UW CENTER FOR
PATTERN ANALYSIS AND MACHINE INTELLIGENCE

GRADUATE SEMINAR SERIES

Reconfiguration in Modular Robots Using Graph-based and Random Search Methods

Speaker: Keyvan Golestan

Date: September 12, 2012

Time: 4:30 pm – 5:00 pm

Place: E5 (4128) Refreshments will be served

Abstract :

Modular robots are group of robots consist of small components called Modules, with the main ability to change their physical configuration due to particular environmental circumstances. The main problem regarding this shape-shifting behaviour is the necessary time for finding a feasible path between two configurations increases exponentially with the number of modules and their degrees of freedom. Tackling this problem, we propose a method that utilizes graph-based modeling techniques along with concepts from social networks, to propose an isomorphism invariant method for graph signature calculation. This method helps the time complexity of graph signature calculation in symmetric modules to be dropped from exponential to polynomial. Moreover, we have applied two probabilistic methods to first decrease the needed time for finding a feasible configuration path and second, to make the found path a collision-free one. Experimental results show significant enhancement in the performance of graph signature calculation algorithm.

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