ECHORD++

The European Coordination Hub for Open Robotics Development

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Brief Experiment Description

- Target: Generation of safe trajectories for Autonomously Guided Vehicles
- Working environment: automated warehouses
- Paths are predefined

Trajectories can only be modified by acting on the velocity reference

- Requirements:
  - Safety: emergency stops must be guaranteed
  - Efficiency: minimum time transients compatible with the kinematic and the dynamic constraints
- Challenge:

Velocity references must be planned in real time by considering variable bounds

Novelty/Objectives

- Target:

Optimal velocity planner able to manage the safety issues and to increase the plant efficiency: a variable velocity is assumed along each path segment

- Novelty: safety is directly accounted for during the velocity planning phase

Problems

- Obstacle positions are unknown and traffic conditions continuously change, so that velocity functions are planned in real-time
- Velocity constraints are not constant along the path. They depend on:
  - Path shape
  - Vehicle load and load dimensions
  - Shape and dimensions of the safety areas

Impact

- **Scientific:** currently the literature does not cover the proposed topic
- **Economic (end-users):** trajectories will be time-optimal, customers will experiment increased performances
- **Economic (end-users):** trajectories will be smooth, customers will experiment reduced maintenance costs
- **Economic (manufacturer):** a new product required by the market means increased sales
- Knowledge transfer between University and Industry
- Training of experienced technicians which may prosecute the research activity

MORE IMPORTANT

All mentioned results will be achieved by guaranteeing an elevated safety standard