NEUROROBOTICS

Thesis Call

TECHNISCHE UNIVERSITÄT
IN DER KULTURHAUPTSTADT EUROPAS
CHEMNITZ

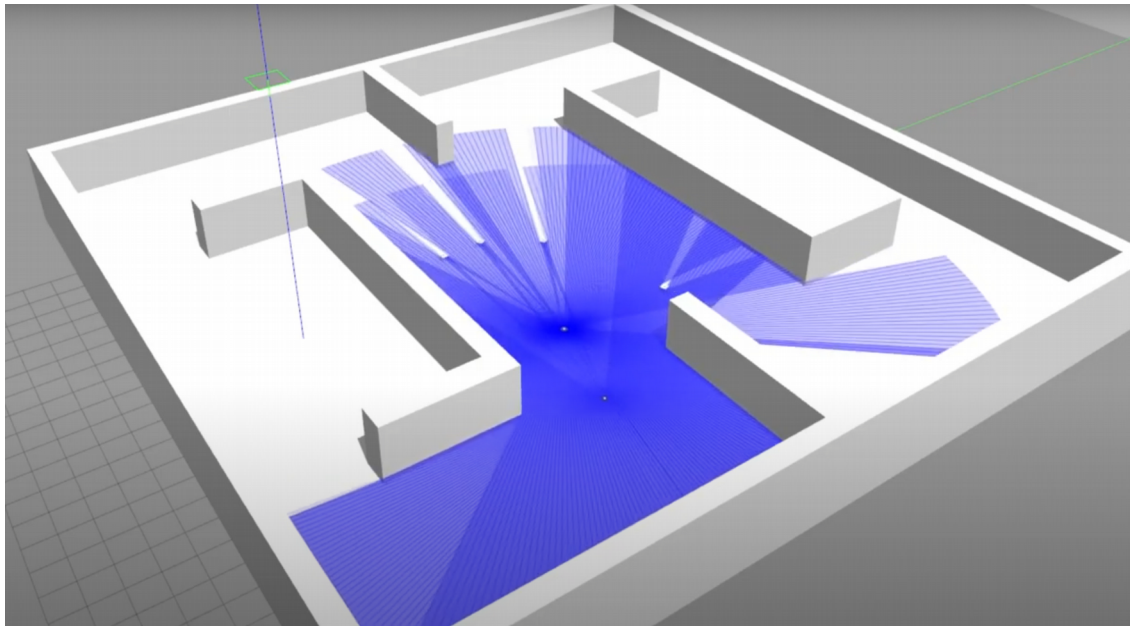
Enhancing Multi-Robot Coordination for Transport Systems

The integration of multi-robot transport systems has the potential to revolutionize logistics and manufacturing by enabling efficient, scalable, and flexible operations. This thesis aims to explore and improve the coordination strategies of multiple robots operating within a transport system, leveraging the capabilities of the ROS2 (Robot Operating System 2) Navigation Stack.

The objective of this research is to refine and optimize multi-robot coordination strategies by investigating different robot formations and parameter settings. Also possibly implement different solutions, on how the formation is working together. By leveraging the ROS2 Navigation Stack, the goal is to identify configurations that improve transport efficiency, reduce operational risks, and enhance overall system performance.

Possible Research Questions:

1. **How do different robot formations impact the performance of multi-robot transport systems?** Experiment with various formations, such as line, grid, or decentralized patterns, to assess their effects on efficiency and navigation.
2. **What are the optimal parameter settings for path planning and obstacle avoidance in different multi-robot scenarios?** Explore and fine-tune parameters such as velocity, acceleration, and sensor thresholds to find configurations that maximize performance.
3. **How do varying numbers and types of robots affect system behavior and outcomes?** Investigate the impact of different robot types (e.g., differential drive vs. omnidirectional) and quantities on system coordination and efficiency.



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Requirements:

- Programming Knowledge in Python and C++