Hamilton Institute

Kalman Filtering approach for Localisation in RobotSoccer

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Abstract:
Autonomous robots can be used in a wide range of applications, for example as a worker in a factory or for rescue missions in dangerous situations. To fulfill the different tasks the robot has to know its own position. This problem is well known as the self localisation problem and there are numerous algorithms for solving this problem. The most common approaches are the particle filter, which is based on Bayesian filtering, and the Kalman filter. In this thesis the self localisation problem is investigated on a RoboCup soccer player. RoboCup is an international competition, in which teams from all around the world compete with each other. The RoboCup competition is divided into different leagues, where one of them is the RoboCupSoccer - Standard Platform League. In this league robots play in a soccer match against each other, where all the teams are obliged to use the same hardware. At the moment the hardware used is a humanoid robot, called Nao, produced by Aldebaran. Our team, Robo Eireann, participates since 2000 in this league. Therefore the aim of this thesis is to improve the existing localisation, an unscented Kalman filter. To do so the filter is combined with approaches called Covariance Intersection and Cox's algorithm. The developed algorithms are tested in a Matlab simulation, on real collected data, while the robot is standing, and on the robot itself. The tests on the real robot are performed in a way that the robot has to walk to a specific position on the field. As soon as the robot thinks it is at the correct position, the error to the real position is measured. We show the advantages and disadvantages of these new filters and give ideas of how to further improve them.

Venue: Seminar Room, Hamilton Institute, Science Building, NUI Maynooth

Time: 10.00am - 10.30am

Travel directions are available at www.hamilton.ie

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