

Point-based Multi-agent Localization in Symmetric Soccer Field

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MOTIVATION

Localization is one of essential issues for biped robots particularly in the RoboCup SPL competitions and facilitates proper performance of these robots in various field conditions. In case of symmetric field, this could be accessible with employing communication between agents and sharing moving objects data. This description focuses on demonstrating a simple and applicable procedure for localization to avoid wrong decision making during the game.

DESCRIPTION

Several teams in Standard Platform League have been implemented and tested localization in symmetric field i.e. similar goal posts. They employed popular Kalman Filter based and probabilistic approaches (MCL) which show the ability of both categories to cope with this issue. Furthermore, Moving objects in soccer field such as ball and other Naos (including team-mates and opponents) play a key role for robot to make the decision whether my position or direction is wrong or right?

There are two main methods currently being adopted in this description into the localization task on biped robots. One implementing global ball data which facilitates more accurate estimation of robot position and the other is obstacles or other Naos data. By using global ball data and sharing the sign of its position in x-direction (along field's length) each robot can decide about correctness of its own pose. In more sophisticated way, each robot can match its team-mates position with detected team-mates and assign positive or negative points to other team mates. By collecting this information continuously during the game, it can be possible for each robot to modify its pose or direction. Moreover, in this step learning method can be introduced to allocate weighted positive or negative points and specify the reliability of each agent data instead of static weighting.

Further works needs to be done to develop and complete presented approach in various scenarios in field to increase performance of the method.

DEMONSTRATION

We plan to demonstrate the point-based multi-agent localization for the Open Challenge of RoboCup 2012 SPL with various circumstances.