

Autumn 2011
Instructor: B. Ross

COSC 5P71 Genetic Programming Project

Due date: End of term.

Evaluation: A 10- to 15-page paper, and relevant code and data listings.

Topics: Two basic types of topics are as follows:

1. Application: Use genetic programming to solve some application problem of your choosing. This might be a novel problem in which GP has yet to be applied. You might also try using a new approach or variation of GP towards a known problem, or even an improvement of some other researcher's approach as described in the literature. Lots of data for different real-world problems is available at the UCI Machine Learning Repository (www.ics.uci.edu/~mllearn/MLRepository.html). The results of your experiment should be described in a suitable report, which lists all the relevant parameters and results. Attention should be given to experimental methodology and analyses.

2. System: Create a new genetic programming system with some interesting features. Possibilities include:

- Koza's GP system in a language of your choice (other than Lisp). You might embellish it with some new features.
- Extend an existing GP system (lil-GP 1.1, ECJ, OpenBeagle, ...) in a useful and nontrivial way.
- Create a visualization tool for a genetic programming system. Many papers exist on techniques for visualizing runs, populations, progress, etc.
- A distributed GP system. This is similar to subpopulations, except the populations are run on different processors.
- A new GP representation, using grammars, linear chromosomes, ...

Topic decision: Please pass your topic idea to me for approval before you start work on it.

Background research: Be sure to research relevant background research to your topic. See online citation indices, journals, conferences, technical reports, etc.

Comments: The intension of the project is to give you an opportunity to be creative with ideas you have been exposed to during the course. Please keep your project idea focused and within reasonable limits. Many might use very interesting ideas and obtain impressive research results, which could be published at a research conference (although this is not an expected criteria for the project).

Grading will focus on the scientific maturity of your report. Experiment methodology should be sound and rigorous, and empirical results should be analyzed using appropriate statistical methods. New systems should be tested using appropriate experimental test cases.