

The PLUS Accelerator

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Our plan is to demonstrate a workstation accelerator (called PLUS) that not only executes the current speech recognition systems in real time, but that will also support the increasing computational demands of speech recognition systems in the next several years. The accelerator will also be useful for other compute-bound applications. The accelerator will be replicated and made available to other sites.

Our approach is to connect single-processor machines of roughly the performance of high-end workstations by means of a very fast and powerful communication mechanism. This makes the memory on each node visible to every other node as if the system were a single shared-memory multiprocessor. The prototype, for example, uses 25MHz Motorola 88000 processors with up to 32 Mbytes of DRAM memory and 512 Kbytes of SRAM in each node; the interconnection is based on a MOSIS-built mesh router with 40Mbytes/sec bandwidth.

PLUS research contribution comprises new mechanisms to support shared-memory and synchronization between processors. The emphasis is on low latency and low overhead synchronization.

The PLUS prototype is interfaced to host computer systems by means of a SCSI interface, this interface can also perform speech input/output and limited signal processing. Interfacing PLUS to a host does not require any operating system change on the host.

We have completed the design of both the PLUS board and of the host interface. After fabrication is completed we expect to take about two months for debugging and then start replication. Minimal software (sufficient, for example, for running the Sphinx system) is already available.

Motivation and description of the PLUS architecture can be found in:

Bisiani, R. and Ravishankar, M.
Programming the PLUS Distributed-Memory System
Fifth Distributed Memory Computing Conference
Charleston, SC, April 1990

Bisiani, R. and Ravishankar, M.
PLUS: A Distributed Shared Memory System
17th Annual International Symposium on
Computer Architecture
Seattle, WA, May 1990

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