

An Introduction to Evolutionary Programming

Andrea Wilcox

This paper describes evolutionary programming including the definition and a brief history of evolutionary programming. In addition, this paper examines two branches of evolutionary programming, which are genetic algorithms and genetic programming. Both of these topics are defined in this paper and illustrated with examples.

KEY WORDS: Evolutionary programming, Genetic algorithms, Genetic programming

Genetic Algorithms: A Mathematical Understanding

Kjell Sporseen

Evolutionary programming and genetic algorithms are not just for people with programming knowledge and a computer science background. In this article, we explore the connections between genetic algorithms and traditional mathematical approaches to optimization problems. We begin by comparing genetic algorithms to genetic programming. Next, genetic algorithms are placed within a mathematical context, with an emphasis on their relation to calculus-based optimization methods. Lastly, we work through a simplified example of a genetic algorithm without use of computer programming code. This article is meant to help bridge the gap between understanding a mathematics-centered approach to problem solving and the value of computer-aided techniques.

KEY WORDS: Evolutionary programming, Genetic algorithms, Optimization, Genetic programming

Genetic Programming The Poker Program

An Implementation of Genetic Programming in C++

Timothy L. Ernst

Evolutionary Programming has developed into an extraordinary subject to study in the field of Artificial Intelligence. Evolutionary Programming is the study of programs that use simulations of biological functions in order to evolve to a specified environment. Scientists have used Evolutionary Programming techniques in order to find solutions to very complex problems. These evolving programs find good solutions to these complex problems, but not perfect solutions. The perfect solutions would take even the most advanced super computer decades to figure out. Evolutionary Programming is a method for finding solutions in smaller intervals of time, because the solutions themselves evolve over time. The purpose of this paper is to explore the implementation of one of the three areas of Evolutionary Programming, Genetic Programming. Genetic Programming is a method of having actual programs evolve through the process of natural selection and genetic sexual reproduction. I tackle the implementation of this method by taking on a project to create a program that learns how to play Texas Hold'em Poker. In this article, I first talk about what my goals are for this project. I then describe the way in which I implement the Genetic Programming methods. Finally, I describe the results from the project along with the actual project code.

KEY WORDS: Evolutionary Programming, Genetic programming, Evolutionary cycle, Decision trees, Dynamic structures, Nodes
