Heterogeneous Processing Minitrack

Yong Meng TEO and Gary Soon Huat TAN

Department of Information Systems and Computer Science
National University of Singapore
Kent Ridge, Singapore 119260
email: {teoym,gtan}@iscs.nus.sg

Heterogeneous Processing is an important topic which has recently emerged in the field of High Performance Distributed Computing and is receiving increasingly widespread attention and interest. This minitrack brings together researchers working on the topical areas of programming paradigms, load balancing and frameworks for heterogeneous environments, visualization and debugging tools, and applications.

There were eighteen (18) submissions from Australia, Austria, Canada, Germany, Italy, Japan, Singapore, Switzerland, U.S.A. and Yugoslavia. Of these, eight (8) papers have been selected for the minitrack (2 from Australia, 1 from Canada, 1 from Italy, 1 from Japan and 3 from U.S.A.). Each paper was stringently reviewed by four referees for content, quality, accuracy and relevance. They are briefly described herewith in the order of oral presentation at the conference.

In the first paper, Murthy and Krishnamurthy discuss the GAMMA programming paradigm, based on the multiset datastructure. The paper describes how this paradigm can be integrated with the entity-relationship (ER) model to structure parallel and distributed programs.

In the second paper, Poggi describes an object-based programming environment called HOMAGE for the development of multi-agent systems. In this environment, two different programming levels of object and agent are offered. The object level allows the development of agent models and systems based on two object-oriented programming languages, the agent level allows the specialization of the agent models defined at the object level for the development of real multi-agent systems through a multi-agent oriented language.

The PVM 3.4 Tracing Facility, which is an enhanced tracing facility and tracing tool for PVM (Parallel Virtual Machine), is next described by Kohl. The improved tracing facility provides more flexible and efficient access to run-time program information, and also supports a buffering mechanism to reduce the perturbation of user applications caused by tracing.

Osawa, Hisano and Yuba describe a visual performance debugging system for parallel programs in the fourth paper. This system features visualization of program execution, modification of processor scheduling using direct manipulation, simulation of execution of the modified program, and automatic modification of the source program.

The next paper is concerned with monitoring the evolution of data structures in distributed message-passing programs. Sarukkai and Beers present a methodology and tool that automatically tracks memory bindings of dynamic data structures of message-passing C programs and inter-processor data-structure movement, using PVM on distributed environments.

In the sixth paper, Chun, Moser, Melliar-Smith and Agrawal describe a communication protocol development environment based on a discrete-event simulator, which is used in testing and debugging a fault-tolerant multicase protocol operating over a network of multiple interconnected local area networks.

The seventh paper is on power minimization in heterogeneous processing. Catherine and Robert Gebotys present a new methodology and initial analysis of power in heterogeneous systems for real-time compute-intensive applications, and also minimization of latency and interprocessor communication.

The eighth and last paper of this minitrack focuses on load balancing. In this paper, Maheshwari presents a priority-based decay usage load balancing algorithm for a heterogeneous environment.

These eight papers serve as an indication of the many important and pressing issues currently faced by researchers in heterogeneous processing. We thank all authors for their support in this minitrack, and all referees for their invaluable comments and reviews, without which this minitrack would not have been a high-quality one.