Robo-maze Blast Report

Dogà Sara

Widmann Lukas

Askar Sami

Abstract

Bomberman + Evolutionary algorithmens + Tournament Arc goes brr

ACM Reference Format:

1 Introduction

1.1 The game

Robo Maze Blast, created in 2008 by Kai Ritterbusch and Christian Lins, is a clone of the Bomberman game. Also known as Dynablaster, it is a strategy maze-based video game franchise originally developed by Hudson Soft in 1985.

The general goal of Bomberman is to complete the levels by strategically placing bombs in order to kill enemies and destroy blocks. Some blocks in the path can be destroyed by placing bombs near it, and as the bombs detonate, they will create a burst of vertical and horizontal lines of flames. Except for indestructible blocks, contact with the blast will destroy anything on the screen.

1.2 Our Goal

The aim of our project is to explore the efficiency of different Genetic Algorithms to develop 3 agents with strategic competence in the Robo Maze Blast scope, and to compare them by making the agents fight against each other and observe which agent outlives the others more frequently.

2 Background

2.1 Genetic Algorithms

Genetic Algorithms (GA) are optimization algorithms inspired by the process of natural selection and biological evolution. They are widely used to solve complex optimization and search problems in various domains.

The core steps of a typical genetic algorithm can be described as follows:

- **Population Base**: Initialize a population from valid chromosomes, i.e. a set of strings that encodes any possible solution. Usually, the initial population is chosen randomly.
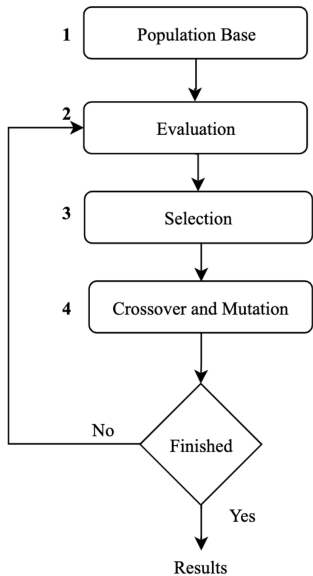
Figure 1: A diagram on the steps of a genetic algorithm

- **Evaluation**: Each population solution is evaluated on the basis of a predetermined fitness function.
- **Selection**: Reproductive opportunities are allocated to the chromosomes that represent a better solution to the target problem, and such solutions are selected to form a 'mating pool' for the next generation.
- **Crossover and Mutation**: The selected individuals are then combined to produce offspring by exchanging genetic material. Sometimes small changes can happen in the genetic material, such as bit flips. All of this ensures good exploration of the solution space and diversity.

These steps are repeated for a number of times until an ending criterion is reached.

2.2 Robo Maze Blast's Default AI Agent

3 Agent 1

Agent 1

3.1 Differential Evolution

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Item	Quantity
Widgets	42
Gadgets	13

Table 1: An example table.

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3.2 How to add Tables

Use the table and tabular environments for basic tables — see Table 1, for example. For more information, please see this help article on tables.

4 Supervised Learning with Jenetics

4.1 Introduction

My objective was to create an AI player based on a GA using human game-play data. Due to constrained optimization (e.g., state / action

of the game), I found Genetic Algorithms to be a perfect choice for this task [**?**] . For this, I chose the Jenetics library.

4.2 How to add Citations and a References List

You can simply upload a `.bib` file containing your BibTeX entries, created with a tool such as JabRef. You can then cite entries from it, like this: [Gre93]. Just remember to specify a bibliography style, as well as the filename of the `.bib`. You can find a video tutorial here to learn more about BibTeX.

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4.3 Good luck!

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References

[Gre93] George D. Greenwade. The Comprehensive Tex Archive Network (CTAN). *TUGBoat*, 14(3):342–351, 1993.