Comments on Approximate Planning in the Probabilistic-Planning-as-Stochastic-Satisfiability Paradigm

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First, a brief description of the commentator's interpretation and understanding of this paper. It describes a methodology for bounding non-deterministic problems. It appears this is done by solving for deterministic states and then using those solutions to "limit" the extent of the non-deterministic states to be considered, thus making the "whole problem" easier to solve by raising it to a higher probability of being knowable. Optimization of a resulting sequence is not a requirement on this tool.

The first question would be about where in an uplink process this tool would be useful? As with any planning tool it can be of value during early planning phases but has any thought been given to other types of uplink tasks it may be used for? Would this type of technology be used primarily on the ground by a flight team or could it be used as part of a spacecraft's onboard flight software, perhaps in responding to faults encountered during flight?

Some discussion is provided about the performance of the algorithm but it really only consists of comparisons and general discussion. There is a need for data that could provide a more quantitative assessment? For instance, a sequence of activities consisting of N activities with an average of M commands per activity and with a total duration of T days required X minutes (or hours) to run to completion and the resulting sequence satisfied some percentage Y of the requirements levied on it. It would be useful to see even some quick and dirty quantitative analysis of performance. The comparisons to other similar tools is valuable but it's actual numbers that help a user understand the product. Also, if it takes the program longer to run to completion than the duration of the sequence it's trying to build then it's of questionable value as a useful tool during the later stages of sequence development.

Because this is a technical paper about an extremely technical topic, it contained a great deal of jargon, much of which is specialized jargon. Though this is a method for accurately expressing the concepts contained in the paper, it also makes the work difficult to understand by those not intimately familiar with the specific technical field. The commentator had to work at not becoming lost in the words and the notation. It is suggested that the authors consider "wordsmithing" some of the text to make it more readable (and, hence, more meaningful) to someone who doesn't necessarily have this type of technical background. This should be especially considered for a few of the most important concepts and techniques. Doing so would make the paper more "intellectually available" to a wider audience.

The commentator's experience dictates that any tool used as a planner for sequencing a spacecraft must provide the ability to override its decisions while maintaining its internal fidelity. This ability to override is useful when a flight team needs to force things to be done differently than a tool would do it because they're responding to an anomaly or, more likely, some user demands that their activity be performed in a manner or at a time that the planner thinks is wrong. Maybe the deviation from the standard rules is a one-shot-deal or maybe it's in response to some special circumstances that suddenly arose ("Oh, oh, there's a supernova happening right now over there in the sky and we have to violate this pointing constraint and go look at it"). The paper did not address this issue. Therefore, some level of flexibility should be made available with this tool? The way spacecraft operations are done today and are being planned for the future makes flexibility a requirement on any planning tool.