Title: Diagnosis of Multi-Robot Coordination Failures Using Distributed CSP Algorithms

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Evaluation of distributed social algorithms implemented to coordinate agents between their assigned roles of leader and followers. Agents communicate possible obstacles that will impede current direction, and all agents within the group are given this new information and use it to maintain consistency with the addition of or removal of a constraint. Finding out the computational trade off between time and the communication required to establish consistency between all or conflicted agents. The authors presented 3 algorithms to work within the CSP, Synchronous backtracking, Asynchronous Backtracking and Distributed Stochastic Search Algorithm. Each algorithm was implemented into the agents with each experiment varying the number of agents used, first using physical models and when the number of agents required increased, switched over to a popular simulation tool for robotics. Performance variables that were gathered is the number of messages sent to another agent and then the runtime for each algorithm given the number of agents. There were two points where the paper mentioned out of scope results, the continual local fault evaluation where it the agents would not use the STOP action despite being "stuck" and contrasting results between Asynchronous backtracking and stochastic local search of another paper.

While the number of test can warrant an establishing point for data to be based on, they only tested up to 30 times for each algorithm and the test environment should have mentioned being static or at least the domain size was at least expanded upon.

References

Elmaliach, M. K. (2006). Diagnosis of Multi-Robot Coordination Failures. *ASSOCIATION FOR THE ADVANCEMENT OF ARTIFICIAL INTELLIGENCE*, 970-975.