



**Hochschule
Bonn-Rhein-Sieg**
University of Applied Sciences

Software Development Project

Final Presentation

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Introduction

Software Development Project

Basic Navigation Test

- Environment: Workspaces, waypoints and obstacles.
- Task specification: Sequence of poses.



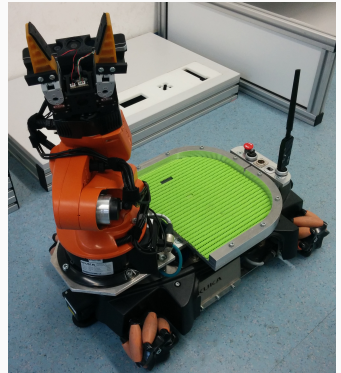
Challenges

- **Perception:** Accessing and processing sensor data.
- **Mapping:** Building map of the environment.
- **Localization:** Pose inside map.
- **Path planning:** Determine sequence of poses between waypoints.
- **Motion control:** Execution of path.

KUKA youBot

The youBot is a mobile manipulator designed for education and research purposes. It comes with fully open interfaces and API.

- Omnidirectional, four-wheeled
- 5-DOF manipulator with a two-finger gripper
- On-board PC with CPU, 2GB memory, 32GB SSD drive
- Sensors: vision sensors, rangefinders



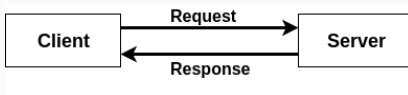
Robot Operating System (ROS)

Set of software and libraries.

- **Node:** A process using ROS.
- **Topic:** Message queue, used for communication between nodes.

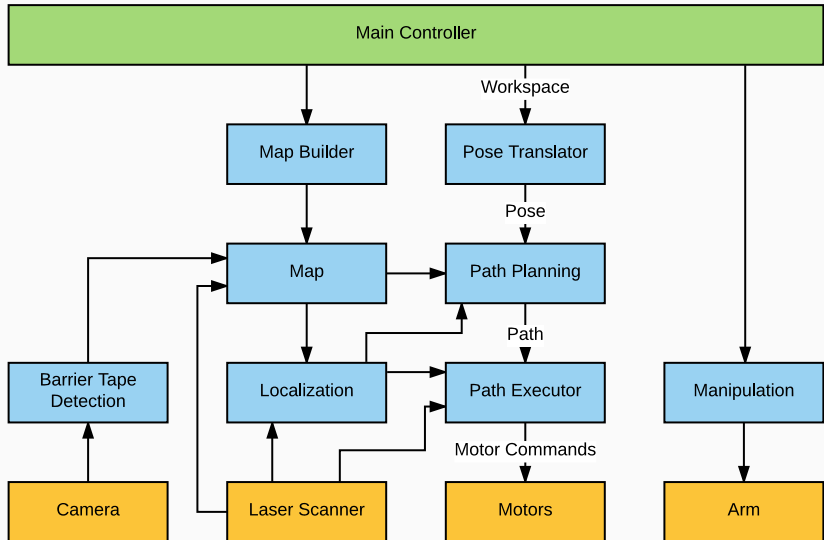


- **Service:** Offers synchronous service calls.



Approach

Software Modules



Realization

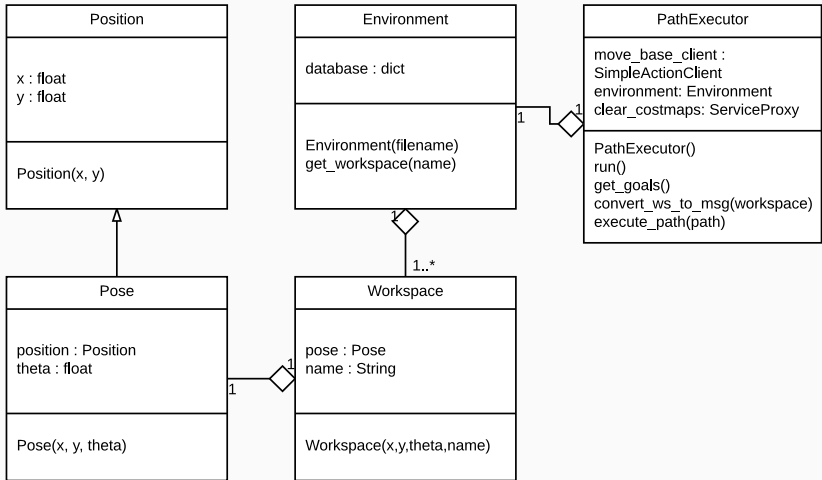
Map building I

Map building II

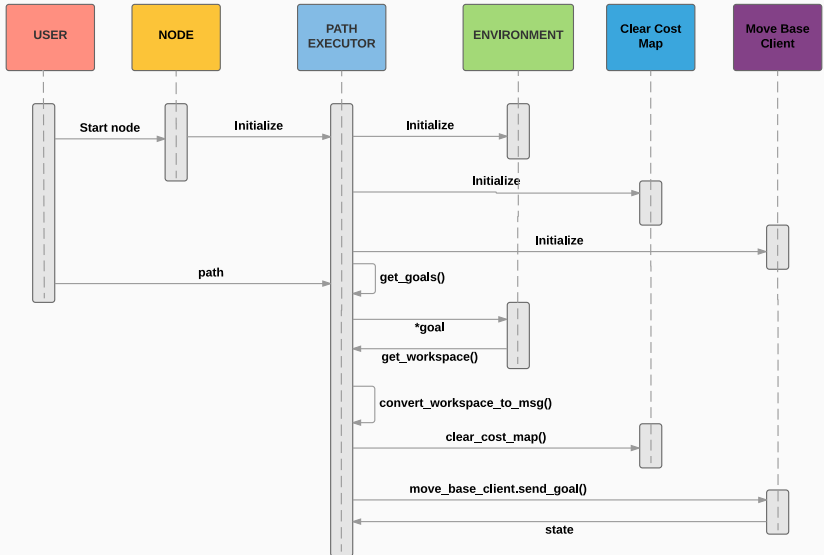
Navigation - Local Planner

Results

Class Diagram



Sequence Diagram



Conclusions

Conclusions

Future Work