DEPARTMENT HEAD

MSc Thesis Task Description

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Drone Localization in Ad hoc Indoor Environment

A prerequisite for future expansion of mobile robots is the ability to navigate autonomously and safely in their ever-changing environment without collision. The positioning of drones in ad hoc indoor environment where no infrastructure is available is needed to fulfill this prerequisite.

The student's task is to develop a positioning system by placing stationary LIDAR sensors on a drone, to collect range measurements of its environment and use a SLAM algorithm to find the current position. The position and orientation of these sensors is fixed relative to the drone's frame and scanning of the drone's environment is done by orientation changes that happen due to the natural motion during flights.

Tasks to be performed by the student will include:

- Find similar LIDAR based positioning solutions and get familiar with different SLAM algorithms.
- Experiment with the specific sensor available at the department and get to know its capabilities and limitations.
- Design the system for 3D positioning including the sensor placement on the drone.
- Verify your design in simulated environments. Collect data in Gazebo and use this data for SLAM processing. Try multiple designs for placement of sensors and number of sensors to find the optimal solution.
- Build the most optimal design on a Quadcopter. Do measurements and compare the results to a reference position from another source.
- Create a detailed documentation.

Supervisor at the department: Dr. Gábor Fehér, associate professor

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/ Dr. Gábor Magyar /
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