USEET9 - Learning Robots

Présentation

Prérequis

Programming in Python or C++, basics of ROS and simulation environments, understanding of machine learning concepts (e.g. Neural Nets, Reinforcement Learning, Computer Vision) may be helpful.

Objectifs pédagogiques

Students are able to conduct a project-oriented, scientific work in the area of robotics. They have the ability to define an innovative project topic, acquire skills and technologies required for the project, find related works and base their own work on them where appropriate. The students are further able to work independently in a team and to apply state-of-the-art methods to develop concepts and solutions for the project topic. They can document the results in the form of a scientific report and present their findings in the form of a presentation. They are able to acquaint themselves with a new topic and to conduct a scientific project.

Programme

Contenu

At the beginning of the project, the range of contents that should be covered in the project will be discussed in detail and the relevant methods will be identified. This is accompanied by a literature search, reading, and discussion phase. In this phase relevant mathematical and computational methods will be selected and discussed. In the second phase, the team starts to implement the experimental design on a simulated robot. Regular team meetings and supervisory consultations lead to an iterated improvement of the software. In the third phase, the thoroughly tested software will be transferred to the robot and tested in a real or simulated environment. The results are written up in a final project report and are presented in a final project presentation.

- Definition of concrete project idea.
- Project plan incl. systematic literature review.
- Evaluation of suitable technologies.
- Self-learning of the required technical foundations.
- Architecture design.
- Implementation.
- Integration.
- Test.
- Deployment.

Modalités de validation

- Contrôle continu
- Projet(s)
- Mémoire

Description des modalités de validation

Project presentation and report.

Bibliographie

Titre	Auteur(s)
Probabilistic Robotics	Thrun, Burgard, Fox
Pattern recognition and machine learning	Bishop

Artificial intelligence. A modern approach	Russell & Norvig
ROS by Example INDIGO – Volume 1	Goebel