Research Paper Summaries

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**LQG-MP: Optimized Path Planning for Robots with Motion Uncertainty and Imperfect State Information**

The main topic of this research is to present LQG-MP(linear-quadratic Gaussian motion planning), a new approach to robot motion planning that takes into account the sensors and the controller that will be used during execution of the robot’s path (Although I don’t have any knowledge about linear algebra nor Artificial Intelligence yet, I am particularly interested in learning Artificial Intelligence in my Computer Science Career so this was enough to keep me interested). This research apparently uses RRT-algorithm to run tests. RRT algorithm stands for “Rapidly exploring Random Tree, an algorithm designed to efficiently search nonconvex, high-dimensional spaces by randomly building a space-filling tree.” The authors of this research interestingly points out about the fundamental ideas behind robots choosing the best path. They state that every motion that robots have to take comes with uncertainties that are heavily influenced by “safety” and “accuracy”. The challenge that this research attempted was to specifically quantify this amount of uncertainty and see what they can do with it. After series of tests, they have verified that their new approach LQG-MP precisely characterizes the a-priori probability distributions (probability used in distinguishing the ways in which values for probabilities can be obtained), which ultimately increases the probability of a successful execution compared to uncertainty-unaware planners. Overall, there were so many esoteric words or formulas that I had no idea until I looked them up online. But the research paper was very professionally organized and I was see the glimpse of real-life usage of probabilities in machines.

Source Cited:

<http://www.cs.berkeley.edu/~pabbeel/papers/vandenBergAbbeelGoldberg_RSS2010.pdf>

<http://en.wikipedia.org/wiki/A_priori_probability>

http://en.wikipedia.org/wiki/Rapidly\_exploring\_random\_tree