

Neural Network Enhanced Visualization of High-Dimensional Data

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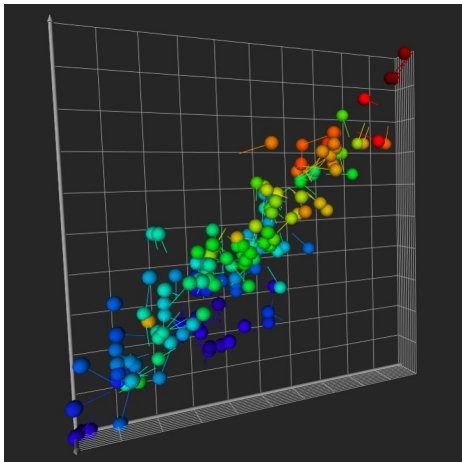
Background and Objective

Large amounts of high-dimensional data not only create the need for analysis of the data and interpretation of results, but also the need for development of tools and methods that can handle such data. Many techniques are graphical in nature with ability to represent a small number of variables at a time. Application of information visualizations using neural network techniques enhance knowledge extraction and are targeted towards complex data and provide for a very small, if any, loss of information.

Methods

The approaches are based on a self-organizing map (SOM) algorithm and are implemented in C/C++ programming language using OpenMP (shared memory) and MPI 2.0 (distributed memory) libraries for high-performance computing.

Results



(Dis)Placement of records in a neural-network augmented classic visualizations (3D scatter plot shown here) is directed by all (or a subset of) dimensional values.

Discussion and Conclusions

We present techniques that combine classic visualizations and neural-network algorithms, creating meaningful visualizations. Computational complexity of algorithms is addressed by the use of the multi-processor environment.

Theme: Biotechnology and Bioinformatics

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