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# Modeling a Sensor to Improve its Efficacy

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Robots rely on sensors to provide them with information about their surroundings. However, high-quality sensors can be extremely expensive and cost-prohibitive. Thus many robotic systems must make due with lower-quality sensors. Here we demonstrate via a case study how modeling a sensor can improve its efficacy when employed within a Bayesian inferential framework. As a test bed we employ a robotic arm that is designed to autonomously take its own measurements using an inexpensive LEGO light sensor to estimate the position and radius of a white circle on a black field. The light sensor integrates the light arriving from a spatially distributed region within its field of view weighted by its Spatial Sensitivity Function (SSF). We demonstrate that by incorporating an accurate model of the light sensor SSF into the likelihood function of a Bayesian inference engine, an autonomous system can make improved inferences about its surroundings. The method presented here is data-based, fairly general, and made with plug-and play in mind so that it could be implemented in similar problems.

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