Probabilistic Robotics
PRRO6Y, Fall 2017
Book Assignment 2.8.1
Assigned: Tuesday September 5;
Due: Thursday September 7, 13:00 in the afternoon

September 5, 2017

A robot uses a range sensor that can measure ranges from $0m$ to $3m$. For simplicity, assume that actual ranges are distributed uniformly in this interval. Unfortunatelly, the sensor can be faulty. When the sensor is faulty, it constantly outputs a range below $1m$, regardless of the actual range in the sensor's measurement cone. We know that the prior probability for a sensor to be faulty is $p = 0.01$.

Suppose the robot queried its sensor N times, and every single time the measurement value is below $1m$. What is the posterior probability of a sensor fault, for $N = 1, 2, \ldots, 10$? Formulate the corresponding probabilistic model.

Hint: Evidence is build up when the sensor is queried, so the normalizer in Bayes rule can't be ignored.

Hand-In

This assignment doesn't have to be handin, it will be discussed in class.

This assignment will not be graded. This assignment is intended to revitalize your understanding of conditional probabilities.