



Genetic Algorithms with Python

By Clinton Sheppard



Genetic Algorithms with Python By Clinton Sheppard

Genetic algorithms are one of the tools you can use to apply machine learning to finding good, sometimes even optimal, solutions to problems that have billions of potential solutions. This book gives you experience making genetic algorithms work for you, using easy-to-follow example projects that you can fall back upon when learning to use other machine learning tools and techniques. Each chapter is a step-by-step tutorial that helps to build your skills at using genetic algorithms to solve problems using Python.

Python is a high-level, low ceremony and powerful language whose code can be easily understood even by entry-level programmers. If you have experience with another programming language then you should have no difficulty learning Python by induction.

Contents

- A brief introduction to genetic algorithms
- Chapter 1: Hello World!- Guess a password given the number of correct letters in the guess. Build a mutation engine.
- Chapter 2: One Max Problem- Produce an array of bits where all are 1s. Expands the engine to work with any type of gene.
- Chapter 3: Sorted Numbers- Produce a sorted integer array. Demonstrates handling multiple fitness goals and constraints between genes.
- Chapter 4: The 8 Queens Puzzle- Find safe Queen positions on an 8x8 board and then expand to NxN. Demonstrates the difference between phenotype and genotype.
- Chapter 5: Graph Coloring- Color a map of the United States using only 4 colors. Introduces standard data sets and working with files. Also introduces using rules to work with gene constraints.
- Chapter 6: Card Problem- More gene constraints. Introduces custom mutation, memetic algorithms, and the sum-of-difference technique. Also demonstrates a chromosome where the way a gene is used depends on its position in the gene array.
- Chapter 7: Knights Problem- Find the minimum number of knights required to attack all positions on a board. Introduces custom genes and gene-array creation. Also demonstrates local minimums and maximums.
- Chapter 8: Magic Squares- Find squares where all the rows, columns and both diagonals of an NxN matrix have the same sum. Introduces simulated

- annealing.
- Chapter 9: Knapsack Problem- Optimize the content of a container for one or more variables. Introduces branch and bound and variable length chromosomes.
 - Chapter 10: Solving Linear Equations- Find the solutions to linear equations with 2, 3 and 4 unknowns. Branch and bound variation. Reinforces genotype flexibility.
 - Chapter 11: Generating Sudoku- A guided exercise in generating Sudoku puzzles.
 - Chapter 12: Traveling Salesman Problem (TSP)- Find the optimal route to visit cities. Introduces crossover and a pool of parents.
 - Chapter 13: Approximating Pi- Find the two 10-bit numbers whose dividend is closest to Pi. Introduces using one genetic algorithm to tune another.
 - Chapter 14: Equation Generation- Find the shortest equation that produces a specific result using addition, subtraction, multiplication, etc. Introduces symbolic genetic programming.
 - Chapter 15: The Lawnmower Problem- Generate a series of instructions that cause a lawnmower to cut a field of grass. Genetic programming with control structures, objects and automatically defined functions (ADFs).
 - Chapter 16: Logic Circuits- Generate circuits that behave like basic gates, gate combinations and finally a 2-bit adder. Introduces tree nodes and hill climbing.
 - Chapter 17: Regular Expressions- Find regular expressions that match wanted strings. Introduces chromosome repair and growth control.
 - Chapter 18: Tic-tac-toe- Create rules for playing the game without losing. Introduces tournament selection.

 [Download Genetic Algorithms with Python ...pdf](#)

 [Read Online Genetic Algorithms with Python ...pdf](#)

Genetic Algorithms with Python

By Clinton Sheppard

Genetic Algorithms with Python By Clinton Sheppard

Genetic algorithms are one of the tools you can use to apply machine learning to finding good, sometimes even optimal, solutions to problems that have billions of potential solutions. This book gives you experience making genetic algorithms work for you, using easy-to-follow example projects that you can fall back upon when learning to use other machine learning tools and techniques. Each chapter is a step-by-step tutorial that helps to build your skills at using genetic algorithms to solve problems using Python.

Python is a high-level, low ceremony and powerful language whose code can be easily understood even by entry-level programmers. If you have experience with another programming language then you should have no difficulty learning Python by induction.

Contents

- A brief introduction to genetic algorithms
- Chapter 1: Hello World!- Guess a password given the number of correct letters in the guess. Build a mutation engine.
- Chapter 2: One Max Problem- Produce an array of bits where all are 1s. Expands the engine to work with any type of gene.
- Chapter 3: Sorted Numbers- Produce a sorted integer array. Demonstrates handling multiple fitness goals and constraints between genes.
- Chapter 4: The 8 Queens Puzzle- Find safe Queen positions on an 8x8 board and then expand to NxN. Demonstrates the difference between phenotype and genotype.
- Chapter 5: Graph Coloring- Color a map of the United States using only 4 colors. Introduces standard data sets and working with files. Also introduces using rules to work with gene constraints.
- Chapter 6: Card Problem- More gene constraints. Introduces custom mutation, memetic algorithms, and the sum-of-difference technique. Also demonstrates a chromosome where the way a gene is used depends on its position in the gene array.
- Chapter 7: Knights Problem- Find the minimum number of knights required to attack all positions on a board. Introduces custom genes and gene-array creation. Also demonstrates local minimums and maximums.
- Chapter 8: Magic Squares- Find squares where all the rows, columns and both diagonals of an NxN matrix have the same sum. Introduces simulated annealing.
- Chapter 9: Knapsack Problem- Optimize the content of a container for one or more variables. Introduces branch and bound and variable length chromosomes.
- Chapter 10: Solving Linear Equations- Find the solutions to linear equations with 2, 3 and 4 unknowns. Branch and bound variation. Reinforces genotype flexibility.
- Chapter 11: Generating Sudoku- A guided exercise in generating Sudoku puzzles.
- Chapter 12: Traveling Salesman Problem (TSP)- Find the optimal route to visit cities. Introduces crossover and a pool of parents.
- Chapter 13: Approximating Pi- Find the two 10-bit numbers whose dividend is closest to Pi. Introduces using one genetic algorithm to tune another.
- Chapter 14: Equation Generation- Find the shortest equation that produces a specific result using addition,

