Session 2: Applications

Session Chair: S. Smith

It is always a pleasure to chair this session as the diverse and wide ranging application areas to which parallel and distributed computing has been applied never fails to be of interest. The papers in this session are no exception and consider visual programming environments, the use of compact genetic algorithms and design, implementation and deployment of distributed services on the Internet.

The first paper of the session, “Visual Data-parallel Programming for Signal Processing Applications” by P. Boulet, J-L. Dekeyser, J-L. Levaire, P. Marquet and J. Soula presents a visual specification environment for multidimensional signal processing using the ARRAY-OL object-oriented language developed by Thomson Marconi Sonar. The environment includes a graphical editor, code transformer and a code generator for SMP computers. The application program can be designed by graphically arranging elementary software components from which the system generates C++ code. To illustrate the use of the environment, an example is considered which computes the energy of hydrophone signals.

The use of genetic algorithms is now becoming commonplace in a wide range of applications. In the second paper of this session, entitled “A Parallel Compact Genetic Algorithm for multi-FPGA Partitioning” by J. Hidalgo, R. Baraglia, R. Perego, J. Lanchares and F. Tiradoa, a compact genetic algorithm is presented to solve multi-FPGA partitioning problems. Both serial and parallel versions of the algorithm have been designed and implemented on a cluster of workstations. The application of the compact genetic algorithm conserves memory resources in order to address large multi-FPGA partitioning problems, while the execution time can be reduced by exploitation of parallelism. The results obtained are very promising and demonstrate that the use of compact genetic algorithms is viable for solving multiple-FPGA partitioning problems.

The final paper of the session proposes that mobile agents, and distributed objects (such as those supported by CORBA) are not necessarily competing or alternative technologies for the design, implementation and deployment of distributed services on the Internet, but can compliment each other to provide a flexible middleware. “Integrating Mobile Agent Infrastructures with CORBA-based Distributed Multimedia Applications” by Levaire, P. Marquet, J. Soula, Levaire, P. Marquet and J. Soula, considers a case study which adopts the mobile agent programming paradigm, and yet is compliant with CORBA. Results are presented for an implementation of the architecture which exhibited promising performance measures.