Stony Brook University
The Graduate School

Doctoral Defense Announcement

Abstract

Data Distribution Equivalence for Data Intensive Interconnection Networks.

By

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This thesis considers two problems. One problem is closed-form solutions for equivalence computation of divisible workload in a mesh, toroidal and hypercube networks and the other problem is scheduling divisible workloads from multiple sources in mesh, toroidal and hypercube networks of processors.
We propose a flow matrix closed-form equation to present the equivalence, which allows a characterization of the nature of minimal time solution and a simple method to determine when and how much load to distribute for processors.   Also, we propose the use of a reduced Voronoi diagram algorithm (RVDA) to minimize the overall processing time of these workloads by taking advantage of the processor equivalence technique. Three case studies with 10 sources of workloads are presented to illustrate the general approach for multiple sources of workloads.   In the first phase, a Voronoi Manhattan distance diagram is used to obtain a network cluster division. In the second phase, we propose an efficient algorithm to obtain near-optimal load distribution among processors represented by equivalent processors. The algorithm minimizes the number of processors utilized. Experimental evaluation through simulations demonstrates that a task can be finished in the same suboptimal time and yet save over 30% of processor resources.

Date: Aug 07, 2018   **Program**: Applied Mathematics and Statistics

Time: 1:30 p.m.- 3:00 p.m.   **Dissertation Advisor**:

Esther M. Arkin

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Place: Math Building 1-122A