

MEEN 689: State Estimation using an IMU, a GPS and an Infrared sensor

Summary

The aim of this project is to combine the data of local state coming from IMU, GPS and Sonar sensor to estimate the position of the system. Generally, a GPS and an IMU is enough for estimating the state or the position of the system with minimal error but this is true outdoor where GPS measurements are very accurate. When a system like a mobile robot is running in a building, the values of the state coming from GPS are not that accurate and thus the state cannot be estimated properly for moving the robot. Thus, in this project we aim to combine Sonar sensor with the IMU and a GPS system to accurately estimate the position of the system in both indoors and outdoors. A Sonar gives the distance of the system from an object that is in front of it. This can be used to estimate the position of the system with respect to that object.

To carryout the project in real world, we are planning to buy standard sensors and then mount them on a small car. As we move the around, we will be calculating the readings from all these sensor's and then will use Kalman Filter, Bayes Filter, EKF or particle filter to combine these readings from different sensors. We plan to use each of these filters and then test which of them works the best for our system to get most accurate values.