

Introduction to Robotics

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Persons

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Assignments and exams

- Weekly
 - programming in ROS Kinetic
 - tasks for model car or simulator
 - Linux/Ubuntu 16.04 LTS 64x, Python
- Slides and assignments online in KVV
- Written exams by mid of February 2017

Topics

- Structure:
 - Introduction: hardware of AutoMiny
 - Robotic Operating System
 - Frontal video camera – Calibration and image processing
 - Lidar: Technology, reading the point cloud
 - PID control
 - Computer vision: color processing
 - Simulating GPS with markings
 - Navigation with feed-back
 - Stereoscopy – 3D
 - Reactive behavior
 - WiFi-Communication
 - Free form navigation (A* algorithm)
 - Car competition

Head of Artificial Intelligence and Robotics

- Prof. Dr. Raúl Rojas
- Projects:
 - Autonomous Vehicles (Prof. Dr. Göhring)
 - Autonomous model car project
 - Autonomous electric wheelchair

Autonomous vehicles



AutoNOMOS-Labs - subprojects

Computer Vision

optical flow, stereo vision, line and traffic light recognition, object detection and classification

Lidar and Radar

point cloud operations, clustering, object tracking, data fusion, object prediction

Navigation and control

planning in dynamic environments, control, simulation, mapping

AutoNOMOS-Labs - subprojects contd.

Energy efficiency

using 3d maps, traffic lights, and planning around dynamic objects

Swarm behavior

how to plan without maps, using surrounding objects, only

Communication

car-to-car, car-to-infrastructure communication, map updates

Autonomous model cars



