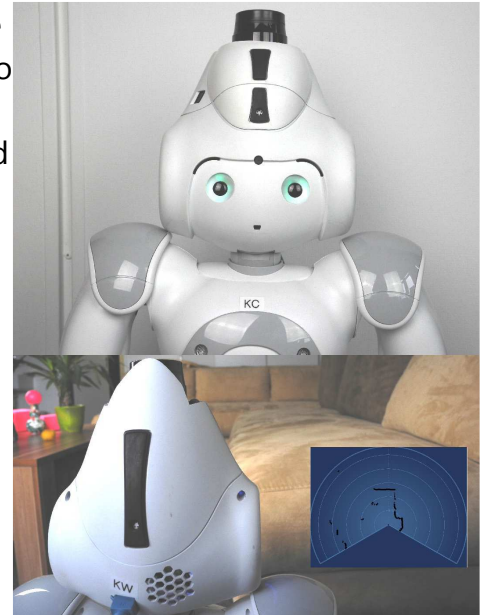
Neural network learning with a laser robot head

Master Thesis

Abstract

Being able to cover an indoor environment up to 4 meters, the laser head of NAO provides a compact and accurate method to obtain a 2D obstacle map for the use of humanoid robot navigation. Moreover, the laser data is integrated in NaoQi and can be easily retrieved by simple commands. This kind of laser head has been initially developed as a stair climbing robot, an obstacle avoidance robot, etc. In this project, we propose to use the laser sensor for moving object prediction in an ambient environment. While there is previous research [1] of dynamic collision avoidance or moving object tracking, we propose to realize these two aspects in a humanoid robot with neural networks technologies.

[1] A. Ess et al. Moving Obstacle Detection in Highly Dynamic Scenes. ICRA 2009.



Goals

- Construct a 2D map with laser data in a real indoor environment.
- For sub-task (i): Identify and track moving objects in the map, e.g. with a recurrent neural network.
- For sub-task (ii): Build a collision avoidance model with neural network technologies.

Useful Skills

- Programming experience, preferably Python, C/C++.
- Keen interest in artificial intelligence and bio-inspired methods.
- Collaboration with a technician for the laser head is possible.

Contact

Dr. Cornelius Weber, Professor Dr. Stefan Wermter, Junpei Zhong
Email: {weber,wermter,zhong}@informatik.uni-hamburg.de
Telefon: +49 40 42883-2537, -2434, -2531