ESE 566: Hardware/Software Co-Design of Embedded Systems
Report 4 (Fall 2002)

Goal of the fourth report is the (A) design and (B) implementation of a hardware/software partitioning algorithm. Following specific issues must be addressed in your work:

- The targeted architecture will be among the architectures you discussed in your first report. I suggest that you consider an architecture including two processing units such as one general-purpose processor and one customized processor (DSP processor, FPGA, ASIC etc). Most of the architectures discussed in Report 1 are of this type. Multiprocessor architectures can be also considered.
- Your hardware/software partitioning method will consist of a cost function to guide the partitioning process and a partitioning algorithm.
    - In your report, please offer an intuitive explanation for the cost function you used. Can you provide other means of validating the correctness of your cost function?
    - The partitioning algorithm will rely on iterative optimization algorithms such as simulated annealing or tabu search. How can you argument the optimality of your partitioning method? Using exact optimization algorithms are also highly encouraged.
- The report must include sufficient experimental results to motivate the correctness and efficiency of your hardware/software partitioning algorithm. Use examples with different number of tasks, task execution times, interconnectivities etc to discuss your algorithms.
- Discuss the results of your hardware/software partitioning method for a case study. It is highly desirable that the case study is based on the application you specified as part of your second report. Please contact me if you decide to use another example for your case study. Your report should discuss the profiling (execution time, cost etc) you conducted for case study.
- Your report must thoroughly present your entire activity and experience with the co-design activity. Your report should follow the structure of a conference paper and not exceed 8 pages.
    - Enumerate and explain the similarities between your method and published hardware/software partitioning methods.
    - Please describe in detail the partitioning technique: cost function, algorithms, data structures etc.
    - Details the experiments you conducted.
    - Discuss the results you obtained and explain the efficiency/inefficiency of your technique.
    - Are there any advantages and limitations you identified for the method?
    - How can you further improve the methods you presented?

Due date: December 20, 8 am.