Universität Heidelberg
Institute for Computer Engineering
(ZITI)

Master of Science Computer Engineering

Robotics Practical

Walking NAO

Barth, Alexander
Wagner, Royden

supervised by Wittlinger, Peter

Summer term 2020

Abstract

@todo: complete

This report describes the walking NAO project of the Robotics Practical lecture. This project is done by Barth, Wagner, which are all students in the master program computer engineering. The main target is to

Contents

1 Testing and prep

@todo: ...

test development env for ROS (in docker?)
try nao/ naoqi with ROS: http://wiki.ros.org/nao
use DenseDepth as basemodel for depth estimation: https://arxiv.org/pdf/1812.11941v2.pdf
write test-funcs to showcase depth estimation model in realtime via your webcam

2 Remote control

@todo: ...

construct NAO-nano-backpack
write webapp to control NAO
serve webapp with flask on nano

idea: use UI5

3 Depth estimation

@todo: ...

use opencv to detect if dark blue colored objects are in the desired direction and decline movement if so

get desired direction and draw on depth image
use color picker to check if movement in chosen direction is possible (dark blue == not possible)
try to implement a color search algo in opencv similar to SSD (single shot detector)

implement functions to check if navigation in certain direction is possible based on point cloud of surroundings
optional: try to change basemodel of DensDepth to MobileNet V1/V2 to increase speed

4 Commissioning

@todo: instructions for commissioning

5 Conclusion and outlook

@todo: future usage in lecturing and the robotic lab