subtraction, multiplication, etc. Introduces symbolic genetic programming.

- Chapter 15: The Lawnmower Problem- Generate a series of instructions that cause a lawnmower to cut a field of grass. Genetic programming with control structures, objects and automatically defined functions (ADFs).
- Chapter 16: Logic Circuits- Generate circuits that behave like basic gates, gate combinations and finally a 2-bit adder. Introduces tree nodes and hill climbing.
- Chapter 17: Regular Expressions- Find regular expressions that match wanted strings. Introduces chromosome repair and growth control.
- Chapter 18: Tic-tac-toe- Create rules for playing the game without losing. Introduces tournament selection.

Genetic Algorithms with Python By Clinton Sheppard Bibliography

- Rank: #394378 in Books
- Brand: Clinton Sheppard
- Published on: 2016-04-29
- Original language: English
- Dimensions: 9.69" h x 1.20" w x 7.44" l,
- Binding: Paperback
- 530 pages

 [Download Genetic Algorithms with Python ...pdf](#)

 [Read Online Genetic Algorithms with Python ...pdf](#)

Download and Read Free Online Genetic Algorithms with Python By Clinton Sheppard

Editorial Review

From the Back Cover

Get a hands-on introduction to machine learning with genetic algorithms using Python. Step-by-step tutorials build your skills from Hello World! to optimizing one genetic algorithm with another, and finally genetic programming; thus preparing you to apply genetic algorithms to problems in your own field of expertise.

About the Author

I am a polyglot programmer with more than 15 years of professional programming experience. When learning a new programming language, I start with a familiar problem and try to learn enough of the new language to solve it. For me, an engine for solving genetic algorithms is that familiar problem. Why? For one thing, it is a project where I can explore interesting puzzles, and where even a child's game like Tic-tac-toe can be viewed on a whole new level. Also, I can select increasingly complex puzzles to drive evolution in the capabilities of the engine. This allows me to discover the expressiveness of the language, the power of its tool chain, and the size of its development community as I work through the idiosyncrasies of the language.

Users Review

From reader reviews:

Judith Mandel:

Book is actually written, printed, or descriptive for everything. You can learn everything you want by a book. Book has a different type. As it is known to us that book is important point to bring us around the world. Next to that you can your reading expertise was fluently. A book Genetic Algorithms with Python will make you to always be smarter. You can feel more confidence if you can know about anything. But some of you think this open or reading some sort of book make you bored. It isn't make you fun. Why they might be thought like that? Have you searching for best book or ideal book with you?

Melissa Becker:

This Genetic Algorithms with Python usually are reliable for you who want to become a successful person, why. The main reason of this Genetic Algorithms with Python can be one of the great books you must have is actually giving you more than just simple looking at food but feed you actually with information that possibly will shock your before knowledge. This book is handy, you can bring it everywhere and whenever your conditions at e-book and printed people. Beside that this Genetic Algorithms with Python giving you an enormous of experience like rich vocabulary, giving you trial of critical thinking that we understand it useful in your day activity. So , let's have it appreciate reading.

Fred Nelson:

Is it you who having spare time then spend it whole day by watching television programs or just lying on the bed? Do you need something new? This Genetic Algorithms with Python can be the response, oh how

comes? A book you know. You are therefore out of date, spending your spare time by reading in this new era is common not a nerd activity. So what these guides have than the others?

Mattie Priest:

Reading a book make you to get more knowledge as a result. You can take knowledge and information from your book. Book is created or printed or created from each source which filled update of news. With this modern era like today, many ways to get information are available for you. From media social including newspaper, magazines, science guide, encyclopedia, reference book, story and comic. You can add your understanding by that book. Do you want to spend your spare time to open your book? Or just seeking the Genetic Algorithms with Python when you essential it?

**Download and Read Online Genetic Algorithms with Python By
Clinton Sheppard #7YCWDX56F90**

Read Genetic Algorithms with Python By Clinton Sheppard for online ebook

Genetic Algorithms with Python By Clinton Sheppard Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Genetic Algorithms with Python By Clinton Sheppard books to read online.

Online Genetic Algorithms with Python By Clinton Sheppard ebook PDF download

Genetic Algorithms with Python By Clinton Sheppard Doc

Genetic Algorithms with Python By Clinton Sheppard Mobipocket

Genetic Algorithms with Python By Clinton Sheppard EPub