Universität Bremen

Institute for Artificial Intelligence

Faculty 03

Mathematics &

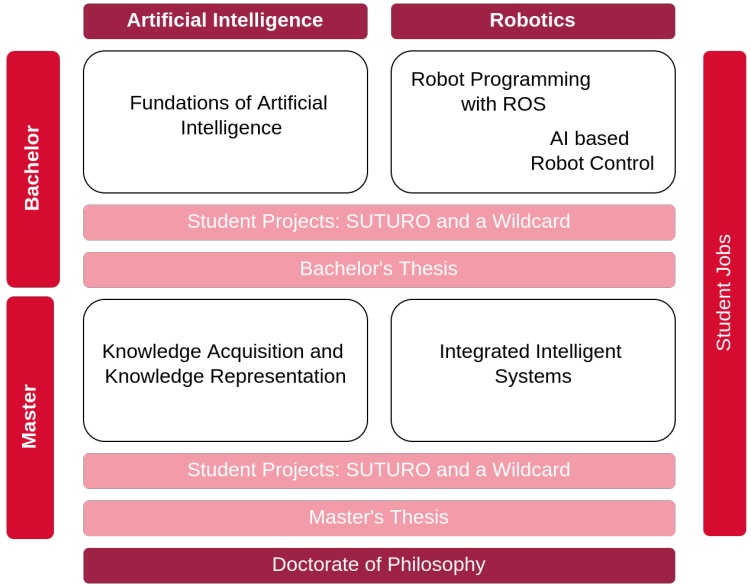
Computer Science

Robot Programming with ROS

1. Introduction, Overview

Arthur Niedźwiecki

19th Oct. 2023


Artificial Intelligence
Robotics
Bachelor
Fundations of Artificial Intelligence
Robot Programming with ROS
AI based Robot Control
Student Projects: SUTURO and a Wildcard
Bachelor's Thesis
Master
Knowledge Acquisition and Knowledge Representation
Integrated Intelligent Systems
Student Projects: SUTURO and a Wildcard
Master's Thesis
Doctorate of Philosophy
Student Jobs

Plan

General Info

- Lecturers: Arthur, Alina (PhD students at IAI)
- Tutor: Stefan (WiMi at IAI)
- Correspondence: `aniedz@cs.uni-bremen.de`
- Dates: Thursdays, 14:15 - 15:45, 16:15 - 17:45
- Language: English and German
- Credits: 6 ECTS (4 SWS)
- Course type: practical course
- Course number: 03-IMVP-RPROS (03-BE-710.98b)
- Location: TAB Building, Room 0.30 EG

Plan

Course Goals

Intended Learning Outcomes

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- You can describe how a robot perceives the world.
- You understand how an autonomous vacuum cleaner navigates.

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...and get to play with a real little robot!

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https://www.ros.org/

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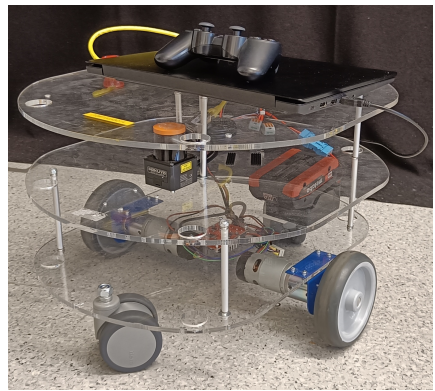
- *De facto* standard in modern robotics

TortugaBot

- 2 controllable wheels
- 2D laser scanner
- Thinkpad E485 PC with bluetooth
- PlayStation joystick



Rough schedule

Until Christmas 2023: Assignments in simulation

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Jan - Mar 2024: Project in groups

- Controlling TortugaBot
- Heuristic decision-making
- The big day: *competition*

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Scheinbedingungen Summary

- Graded homework every week until January, then group project
- Live presentation of the group project, individual grading
- 50 homework + 50 group project = 100 points for final grade
- At least 25 points from the homework to participate in the project
- Final grade: 50 of 100 points - 4.0, 100 of 100 points - 1.0.
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- Solutions are discussed in the tutorial.

Links

- This lectures website:
  `https://ai.uni-bremen.de/teaching/cs-ros-ws23`
- Git reference book:
  `https://git-scm.com/docs/gittutorial`
- Assignments repository:
  `https://github.com/artnie/rpwr-assignments`

Info summary

Next class:

- Date: 26.10.
- Time: 14:15
- Place: same room (TAB 0.30)

Assignment:

- Due: 25.10, Wednesday, 23:59
- Points: 3 points
- For questions: write me a mail
  or ask your colleagues in the StudIP forum

Plan

Assignment goals

Set up your workspace

Set up your Git repository

Get comfortable with Jupyter

Install/Navigate a Linux terminal

Linux

Highly recommended to try Linux!

- Ubuntu 20.04 runs all of the institutes robot software
- ROS is best supported for Ubuntu 20.04
- Natively communicate with the TortugaBot in the project
- You can break everything

Ubuntu 20.04 - your options (Recommended)

Release page:
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  `https://www.virtualbox.org/`
- WSL2 - Windows Subsystem for Linux (best for Windows)
  Full Ubuntu 20.04 CLI under Windows
  `https://ubuntu.com/tutorials/install-ubuntu-on-wsl2-on-windows-10\`

Robot Operating System (Recommended)

ROS Noetic runs on Ubuntu 20.04

- Installation guide
  `https://wiki.ros.org/noetic/Installation/Ubuntu`
- Open access tutorials
  `https://wiki.ros.org/ROS/Tutorials`

Assignments Repository

`https://github.com/artnie/rpwr-assignments`

Q & A

Thanks for your attention!