

Bachelor Thesis / Master Thesis

Simulation in Mobile Robotics: Investigation of an Industrial Compost Turner

Subject and Motivation

In our current research project, we are working on the development of an autonomous compost turner (see Figure 1). Although several research activities have been published on this topic, there is still much to be done in the field of research. Currently, we are using advanced simulation environments such as Gazebo/ROS and NVIDIA Isaac Sim. Thus, expensive but highly effective LIDAR sensors are used, but investigations into potential image-based solutions and more affordable LIDAR alternatives are underway.



Figure 1: Compost turner on an industrial composting plant. Before testing our technology on the prototype, we use simulation tools to verify our approaches.

Research Topics

Depending on your interest and expertise, various topics are available for the thesis. The focus of the thesis may include the following topics.

Simulation and alternative sensor solutions: Utilizing high-performance simulation environments such as NVIDIA Isaac Sim to test and validate alternative solutions to current LIDAR technology before deploying them in the actual prototype. Possible alternative solutions include:

- Stereo camera systems
- Vision-based object detection
- budget-friendly LIDAR options
- Alternative Solutions

In addition, there are numerous opportunities in the broader area of simulation, including:

Additional Simulation Capabilities: Perform simulations using CAD (Computer-Aided Design), CAE (Computer-Aided Engineering), multi-body simulation, and system simulation.

Contact

If you are interested in this topic, please contact me at cichocki@tugraz.at. We will find an exciting topic for your thesis which suits your personal interests.

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