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Title: Analysis of environmental influences on robot localization accuracy using simulation data

The accuracy of indoor localization systems is crucial for different logistical tasks such as the navigation of Autonomous Mobile Robots (AMRs) and safer operation of autonomous and conventional forklifts. However, the localization of the vehicle can be affected by various environmental influences, such as changes in topology, obstacles, reflections and atmospheric conditions. Within the scope of the thesis, a simulation environment is to be developed to investigate and quantify environmental influences on localization accuracy.

Task definition:

- **Development of a simulation environment:** Design and implementation of a simulation environment that makes it possible to simulate and vary different environmental influences on localization accuracy.
- **Carrying out experiments:** Use of the developed simulation environment to perform targeted experiments investigating the effects of environmental influences on localization accuracy.
- **Data evaluation and analysis:** Collecting and analyzing data from the experiments to draw conclusions about the effects of environmental influences.

Requirements:

- Students of engineering or computer science
- Interest in mobile robots, localization technologies and simulation
- Good programming skills