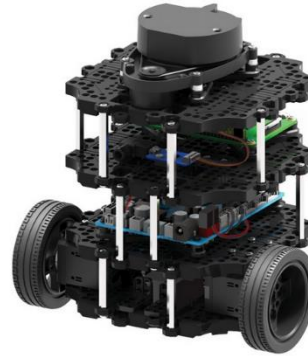


## Implementation of a localization system for autonomous routing and obstacle avoidance on a wheeled robot

The reliable detection of an autonomous machine's current location not only enables tracking and adaptive logistics in material transport, but also the provisioning of context aware functions for the autonomous processing of the handled material. Indoors, GPS is unsuitable for accurate positioning. Still, many location-based functions are conceivable within buildings like production halls or storage facilities, using mobile machines that are aware of their own location. A robot with a Raspberry Pi shall be connected to an external positioning system. With additional internal data (i.e. the robot's odometry) the robot will be able to calculate his actual position, speed and heading. The robot shall also be able to receive commands, autonomously route itself to a given position and report its current position.



The following tasks shall be completed:

- Research and documentation of existing positioning systems for autonomous machines
- Definition and implementation of a communication interface between Raspberry Pi, localization system and an external terminal
- Integration (mechanic & electric) of the given UWB-Localization in the robot
- Integration of UWB positioning data and other data such as odometry to calculate the current position, speed and direction
- Implementation of the execution of an external "go to" command to reach a given location and routing around forbidden areas
- Realization of a functional prototype and testing regarding localization accuracy and overall performance
- Documentation of the results

**Project type** Master's thesis, student project  
**Requirements** Experience in programming (e.g. C, Python)  
**Supervision** M.Sc. Hannes Raddatz, M.Sc. Fabian Hölzke,  
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