

# Abstract

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## **Parallelizing Optimal Multiple Sequence Alignment by Dynamic Programming.**

Optimal multiple sequence alignment by dynamic programming, like many highly dimensional scientific computing problems, has failed to benefit from the improvements in computing performance brought about by multi-processor systems, due to the lack of suitable scheme to manage partitioning and dependencies. A scheme for parallel implementation of the dynamic programming multiple sequence alignment is presented, based on a peer to peer design and a multidimensional array indexing method. This design results in up to 5-fold improvement compared to a previously described master/slave design, and scales favourably with the number of processors used. This study demonstrates an approach for parallelising multi-dimensional dynamic programming and similar algorithms utilizing multi-processor architectures.