



Robotics and Embedded Systems

Master/Bachelor Thesis

State Estimation for Snake Robot based on Extended Kalman Filter



Motivation

The advantage of a snake-like robot imitating the locomotion of real snakes is that it can move well in unstructured environments, like narrow pipes, rough or soft ground, and even in water. Hence, it is significant to make the snake wisely, for example, recognizing environment and learn how to optimize the locomotion. Therefore, it is necessary to estimate the robot's state in uncertain area. By fusing data from IMU sensors, there will be an opportunity to estimate the snake state.

Task

You will participate in the development of a snake-like robot. Your main job will be online implementing the control algorithm by using Arduino Due, including robot state estimation with IMU sensor data, WIFI communication between Arduino and PC. Therefore, knowledge of C++ or C is very helpful. Knowledge about Arduino and electronics will fit this thesis in a perfect way.

This work is in English.

Arrangement

Learn coding knowledge about Arduino Due and implement the existed algorithm online. Connecting the Arduino Due and the PC via WIFI and realize data exchange. Using IMU sensors to estimate the robot state based on EKF (Extended Kalman filter).

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