trAIner - an Artificial Intelligence Game

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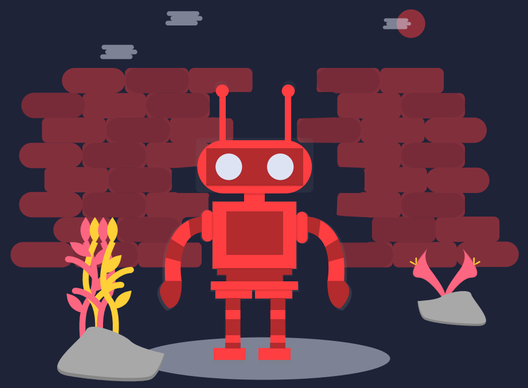
Features

- **Build your own maps**
- **Play the maps yourself**
- **Understand the complex nature of AI**
- **Experiment with hyperparameters**

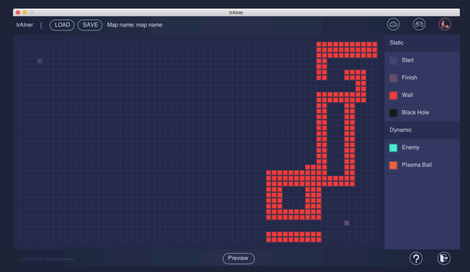


Introduction

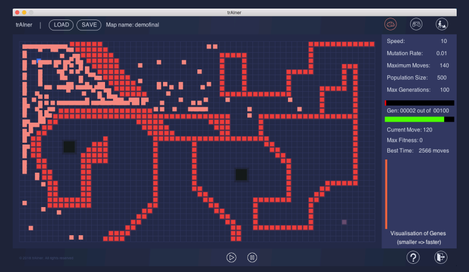
trAIner is an absorbing, immersive game experience that lets the player develop and train his own AI on his own pre built maps, providing long term satisfaction and steadily increasing the players knowledge of how its AI learns and operates. It also allows the player to built his own maps and test them by playing on it.

trAIner is a singleplayer cross-platform game written in Java, and thus can be played on any system or browser supporting Java.

For training the AI a genetic algorithm is used which is gradually developed by the player. In the map builder the user builds his own maps in a sandbox-style fashion.



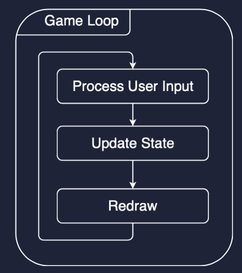
Map building mode



AI mode

Architecture

- Game loop
- Double buffer
- Type object



Requirements

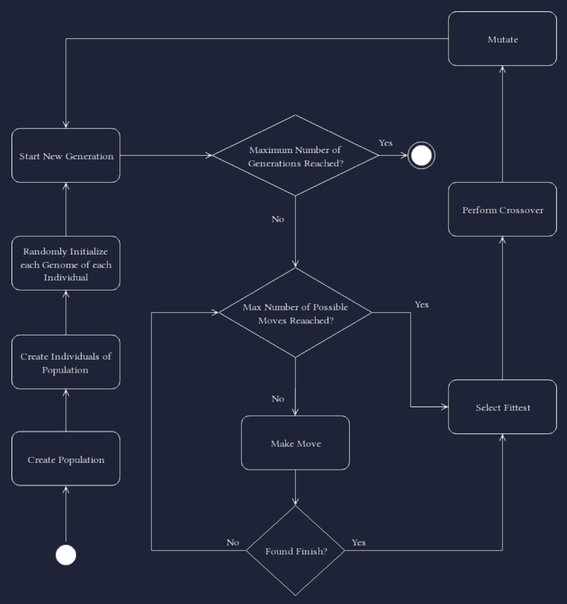
Technical Constraints:

Programming Language	Java
Supported Platform	All platforms supporting Java
Budget	750 hours
Scope	A.I. based system
Schedule	04.10.2018 - 24.01.2019

Non Functional Constraints:

Portability	Each Java capable device can run the game
Usability	User friendly and long-term satisfacting game
Cost	Minimal installation and setup efforts

Genetic Algorithm



Pseudocode

```
GeneticAlgorithm():
    initialize population
    determinte fitness of population
    while(termination criteria is reached):
        select parents
        perform crossover with crossover probability pc
        mutate with mutation probability pm
        transform solution from genotype to phenotype space
        select survivors
        find best
    return best
```

Conclusion/Future work

Confusion and misrepresentation of AI in the media and in the public as well as a lack of comprehension on how machines and algorithms learn seems to scare the general public away from taking interest in artifical intelligence. Games like "trAIner" could be a gateway to introduce the general public to the concept of machine learning and maybe even to encourage some players to study AI more in-depth.

Future work:

- Scoreboard
- Reusing pre-trained AI
- Reinforcement learning