Synthesizing Parallel Programming Models for Asymmetric Multi-core Systems

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Asymmetric Multi-Core Systems

- ## Potential for data-intensive applications

    – Multiple dimensions of parallelism

    – Heterogeneity, application-specific accelerators

    – Ample memory bandwidth

    – Flexibility via delegating control to software

- ## Limitations

    – Programming models ignore polymorphic parallelism

    – Runtime systems ignore polymorphic parallelism

Contributions

- Polymorphic parallelism on the Cell BE

- Event-driven scheduling

  – Unification of task, data, pipeline parallel execution

  – Integration of DMA and communication parallelism

- Runtime performance prediction

  – Model of multi-grain concurrency

  – Model-driven adaptation in the runtime system

- Cell system software modules

  – EDTLP, MMGP

Results

Randomized "Axelerated" Maximum Likelihood Inferer