We present a computational framework for automatic synthesis of control communication strategies for a robotic team from task specifications given as regular expressions about servicing requests in an environment.

Our approach is based on two main ideas. First, we extend recent results from formal synthesis of distributed systems to check for the distributability of the task specification and to generate local specifications, while accounting for the service and communication capabilities of the robots. Second, by using a technique inspired from LTL model checking, we generate individual control and communication strategies.

**Approach**

Distributability: find a service plan for each robot such that the global behaviors of the team satisfy the global specification.

Implementability: find a service plan for each robot such that the service plan can be implemented given the motion constraints of the corresponding robot.

**Experimental Results**

(1) Our Robotic Urban-Like Environment has a collection of roads, intersections, and parking lots.

(2) Global Specification:

   "Service L4 and then L5, then first service L1 and L2, in an arbitrary order, then L2, and finally both L1 and L3, in an arbitrary order."

   M: (L4,L5) + (L1,L5) + (L1,L2, L3) + (L2,L3) + (L3,L1)

(3) Distribution of the requests

   | Robot 1: | L5L1L3 | Robot 2: | L2L3L4 |

(4) Service plans:

   | Robot 1: | HILMHI | Robot 2: | HILMHI |

**References**


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