

ETH Master Course

Autonomous Mobile Robots - 151-0854-00L

Agenda Spring 2020

Lecture: *Weekly on Tuesday 10.15 - 12.00, NO C 60*

Exercises: *Approximately every second week, Tuesday 14.15 - 16.00, HG F1*

Webpage (additional learning material) : https://asl.ethz.ch/education/lectures/autonomous_mobile_robots/spring-2020.html

MOOC: https://online.ethz.ch/courses/course-v1:ETH+AMRx_FS2020+2020_T1/about



Responsible MOOC:

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Week #	Date	Topic	Lecture segment names	Lecturer	Online release date and problem set	Number worked exercises	Problem set (yes/no)	Problem set due date
1.	18.02.2020	Introduction and Motivation	Introduction and Lecture Overview	Roland Siegwart	12.02.2020			
2.	25.02.2020	Locomotion Concepts	Introduction to Legged Robotics Basics of Rigid Body Kinematics Application of Rigid Body Kinematics (optional) <i>Worked Exercise 1 & 2 (optional)</i> Example of Wheeled, legged and Flying Robots (lecture)	Nick Lawrance	19.02.2020	2	optional	29.02.2020
Ex1	25.02.2020	Introduction to V-Rep simulator		Karen Bodie, Lukas Schmid	19.02.2020			
3.	03.03.2020	Mobile Robots Kinematics	Introduction to Wheeled Locomotion Differential Kinematics Wheeled Kinematics <i>Worked Exercise</i>	Roland Siegwart	26.02.2020	1	yes	07.03.2020
4.	10.03.2020	Perception I (to 4.3)	Sensors IMU GPS Motion Capture systems Laser range finder <i>RGBD/time-of-flight/sonar</i>	Roland Siegwart			no	
5.	17.03.2020	Perception II (to 4.4)	Camera Image Formation, Perspective Projection Introduction to Computer Vision Omnidirectional Projection, Camera Calibration, Unified Model Stereo Vision <i>Worked Example: Structure from Motion</i>	Margarita Chli	11.03.2020		yes	21.03.2020
Ex2	17.03.2020	vehicle		Max Brunner, Lukas Schmid	11.03.2020			
6.	24.03.2020	Perception III: Image Saliency (to 4.5)	Correlation and Convolution Edges and Points <i>Worked Example on Image Filtering</i>	Margarita Chli	18.03.2020	1	yes	28.03.2020
7.	31.03.2020	(to 4.5)	Place Recognition The Error Propagation Law Line Extraction	Margarita Chli	25.03.2020		yes	04.04.2020
Ex3	31.03.2020	Line extraction		Hermann Blum, Lukas Bernreiter, Ignacio Alzugaray	25.03.2020			
Quiz 1	31.03.2020	Quiz 1		Michel Breyer, Margarita Grinvald	31.03.2020			14.04.2020
8.	07.04.2020	Localization I (to 5.2)	Introduction to Map-Based Localization Refresher on Probability Theory	Roland Siegwart	01.04.2020		yes	11.04.2020
	14.04.2020	Week off - Easter Holiday						
9.	21.04.2020	Localization II	The Markov Approach The Kalman Filter Approach	Roland Siegwart	15.04.2020		yes	25.04.2020
Ex4	21.04.2020	Line-based Extended Kalman Filter		Hermann Blum, Lukas Bernreiter, Ignacio Alzugaray	15.04.2020			
10.	28.04.2020	SLAM I	The SLAM problem	Margarita Chli		1	no	10.01.1900
11.	05.05.2020	SLAM II	Monocular SLAM and beyond <i>Worked Example on SLAM</i>	Margarita Chli	29.04.2020	1	yes	09.05.2020
Ex5	05.05.2020	EKF SLAM		Florian Tschopp, Patrik Schmuck	29.04.2020			
12.	12.05.2020	Planning I (to 6.2)	Motion planning Representations and configuration space Graph search methods Collision avoidance	Nick Lawrance	06.05.2020	1	yes	16.05.2020
13.	19.05.2020	Planning II (to 6.3)	Sampling-based planning Planning under motion constraints	Nick Lawrance	13.05.2020	1	yes	23.05.2020
Ex6	19.05.2020	Dijkstra's algorithm and the dynamic window		Daniel Dugas, Julian Förster	13.05.2020			
Quiz 2	19.05.2020	Quiz 2		Michel Breyer, Margarita Grinvald	19.05.2020			02.06.2020
14.	26.05.2020	Summary	Summary	Roland Siegwart			no	