Optimizing particle filter parameters for self-localization.

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Summary: Particle filter-based approaches have proven to be capable of efficiently solving the self-localization problem in RoboCup scenarios and are therefore applied by many participating teams. Nevertheless, they require a proper parametrization – for sensor models and dynamic models as well as for the configuration of the algorithm – to operate reliably. In this paper, we present an approach for optimizing all relevant parameters by using the Particle Swarm Optimization algorithm. The approach has been applied to the self-localization component of a Standard Platform League team and shown to be capable of finding a parameter set that leads to more precise position estimates than the previously used hand-tuned parametrization.

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