USEEU1 - Robot Operating Systems

Mis à jour le 03-07-2024

Code : USEEU1

Unité spécifique de type cours

3 crédits

Responsabilité nationale :
EPN05 - Informatique / Ngoc-Thach DINH

Présentation

Prérequis

Linear algebra and analysis, programming in Python or C++

Objectifs pédagogiques

Students will understand the fundamental theoretical and algorithmic principles behind robotic systems. Students are able to solve robot specific learning problems involving, for example, navigation and mapping, grasping and manipulation, and interaction with humans. They understand the ROS Ecosystem (topics, nodes, messages, services, actionlib) and are able to develop simple applications to control robot motion.

Programme

Contenu

This course gives an introduction to the Robot Operating System (ROS) including available tools that are commonly used in robotics. With the help of examples, the course provides a starting point for working with robots. The course covers how to create software including simulation, to interface sensors and actuators, and to integrate control algorithms.

- ROS architecture: Master, nodes, topics, messages, services, parameters and actions.
- Console commands: Navigating and analyzing the ROS system and the catkin workspace.
- Creating ROS packages: Structure, launch-files, and best practices.
- Simulating with ROS: robot models (URDF) and simulation environments.
- Working with visualizations and user interface tools.
- Introduction to ROS2.

Modalités de validation

- Contrôle continu
- Mémoire

Description des modalités de validation

Continuous monitoring (portfolio).

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