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**Tensor Computation on the High Performance Machines**

High dimensional computational problems suffer from the dimensionality curse, leading the research towards dimensionality reduction and heuristics. However, some problems deviate significantly from the optimal solution when these methods are applied. On the other hand, mapping some problems to higher dimensions increases its chances for classification usling methods like Support Vector Machines. For example, Multiple Sequence Alignments (MSA) in computational biology is optimally solved using dynamic programming algorithm. However, exponential growth in the scoring tensor limits the number and lengths of sequences to a very small number. No dimensionality reduction method can be applied to this kind of scoring problems, while other heuristic methods introduce bias in directing the scoring through to a final solution. The advances in storage technology and parallel processing through high performance computers (HPC), clusters of computers, grids, and clouds, using the peta-scale technology, offer opportunities to address the dimensionality curse with new computational methods. This work implemented a tensor partitioning scheme for parallel processing and applied it on the dynamic programming MSA.