ABSTRACT

Genetic Algorithms for Knowledge Discovery from Biological Data

MSU's Genetic Algorithms Research and Applications Group ("GARAGe") performs research in evolutionary computation, establishing collaborations with a variety of researchers from life sciences. The group, co-directed by Bill Punch and Erik Goodman, is jointly administered in Computer Science and the Case Center for Computer-Aided Engineering and Manufacturing. Evolutionary computation methods have been widely applied for discovering rules or regularities in noise-laden biological data, both separately and in conjunction with neural nets and/or fuzzy logic.

Some of the many projects developing genetic algorithms or genetic programming to apply to problems in biological sciences, which we will describe briefly, include:

- Ongoing collaboration with Dr. Leslie Kuhn's laboratory (in Biochemistry) in modeling of various aspects of protein structure and docking
- Classification of soil microbial samples as to origin, based on Biolog plate test results (with the Center for Microbial Ecology)
- Feature extraction and feature selection in thyroid deficiency data using masking genetic algorithms
- Improving management of prostate cancer patients through better prediction of outcomes (with Henry Ford Health Systems, Detroit)