



FAKULTÄT FÜR
INFORMATIK

Computational Intelligence in Games

Emergence

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Agenda

- Dummy
- Dummy
- Dummy
- Dummy
- Dummy

Stay Alive Agent

Stay Alive by using

- the `advance()` method multiple times
- the grid observation
- a combination of that approaches



Figure : Advancing safe actions

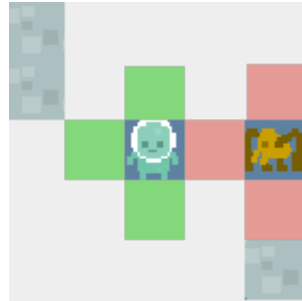


Figure : Grid search for safe actions

Heuristic Agent

- Heuristic for selecting the next best step (including the Stay Alive Strategy)
- Target is found by using an Explorer that is searching for the point of interests
- An Environment class builds up the knowledge base and safes blocking, loosing, scoring and winning objects
- A* Algorithm is used to reached the good classified objects

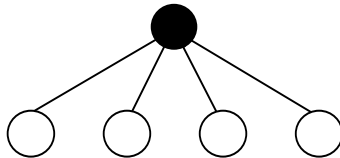


Figure : Search tree for the greedy approach

Heuristic Agent II

$$\text{dist}(u, v) = |x_1 - x_2| + |y_1 - y_2| \quad (1)$$

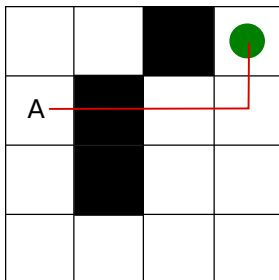


Figure : Manhattan distance for two dimensions

MCTS

- Dummy

MCTS Agent

- Dummy

MCTS Agent II

- Dummy

EA

EA Agent

DeltaScoreEvaluation function

$$s = \sum_{t=0}^n (H(s_t) - H(s_{t-1}))$$

is calculated by using the function

$$H(s_i, s_{i-1}) = \begin{cases} 10, & \text{if isWinner} \\ -10, & \text{if isLooser} \\ \text{score}(s_i) - \text{score}(s_{i-1}), & \text{otherwise.} \end{cases}$$

EA Agent II

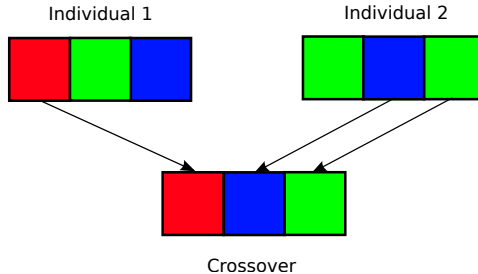


Figure : Crossover of an individual

EA Agent III

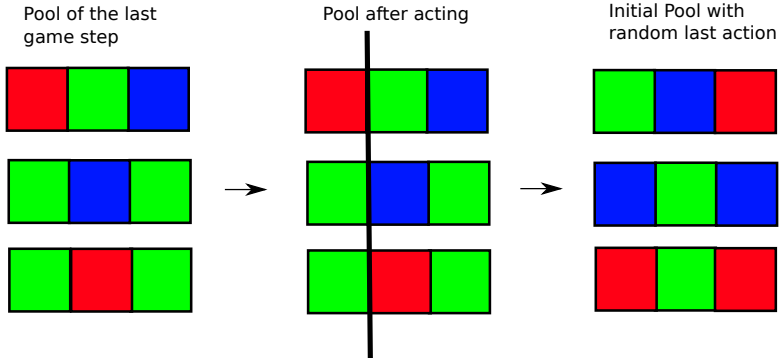


Figure : Sliding Window

Experiment Result

- Comparison among each approach to be fair (1000 games, one game 50 times, 10 times each level)
- Evaluation of the best of each algorithm (3000 games, one game 150 times, 30 times each level)

CPU	Intel i5-4210U @ 1.70Ghz
Memory	8 GB DDR3 L
Operating System	Ubuntu 14.04.1 LTS
Java Version	1.7.0_65

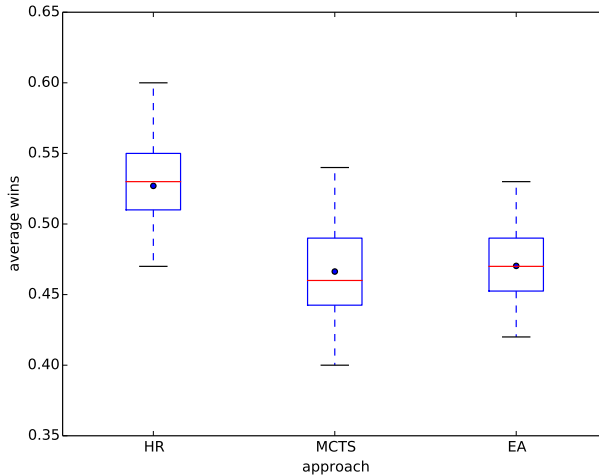
Table : experiment setup

Experiment Result II

Approach	Avg Wins	Std Wins	Avg Score	Std Score	Avg time steps	Std time steps
HR	0.527	0.029	165.05	59.51	695.86	36.17
MCTS	0.467	0.034	230.69	74.64	942.06	34.00
EA	0.470	0.026	178.33	51.85	818.72	38.47

Table : results of all algorithms

Experiment Result III



Development Process

- Dummy

Main Problems Difficulties

- Dummy

Conclusion & Future Work

- Dummy

Thank you for your attention!