MEEN 689 – Robotic Perception
Term Project- Proposal

Topic

Comparison of Linear and Non-Linear Least Square with Extended Kalman Filters for Mobile Robot Localization

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Abstract

Navigating in unfamiliar indoor and outdoor locations is difficult for mobile robots unless they can localize themselves in the first place. For a single robot, various sensors such as Camera, GPS, IMU, LIDAR, etc help the robot localize. However, each sensor is associated with noise in the measurements we observe in real world. The noise each sensor receives is specific to the sensor type which can be estimated prior to usage by calibrating the sensors. Since same parameters (such as position and velocity) can be estimated with multiple sensors, a combination of sensors is well suited to reduce the noise in the measurements and get better estimates. Kalman Filters are well known for combining measurements from different sensors and fusing them to produce parameter estimates. Least Square is yet another technique that is fairly popular amongst the community. In the current project we try to compare both these techniques for localization of mobile robots using real-world and simulation data.