Robotics

Year: 2018-2019
Catalog number:
Teacher(s): dr E.M. Bakker
Language: English
Blackboard: No
EC: 6.0
Level: 500
Period: Semester 2
Hours of study: (24:00 hours of lectures)

Admission requirements
The student should be fluent in C/C++ programming.

Description
During the last decade we have seen an explosion of all kinds of robots designed for tasks that previously were deemed too challenging. Robots have evolved from robotic arms and karts that could execute repetitive or simple tasks such as painting, welding and vacuum cleaning to autonomous cars, drones and humanoid helpers that execute their tasks in much less controlled and even natural settings. For this modern robots require sophisticated adaptive capabilities.
During this course we will have a thorough look at all important aspects of the robot-architecture used in modern and state of the art robots. The use of various actuators and sensors will be studied. Algorithms for low level tasks such as movement, dead reckoning, obstacle-detection, and balancing will be presented. Intermediate level tasks such as mapping, obstacle recognition and avoidance, and more advanced modes of reckoning, navigation and object manipulation will be studied. Finally, high level tasks such as human-robot-interaction and adaptive behavior in natural environments will be studied and proto-typed using state of the art sensor analysis, computer vision and audio recognition techniques.

Course objectives
After successfully finishing the Robotics course the student:

- Has a thorough insight and understanding of the underlying architectures and operating systems of modern state of the art robotic platforms.
- Is capable of designing, developing and implementing low-, and mid-level robotic tasks on different robotic simulators and platforms.
- Has a good understanding of the challenges and progress in scientific robotics research.
- Has insights in the design and implementation of high level robotic tasks using state of the art tools for sensor analysis, computer vision and audio recognition techniques.
- Is capable of implementing a prototype for autonomous Human Robot Interaction.

Timetable

Mode of instruction

- Lectures
- Workshops
- Seminar
- Student discussions
- Presentations
- Homework and assignments

Assessment method
The final grade is based on:

- Homework and assignments (40% of the grade)
- Robotics Project (60% of the grade)

Reading list
Conferences and journals on Robotics.

Registration

Contact information

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