Sebastian Mai

Integrating Ranging Sensors into Finken Robots

Bachelor Thesis

Integrating Ranging Sensors into Finken Robots

Author: Sebastian Mai   Your Term   The Year

Professor: Your Professor

Tutor: Your Tutor

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

1 Prior Art

1.1 Finken Robots

The Finken project aims to create a swarm of autonomously flying quadro-copters to research swarm intelligence beheaviour on robots. Many algorithems in swarm intelligence are based on distance-values. For this reason it is necessary to find a sensor that is capable to measure distances and integrate it into the Finken robots.

The Finken-robots are already existing and of course it is necessary to know wich kind of hardware on the robots could interfere with the ranging sensors that shall be integrated into those robots. It is also important to note that weight and size of the sensore nodes are important factors to the usability in our robots.

IMU
: Inertial Measurement Unit with accelerometer, magnetometer and barometer

Sonar Sensors
: Sonar sensors to measure distances of the nearest object in four directions (front, back, left, right)

IR-Sensor
: Sensor to measure distance to ground with high frequency

Optical Flow
: Optical flow sensor, that can be integrated to measure x-y-velocity over ground

Motors
: Four brushless motors that may cause RF-interfercene and noise

Telemetry
: BTLE-/Zigbee modules to exchange data with the ground station

RC-Control
: 2.4GHz based Radio Control to manually control the robots

Power-Supply
: Lithium polymer batteries with nominally 6.6V output voltage that is converted to 5V and 3.3V by the power distribution hardware

1.2 Evaluation of Existing Ranging Solutions