MOBILE ROBOT PATH PLANNING

Assignment

Autonomous mobile robots (AMRs) are the modern and smarter brother of the Automated Guided Vehicles. Both are vehicles that can be used to automate transportation in warehouses. Many types of hardware designs exists, with many different types of steering concepts. Apart from a car-like steering concept, differential drive is a popular concept that allows in-place turning. Other concepts can even move sideways (= 'crabbing'). In this assignment, we do path planning (which physical path to take) and trajectory generation (which velocity at each point along the path) for multiple steering concepts to assess the impact of the steering concept on the warehouse throughput. An optimal balance between speed/throughput and use of floorspace (including safety margins) needs to be found.

Internship overview

- Master Student
- Internship and/or Graduation
- Mathware
- Location: Eindhoven

Technologies

- Autonomous Mobile Robots
- (Non-holonomic) Path planning
- Trajectory generation
- Mathematical Optimization

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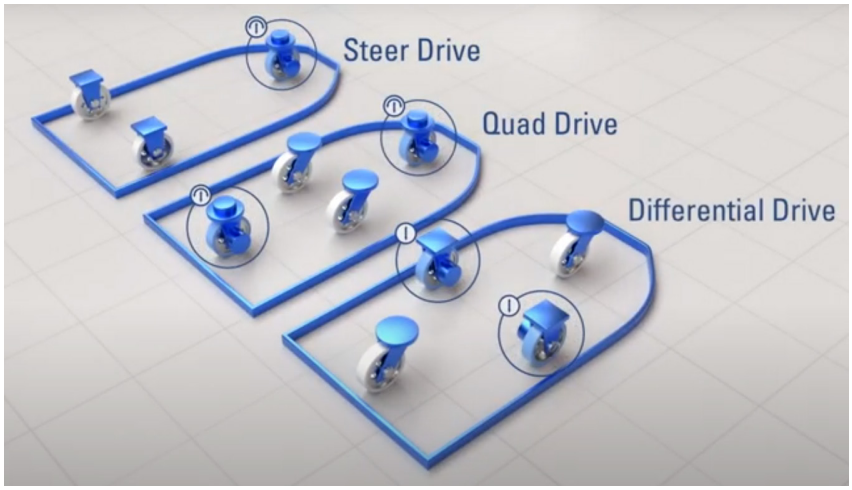
Activities

The student is to implement models for several steering concepts. Consequently, per steering concept and for a selection of typical AMR maneuvers, path planning and trajectory are to be performed as optimization problems that optimize the throughput/floor space balance.
The steering concepts need to be evaluated and compared .The implementation language is free to choose, but good candidates are MATLAB, Python or C++ with ROS.

Context

Some features that need to be accounted for are velocity and acceleration limits of the carts, the friction with the floor, the safety bubble for emergency stopping, known/unknown loads that the cart might be carrying etc.



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Get in touch!
Would you like to know more about this student assignment?

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