GRADUATE STUDENT RESEARCH SEMINAR SERIES (2020)

A DISTRIBUTED TASK AND MOTION PLANNING FOR MULTI-ROBOT SYSTEMS WITH TEMPORAL LOGIC CONSTRAINTS

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This presentation shows an automatic task and motion planning framework for multi-robot systems (MRS) to achieve a complex task based on the automaton theory. Given a set of temporal logic formulae described task specifications for an MRS, an automaton based iterative task decomposition framework is developed thus generate the largest amount of parallel performable subtasks. These parallel subtasks are then assigned into each robot inside the MRS team by considering the costs (or rewards) of completing every single task as well as the overall system concurrency. The robot-task assignment, i.e., task plan, satisfies both the temporal logic constraints of tasks and optimality of robot task performing. Symbolic motion planning (SMP) is conducted for each individual robot based on the task plan in a discretized environment. Task redecomposition and motion replanning are triggered in a distributed manner to update the task plan and robot paths among neighboring robots.

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